IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of: Marcos C. Tzannes	)	Group Art Unit:
Application No.:	)	Examiner:
Filed: Herewith	)	Confirmation No.:
Atty. File No.: 6936-57-PUS-CON-3	)	

For: PACKET RETRANSMISSION AND MEMORY SHARING

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

PRELIMINARY AMENDMENT

Dear Sir:

Prior to the initial review of the above-identified patent application by the Examiner, please enter the following Preliminary Amendment. Although Applicants do not believe that any fees are due based upon the filing of this Preliminary Amendment, please charge any such fees to Deposit Account 19-1970.

Please amend the above-identified patent application as follows:

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are shown in the listing of claims which begin on page 3 of this paper.

Remarks begin on page 5 of this paper.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 1 of 739

AMENDMENTS TO THE SPECIFICATION

Submitted herewith is a marked-up and clean version of a substitute specification. No new matter is believed to have been added therein.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 2 of 739

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Original) A method of packet retransmission comprising:

transmitting or receiving a plurality of packets;

identifying at least one packet of the plurality of packets as a packet that should not be retransmitted.

2. (Original) The method of claim 1, wherein the packet is any grouping of bytes.

3. (Original) The method of claim 1, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

4. (Original) The method of claim 1, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

5. (Original) The method of claim 4, wherein the identifying step comprises using a special value for a sequence identifier (SID).

6. (Original) The method of claim 4, wherein the appended bit field comprises a dedicated CRC.

7. (Original) The method of claim 1, wherein the at least one packet is not stored for retransmission.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 3 of 739

8. (Original) The method of claim 1, wherein the at least one packet is passed immediately to a high layer.

9-105. (Cancelled)

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 4 of 739

REMARKS/ARGUMENTS

By this amendment, claims 9-105 are canceled without prejudice or disclaimer.

Applicant requests examination on the merits.

Applicant believes that the pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

The Commissioner is hereby authorized to charge to Deposit Account No. 19-1970 any fees under 37 C.F.R. §§ 1.16 and 1.17 that may be required by this paper and to credit any overpayment to that Account. If any extension of time is required in connection with the filing of this paper and has not been separately requested, such extension is hereby Petitioned.

Respectfully submitted,

SHERIDAN ROSS P.C.

By: _____

Jason H. Vick
Registration No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202-5141
(303) 863-9700

Date: 20 Jan '19

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 5 of 739

PACKET RETRANSMISSION AND MEMORY SHARING

RELATED APPLICATION DATA

[0001] This application claims the benefit of and priority under 35 U.S.C. § 119(e) to U.S. Patent Application Nos. 60/792,236, filed April 12, 2006, entitled "xDSL Packet Retransmission Mechanism," and 60/849,650, filed October 5, 2006, entitled "xDSL Packet Retransmission Mechanism with Examples," which are both incorporated herein by reference in their entirety.

BACKGROUND

Field of the Invention

[0002] This invention generally relates to communication systems. More specifically, an exemplary embodiment of this invention relates to retransmission of packets in a communication environment. An exemplary embodiment of this invention also relates to memory sharing between transmission functions and other transceiver functions.

SUMMARY

[0003] Exemplary aspects of the invention relate to handling of packets and the assignment of a packet handling identifier. Exemplary aspects relate to sharing of resources between retransmitted packets and other transceiver functions. In addition, exemplary aspects relate to sharing of resources between packets associated with the packet handling identifier and other transceiver functions.

[0004] More specifically, aspects of the invention relate to assigning a packet handling identifier to one or more packets. Based on the packet handling identifier, a packet can either be, for example, forwarded directly to another communication device (or layer) or, alternatively, held for possible retransmission protocols. For example, packets received from,

for example, a higher-layer of a communication device, can be designated to have a specific packet handling identifier, such as a Quality of Service (QOS) level. The QOS level of a packet indicates the importance of certain service metrics (or characteristics) of one or more packets.

[0005] Two exemplary QOS metrics are delay (or latency) and Packet Error Rate (PER). While these two metrics are used for illustrative purposes herein, it should be appreciated that other metrics can also be used with this invention. For example, other QOS metrics could include one or more of a Bit Error Rate (BER), data rate, delay variation (or jitter), packet loss rate, time between error events (TBE), or the like.

[0006] As an example, in the case where the two QOS metrics are latency and PER, packets containing, for example, video information (such as IPTV) may have the requirement for a very low packet error rate but can often tolerate higher delay. In contrast, voice or data (e.g., gaming) traffic may have very low latency requirements but can tolerate a higher packet error rate. For this particular example, the video packets could be designated as "low-PER" QOS packets and the voice or data packets could be designated as "low-latency" QOS packets. For example, a specific QOS identifier could be assigned to the low-latency packets while a different QOS identifier could be assigned to the low-PER packets. The low-latency packets could be forwarded directly to another transceiver, or a higher layer, while the low-PER packets can be stored in a retransmission buffer, e.g., memory, that can be used to reduce packet error.

[0007] As mentioned above, exemplary aspects also relate to sharing of resources between a retransmission function and other transceiver functions.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 7 of 739

[0008] The exemplary systems and methods of this invention can utilize memory, such as a retransmission buffer, for the storing of packets for retransmission functions. Since other transceiver functions may also require memory to perform certain functionality, an exemplary aspect of this invention also relates to sharing the memory for retransmission functions with the memory required for other transceiver functions. For example, memory can be dynamically allocated based on configuration settings or noise conditions and, for example, the memory divided between one or more of interleaving/deinterleaving, RS Coding/Decoding functionality and the functionality used retransmission.

[0009] Aspects of the invention thus relate to identification of one or more packets.

[0010] Additional aspects of the invention relate to identifying one or more packets that can be retransmitted.

[0011] Still further aspects of the invention relate to identifying one or more packets that should not be retransmitted.

[0012] Aspects of the invention also relate to retransmission of one or more of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-data frame, a PTM-TC codeword, and RS codeword and a DMT symbols.

[0013] Still further aspects of the invention relate to appending an identifier to a packet.

[0014] Still further aspects of the invention relate to appending a sequence identifier to at

least one packet.

[0015] Aspects of the invention also relate to routing one or more packets based on a packet handling identifier.

[0016] Aspects of the invention also relate to retransmitting a packet.

[0017] Aspects of the invention further relate to retransmit a packet based on a retransmission request.

[0018] Still further aspects of the invention relate to sharing memory between a retransmission function and one or more of an interleaver, deinterleaver, coder, decoder and other transceiver functionalities.

[0019] Other more specific aspects of the invention relate to sharing memory between a retransmission buffer (or memory) and interleaving/deinterleaving and/or coding/decoding functionality.

[0020] Additional exemplary, non-limiting aspects of the invention are:

1. A method of packet retransmission comprising:

transmitting or receiving a plurality of packets;

identifying at least one packet of the plurality of packets as a packet that should not be retransmitted.

2. The method of aspect 1, wherein the packet is any grouping of bytes.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 9 of 739

3. The method of aspect 1, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

4. The method of aspect 1, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

5. The method of aspect 4, wherein the identifying step comprises using a special value for a sequence identifier (SID).

6. The method of aspect 4, wherein the appended bit field comprises a dedicated CRC.

7. The method of aspect 1, wherein the at least one packet is not stored for retransmission.

8. The method of aspect 1, wherein the at least one packet is passed immediately to a high layer.

9. A packet retransmission module capable of transmitting or receiving a plurality of packets and capable of identifying at least one packet of the plurality of packets as a packet that should not be retransmitted.

10. The module of aspect 9, wherein the packet is any grouping of bytes.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 10 of 739

11. The module of aspect 9, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

12. The module of aspect 9, wherein the module is capable of appending a bit field comprising a sequence identifier (SID) to each packet.

13. The module of aspect 12, wherein the identifying comprises using a special value for the SID.

14. The module of aspect 12, wherein the appended bit field comprises a dedicated CRC.

15. The module of aspect 9, wherein the at least one packet is not stored by the module for retransmission.

16. The module of aspect 9, wherein the at least one packet is passed by the module immediately to a high layer.

17. The module of aspect 9, wherein the module is implemented in one or more of a wireless transceiver, a wireless LAN station, a wired transceiver, a DSL modem, an ADSL modem, an xDSL modem, a VDSL modem, a multicarrier transceiver, a general purpose computer, a special purpose computer, a programmed microprocessor, a microcontroller and

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 11 of 739

peripheral integrated circuit element(s), an ASIC, a digital signal processor, a hard-wired electronic or logic circuit and a programmable logic device.

18. The module of aspect 9, wherein the module is implemented in one or more of a PTM-TC, ATM-TC, PMD and PMS-TC.

19. A method comprising sharing memory between an interleaving and/or deinterleaving memory and a packet retransmission memory.

20. A method comprising allocating a first portion of shared memory for retransmission and a second portion of the shared memory for interleaving and/or deinterleaving.

21. The method of aspect 20, further comprising transmitting or receiving a message indicating how to allocate the shared memory.

22. The method of aspect 19 or 20, further comprising transmitting or receiving a message indicating how to share the memory.

23. A memory capable of being shared between an interleaving and/or deinterleaving buffer and a packet retransmission buffer.

24. A module capable of allocating a first portion of shared memory for retransmission and a second portion of the shared memory for interleaving and/or deinterleaving.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 12 of 739

25. The module of aspect 24, wherein the module is capable of transmitting or receiving a message indicating how to allocate the shared memory.

26. The module of aspect 24, wherein the module is capable of transmitting or receiving a message indicating how to share the memory.

27. The module of aspect 24, wherein the module is one or more of a wireless transceiver, a wireless LAN station, a wired transceiver, a DSL modem, an ADSL modem, an xDSL modem, a VDSL modem, a multicarrier transceiver, a general purpose computer, a special purpose computer, a programmed microprocessor, a microcontroller and peripheral integrated circuit element(s), an ASIC, a digital signal processor, a hard-wired electronic or logic circuit and a programmable logic device.

28. A method of packet retransmission comprising:

transmitting or receiving a plurality of packets;

identifying at least one packet of the plurality of packets as a packet that should be retransmitted and at least one packet of the plurality of packets as a packet that should not be retransmitted.

29. The method of aspect 28, wherein the packet is any grouping of bytes.

30. The method of aspect 28, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 13 of 739

31. The method of aspect 28, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

32. The method of aspect 31, wherein the identifying step comprises using a special value for a sequence identifier (SID).

33. The method of aspect 31, wherein the appended bit field comprises a dedicated CRC.

34. The method of aspect 28, wherein at least one packet is stored for retransmission.

35. The method of aspect 28, wherein at least one packet is passed immediately to a high layer.

36. A packet handling method comprising:

receiving a stream of packets;

identifying a first number of packets in the stream of packets as low-latency packets;

identifying a second number of packets in the stream of packets as low-error packets;

forwarding the low-latency and low-error packets to a transceiver or a higher layer; and

storing the low-error packets for error correction.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 14 of 739

37. The method of aspect 36, further comprising appending the low-error packets with an identifier.

38. A method of allocating memory in a transceiver comprising:

analyzing one or more communication parameters;

identifying a memory allocation; and

allocating memory based on the memory allocation to a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding.

39. A memory sharing method in a transceiver comprising:

receiving a memory allocation;

establishing a shared memory for one or more of interleaving, deinterleaving, RS coding, RS decoding and packet retransmission functions; and

sharing the shared memory between a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding functions.

40. The method of aspect 39, further comprising determining a compatibility of the memory allocation.

41. The method of aspect 39, wherein the compatibility of the memory allocation is based on channel performance metrics.

42. Means for performing the functionality of any of the aforementioned aspects.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 15 of 739

43. An information storage media comprising information that when executed performs the functionality of any of the aforementioned aspects.

44. Any one or more of the features as substantially described herein.

45. Means for packet retransmission comprising:

means for transmitting or receiving a plurality of packets;

means for identifying at least one packet of the plurality of packets as a packet that should not be retransmitted.

46. The means of aspect 45, wherein the packet is any grouping of bytes.

47. The means of aspect 45, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

48. The means of aspect 45, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

49. The means of aspect 48, wherein the means for identifying comprises using a special value for a sequence identifier (SID).

50. The means of aspect 48, wherein the appended bit field comprises a dedicated CRC.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 16 of 739

51. The means of aspect 45, wherein the at least one packet is not stored for retransmission.

52. The means of aspect 45, wherein the at least one packet is passed immediately to a high layer.

53. Means for sharing memory between an interleaving and/or deinterleaving function and a packet retransmission function.

54. Means for allocating a first portion of shared memory for retransmission and a second portion of the shared memory for interleaving and/or deinterleaving.

55. The means of aspect 54, further comprising means for transmitting or receiving a message indicating how to allocate the shared memory.

56. The means of aspect 54, further comprising means for transmitting or receiving a message indicating how to share the memory.

57. Means for sharing a memory between an interleaving and/or deinterleaving function and a packet retransmission function.

58. Means for packet retransmission comprising:

means for transmitting or receiving a plurality of packets;

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 17 of 739

means for identifying at least one packet of the plurality of packets as a packet that should be retransmitted and at least one packet of the plurality of packets as a packet that should not be retransmitted.

59. The means of aspect 58, wherein the packet is any grouping of bytes.

60. The means of aspect 58, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

61. The means of aspect 58, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

62. The means of aspect 61, wherein the means for identifying comprises using a special value for the sequence identifier (SID).

63. The means of aspect 58, wherein the appended bit field comprises a dedicated CRC.

64. The means of aspect 58, wherein at least one packet is stored for retransmission.

65. The means of aspect 58, wherein at least one packet is passed immediately to a high layer.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 18 of 739

66. A packet handling means comprising:

means for receiving a stream of packets;

means for identifying a first number of packets in the stream of packets as low-latency packets;

means for identifying a second number of packets in the stream of packets as low-error packets;

means for forwarding the low-latency and low-error packets to a transceiver or higher layer; and

means for storing the low-error packets for error correction.

67. The means of aspect 66, further comprising means for appending the low-error packets with an identifier.

68. Means for allocating memory in a transceiver comprising:

means for analyzing one or more communication parameters;

means for identifying a memory allocation; and

means for allocating memory based on the memory allocation to a retransmission function and one or more of an interleaving, deinterleaving, RS coding and RS decoding function.

69. Means for memory sharing in a transceiver comprising:

means for receiving a memory allocation;

means for establishing a shared memory for one or more of interleaving, deinterleaving, RS coding, RS decoding and packet retransmission function; and

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 19 of 739

means for sharing the shared memory between a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding functionality.

70. The means of aspect 69, further comprising means for determining a compatibility of the memory allocation.

71. The means of aspect 69, wherein the compatibility of the memory allocation is based on channel performance metrics.

72. A transceiver capable of performing packet retransmission comprising:

a transmission management module configurable to transmit or receive a plurality of packets; and

a QOS module configurable to identify at least one packet of the plurality of packets as a packet that should not be retransmitted.

73. The transceiver of aspect 72, wherein the packet is any grouping of bytes.

74. The transceiver of aspect 72, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

75. The transceiver of aspect 72, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 20 of 739

76. The transceiver of aspect 75, wherein the QOS module uses a special value for a sequence identifier (SID).

77. The transceiver of aspect 75, wherein the appended bit field comprises a dedicated CRC.

78. The transceiver of aspect 72, wherein the at least one packet is not stored for retransmission.

79. The transceiver of aspect 72, wherein the at least one packet is passed immediately to a high layer.

80. A memory capable of being shared between interleaving and/or deinterleaving and packet retransmission.

81. A memory management module capable of allocating a first portion of shared memory for retransmission and capable of allocating a second portion of the shared memory to one or more of interleaving and deinterleaving functionality.

82. The module of aspect 81, further comprising a module for transmitting or receiving a message indicating how to allocate the shared memory.

83. The module of aspect 81, further comprising a module for transmitting or receiving a message indicating how to share the memory.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 21 of 739

84. A module capable of being shared between interleaving and/or deinterleaving and packet retransmission.

85. A transceiver capable of performing packet retransmission comprising:

a transmission management module configurable to transmit or receive a plurality of packets; and

a QOS module configurable to identify at least one packet of the plurality of packets as a packet that should be retransmitted and at least one packet of the plurality of packets as a packet that should not be retransmitted.

86. The transceiver of aspect 85, wherein the packet is any grouping of bytes.

87. The transceiver of aspect 85, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

88. The transceiver of aspect 85, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

89. The transceiver of aspect 88, wherein the identifying step comprises using a special value for a sequence identifier (SID).

90. The transceiver of aspect 88, wherein the appended bit field comprises a dedicated CRC.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 22 of 739

91. The transceiver of aspect 85, wherein at least one packet is stored for retransmission.

92. The transceiver of aspect 85, wherein at least one packet is passed immediately to a high layer.

93. A transceiver capable of handling a stream of packets comprising:

a QOS module capable of identifying a first number of packets in the stream of packets as low-latency packets and a second number of packets in the stream of packets as low-error packets;

a transmission management module capable of forwarding the low-latency and low-error packets to another transceiver; and

a buffer module capable of storing the low-error packets for error correction.

94. The transceiver of aspect 93, further comprising a packet QOS assignment module capable of appending the low-error packets with an identifier.

95. A transceiver capable of having an allocatable memory comprising:

a controller capable of analyzing one or more communication parameters; and

a memory management module capable of identifying a memory allocation and allocating a shared memory based on the memory allocation to a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding functions.

96. A transceiver capable of sharing memory comprising:

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 23 of 739

a controller capable of receiving a memory allocation; and

a memory management module capable of establishing a shared memory for a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding functions.

97. The transceiver aspect 96, wherein the memory management module further determines a compatibility of the memory allocation.

98. The transceiver of aspect 96, wherein the memory allocation is based on one or more communication channel performance metrics.

99. In a communication environment where packets are being transmitted, a method for allocating a first portion of shared memory for retransmission of packets and a second portion of the shared memory for interleaving and/or deinterleaving.

100. The method of aspect 99, wherein all errored packets are retransmitted.

101. The method of aspects 19, 20 and 99, wherein a retransmission function identifies packets that should not be retransmitted.

102. The method of aspect 99, wherein all packets are being transmitted without an assigned a QOS level.

103. A packet communication method comprising:

in a first mode of operation:

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 24 of 739

transmitting or receiving a plurality of packets;

identifying at least one packet of the plurality of packets as a packet that should not be retransmitted;

in a second mode of operation:

transmitting or receiving a plurality of packets;

allocating a first portion of shared memory for retransmission of packets and a second portion of the shared memory for one or more of interleaving, deinterleaving, coding, decoding and error correction; and

in a third mode of operation:

transmitting or receiving a plurality of packets;

identifying at least one packet of the plurality of packets as a retransmittable-type packet;

identifying at least one packet of the plurality of packets as a non-retransmittable-type packet;

allocating a first portion of shared memory for retransmission of the retransmittable-type packets and a second portion of the shared memory for one or more of interleaving, deinterleaving, coding, decoding and error correction.

104. The method of aspect 103, wherein the retransmittable-type packet is a low-latency packet.

105. The method of aspect 103, wherein the retransmittable-type packet is a low-error packet.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 25 of 739

[0021] These and other features and advantages of this invention are described in, or are apparent from, the following detailed description of the exemplary embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] The exemplary embodiments of the invention will be described in detail, with reference to the following figures wherein:

[0023] Fig. 1 illustrates an exemplary communication system according this invention.

[0024] Figure 2 is a flowchart outlining an exemplary method for packet retransmission according this invention.

[0025] Figure 3 is a flowchart outlining an exemplary method for retransmitted packet reception according this invention.

[0026] Figure 4 is a flowchart outlining an exemplary method for memory allocation according to this invention.

[0027] Figure 5 is a flowchart outlining an exemplary method for memory sharing according this invention.

DETAILED DESCRIPTION

[0028] The exemplary embodiments of this invention will be described in relation to

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 26 of 739

packet retransmission and/or memory sharing in an xDSL environment. However, it should be appreciated, that in general, the systems and methods of this invention will work equally well for any type of communication system in any environment.

[0029] The exemplary systems and methods of this invention will also be described in relation to multicarrier modems, such as xDSL modems and VDSL modems, and associated communication hardware, software and communication channels. However, to avoid unnecessarily obscuring the present invention, the following description omits well-known structures and devices that may be shown in block diagram form or otherwise summarized.

[0030] For purposes of explanation, numerous details are set forth in order to provide a thorough understanding of the present invention. It should be appreciated however that the present invention may be practiced in a variety of ways beyond the specific details set forth herein.

[0031] Furthermore, while the exemplary embodiments illustrated herein show the various components of the system collocated, it is to be appreciated that the various components of the system can be located at distant portions of a distributed network, such as a communications network and/or the Internet, or within a dedicated secure, unsecured and/or encrypted system. Thus, it should be appreciated that the components of the system can be combined into one or more devices, such as a modem, or collocated on a particular node of a distributed network, such as a telecommunications network. As will be appreciated from the following description, and for reasons of computational efficiency, the components of the system can be arranged at any location within a distributed network without affecting the operation of the system. For example, the various components can be located in a Central Office modem (CO, ATU-C, VTU-O), a Customer Premises modem (CPE, ATU-R, VTU-R),

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 27 of 739

an xDSL management device, or some combination thereof. Similarly, one or more functional portions of the system could be distributed between a modem and an associated computing device.

[0032] Furthermore, it should be appreciated that the various links, including communications channel 10, connecting the elements (not shown) can be wired or wireless links, or any combination thereof, or any other known or later developed element(s) that is capable of supplying and/or communicating data to and from the connected elements. The term module as used herein can refer to any known or later developed hardware, software, firmware, or combination thereof that is capable of performing the functionality associated with that element. The terms determine, calculate and compute, and variations thereof, as used herein are used interchangeably and include any type of methodology, process, mathematical operation or technique. Transmitting modem and Transmitting transceiver as well as Receiving modem and Receiving transceiver are used interchangeably herein.

[0033] Moreover, while some of the exemplary embodiments described herein are directed toward a transmitter portion of a transceiver performing interleaving and/or coding on transmitted information, it should be appreciated that a corresponding deinterleaving and/or decoding is performed by a receiving portion of a transceiver. Thus, while perhaps not specifically illustrated in every example, this disclosure is intended to include this corresponding functionality in both the same transceiver and/or another transceiver.

[0034] Communication system 100 comprises a portion of a transceiver 200 and a portion of a transceiver 300. The transceiver 200, in addition to well known componentry, comprises an errored packet module 210, a transmission management module 220, a QOS ID module

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 28 of 739

225, a QOS module 230, a packet QOS assignment module 240, a retransmission buffer/interleaving/deinterleaving/RS coding/RS Decoding memory 250, a counter module 260, a memory management module 27D and a controller/memory 280.

[0035] Connected via communication channel 10 to transceiver 200 is transceiver 300. The transceiver 300, in addition to well known componentry, comprises an errored packet module 310, a transmission management module 320, a QOS ID module 325, a QOS module 330, a packet QOS assignment module 340, a retransmission buffer/interleaving/deinterleaving/RS coding/RS Decoding memory 350, a counter module 360, a memory management module 370 and a controller/memory 380.

[0036] As discussed above, the systems, methods and protocols discussed herein will be described in relation to xDSL systems, such as those specified in ADSL2 ITU-T G.993.2, ADSL2+ ITU G.993.5, and VDSL2 ITU G.993.2, which are incorporated herein by reference in their entirety.

[0037] In operation, a first aspect of the invention relates to retransmission of one or more packets, the retransmission identifier being implemented at any transmission layer where packet boundaries are defined. For example, it can be implemented in the Packet Transmission Mode TC (PTM-TC) of xDSL systems. For reference, "Annex A" which is of record in the identified provisional filing and incorporated by reference herein contains the PTM-TC of ADSL2 and VDSL2 systems as specified in the ITU-T G.992.3 ADSL2 standard.

[0038] As discussed herein, the invention will generally be described in relation to the retransmission mechanism being incorporated as part of the PTM-TC however, it should be

appreciated that it can also be implemented inside other layer(s) of a communication device, such as an xDSL transceiver, such as within the PMD or PMS-TC.

[0039] The retransmission techniques disclosed herein can also be performed at a layer above the PTM-TC, for example, in a new layer between the PTM-TC and the next higher layer, or at any layer above the physical layer, e.g., layers 2, 3, 4, 5, etc.

[0040] Additionally, while "packet" is used herein, the term "packet" includes any basic data unit, i.e., a grouping of bytes. For example, a packet could be an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data frame, a PTM-TC codeword, an RS Codeword, a DMT symbol, or, in general, any grouping of data bytes or information. A packet could also be a combination of one or more of the above. For example, a packet could be constructed by concatenating any number of ATM cells to create a larger grouping of bits. For example, five 53-byte ATM cells could be combined into a 265 byte packet or four 65 PTM-TC codewords could be combined into a 260 byte packet. A packet could also be based on dividing any of the above groupings of bytes. For example, larger IP or Ethernet packets could be divided into smaller groups of bytes to be used as a "packet" with the retransmission functionality described herein. For example, a 150 byte IP packet could be divided into three 500 byte packets and used by the retransmission protocol. If the retransmission function is implemented as part of the PTM-TC, packets are received from a higher-layer in the xDSL transmitter PTM-TC and sent via the xDSL transmitter PMS-TC and PMD over the communication channel to the xDSL receiver. The xDSL receiver PMD and PMS-TC process the received signal and pass the results to the PTM-TC, which processes the information and passes the received packet up to a higher layer(s).

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 30 of 739

[0041] Packets received from the higher layer at the xDSL transmitter PTM-TC can be designated to have a QOS level. The QOS level of a packet can indicate the importance of certain service metrics (or characteristics) of this (or more) packet(s). Two exemplary QOS metrics are delay (or latency) and PER. Although, as discussed above, these two characteristics are the focus of the invention, any number of different QOS metrics could also be used.

[0042] As an example, in the case where the 2 QOS metrics are latency and PER, a first set of packets carrying certain information may have a requirement for very low PER but may be able to tolerate higher delay. Other packets containing information such as voice or data traffic may have very low delay requirements but can tolerate a higher PER. According to an exemplary embodiment of this invention, the first set of packets would be designated as "low-PER" QOS packets whereas voice or data packets would be designated at "low-latency" QOS packets. The QOS level (or metric) of a packet could be designated in a number of ways. For example:

i) Certain bit fields in the header of data portions of each packet could contain certain values that specify the QOS requirements a packet. For example, the packet header could contain bit fields that indicate if the packet has a "low-PER" QOS requirement or a "low-latency" QOS requirement. These fields could be read by the transmitting modem and/or receiving modem to determine the QOS level of each packet.

ii) When sending packets from higher layer to the PTM-TC, the higher layer could indicate on a packet by packet basis the QOS requirements of each packet. For example, there could be a separate signal on the interface that indicates if a packet being transferred has a "low-PER" QOS requirement or a "low-latency" QOS requirement.

iii) When sending packets from higher layer to the PTM-TC, there could be a

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 31 of 739

separate interface (or channel) for packets with different QOS requirements. For example, one channel could be used to transfer packets that have a "low-PER" QOS requirement and a second channel could used to transfer packets that have a "low-latency" QOS requirement. This general concept could also be scaled to accommodate a plurality of different QOS requirements and a plurality of channels.

iv) As in the case of Pre-Emption in the PTM-TC (see Annex A), two logically separated γ-interfaces could be used for the transport of a low-PER and low-latency packet flow through a single bearer channel. This general idea could then be scaled to support any number of packet types.

[0043] Other mechanisms can also be used to designate the QOS level of a packet – provided the transmitter and/or receiver retransmission protocol is capable of knowing the QOS level for one or more packets.

[0044] Once the QOS level is known by the PTM-TCs, an efficient packet retransmission can be designed. The exemplary packet retransmission methods and protocols can be designed to include any one or more of the following system level characteristics:

- All packets are received from the higher layer and passed to the higher layers in the correct order.
- "Low-latency" QOS packets will not incur any extra delay due to retransmission.
- Only packets with "low-PER" QOS should be retransmitted, and therefore only low-PER packets will incur the extra delay due to the retransmission mechanism.
- Flow control can be minimized such that the transmitter can generally accept all packets from the higher layer at the required data rate without holding-off (or "blocking")

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 32 of 739

packets from the higher layer during the retransmission process.

- Packet delay-variation/jitter can be minimal.
- A "DRR-like" functionality in a single bearer without requiring latency/interleaver OLR.

[0045] The transceiver 200, in cooperation with the QOS module 230, receives packets from a higher-layer. In cooperation with the packet QOS assignment module 240, a packet Sequence ID (SID) is appended to the received packets. The packets, in cooperation with the transmission management module 220, can then be transmitted in the order in which they were received.

[0046] The QOS Module 230, if not already performed by a high layer, also identifies packets based on the QOS requirement of the packet(s). Then, in cooperation with the packet QOS assignment module 240, a QOS identifier is associated with the packet as discussed hereinafter.

[0047] If, for example, the packet is identified as a low-PER packet, and assigned such an identifier by the QOS module 230, when the transmission management module 220 receives the packet, the packet is identified by the QOS ID module 225 as being a low-PER packet and the packet is forwarded for storage in the retransmission buffer 250. Alternatively, if the packet has been labeled as a low-latency packet, and identified as such by the by the QOS ID module 225, the packet can be transmitted to the receiving modem in cooperation with the transmission management module 220.

[0048] The low-PER packets can be stored for a sufficient amount of time to wait for a

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 33 of 739

retransmission message from the receiver PTM-TC. During this time, the transmitting modem can continue to receive packets from one or more higher layers, label these packets, if needed, and store these packets, if they are identified as low-PER packets, in the same way. The resulting minimum storage requirements for the transmitter PTM-TC are estimated below.

[0049] For successful retransmission, the receiving modem should be able to inform the transmitting modem which packet, or packets, need to be retransmitted. One exemplary way of performing this is by transmitting packets with an appended bit field that contains a counter indicating the place of each packet in a stream of packets. This counter value is also known as a Sequence ID (SID). For example, a bit field containing a 16-bit counter could be appended to each packet and the counter module 260 would be incremented by one after each packet was transmitted. In cooperation with the packet assignment module 240, a packet counter field could be appended to the packet in a number of places, for example, at the beginning or end of the packet, or at the beginning or end of the packet header.

[0050] Packets received from a higher-layer may already have information in a header or data field of the packet that contains the packet count, or sequence, information. In addition, the packet counter field may be appended with an additional CRC field that contains a cyclic redundancy check that is computed on the packet counter field bits only. This CRC can be used by the receiver to determine if the packet counter field is received correctly, i.e., without bit errors. This CRC can be in addition to the standard CRC inserted by the standard PTM-TC (the standard packet PTM-TC CRC is a CRC that covers all bits in a packet). The standard packet CRC may also cover the new packet counter field in its CRC as well. This helps if the receiving modem uses the presence or absence of the packet counter field in a

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 34 of 739

packet to detect if the packet has a low-PER or low-latency requirement (discussed below).

[0051] Alternatively, or in addition, the packet counter field (with or without a dedicated CRC) can be appended only to the packets with a specific QOS requirement, whereas all other packets can be transmitted without modification. For example, all video packets with low-PER QOS could contain the appended packet counter field whereas all the voice/data low-latency packets could be transmitted unchanged. One exemplary benefit of this is that the overhead (rate loss) due to adding the packet counter field is incurred only when transmitting low-PER packets.

[0052] Alternatively, or in addition, all low-PER and low-latency packets can be transmitted with the low packet counter field (with or without a dedicated CRC). In this case, the packet counter field of the low-latency packets may contain a special value indicating that a packet is not a low-PER packet. Also, the packet counter field of the low-latency packet may not even contain a count value, since the low-latency packets are not intended to be retransmitted. In this case, the packet counter field could contain a counter value only for low-PER packets and the counter value would only be incremented when a low-PER packet was transmitted. As an example, if the packet counter field is 16 bits, the special value of all zeros could be used to indicate that a packet is a low-latency packet. In this case, low-PER packets could contain counter values from one up to 2^{16}-1, but not including all zeros, since this special zero value can be used to indicate a low-latency packet.

[0053] The receiving modem, e.g., receiver PTM-TC, which in this case is illustrated as the transceiver 300 and includes comparable functionality to that described in relation to transceiver 200, receives packets from the transmitting modem via the PMS-TC. If the

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 35 of 739

received packet is identified as a low-latency packet by the QOS ID module 325, the packet is passed to a higher-layer. If a received packet is identified by the QOS ID module 325 as a low-PER packet, the packet is forwarded, with the cooperation of the transmission management module 320, to the retransmission buffer 350 for a minimum amount of time before passing to a higher-layer.

[0054] The storage time in the retransmission buffer 350 helps ensure that the retransmission protocol provides a constant delay, e.g., no delay variation seen by the upper layers. This way, if a packet needs to be retransmitted, the receiving modem can continue to provide packets to the higher-layers at a constant rate while waiting for the retransmitted packet(s) to arrive from the transmitting modem. The resulting minimum memory (or storage) requirements for the receiving PTM-TC are estimated below.

[0055] Alternatively, low-PER packets without errors may not be stored for a minimum amount of time before passing to a higher-layer. The error-free low-PER packets can be passed to the higher-layer immediately just like the low-latency packets. However, when a low-PER packet is in error, it is stored along with all of the following low-PER packets before passing to a higher-layer in order to wait for the retransmitted packet(s) to arrive. This will cause a delay variation on the low-PER packets whenever a retransmission occurs. However, this delay variation would not apply to the low-latency packets.

[0056] The QOS ID module 325 can detect that a packet is either low-PER or low-latency using several different methods. For example, if all low-PER and low-latency packets contain the appended packet counter field, then the receiving modem, in cooperation with the counter module 360, detects a low-latency packet when a packet counter field contains the

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 36 of 739

designated special value, which was inserted by the transmitting modem, indicating the packet is a low-latency packet.

[0057] Alternatively, or in addition, the receiver could detect a low-PER packet when the packet counter field contains a valid packet counter value. Additionally, if a dedicated CRC is appended to the packet counter field, the CRC could be used to detect if the packet counter field bits are in error.

[0058] If the packet counter field, including the CRC, is only appended to low-PER packets, the absence or presence of this field in a packet can be used by the receiving modem, and in particular the QOS ID module, to detect a low-delay packet. For example, the receiving modem can examine the position in the packet where the packet counter field would be, if it was a low-PER packet, and if the packet counter field CRC fails while the standard whole packet CRC is correct, the receiving modem could determine that the packet is a low-delay packet, since it does not contain the packet counter field. Likewise, for example, the receiving modem can examine the position in the packet were the packet counter field would be, if it was a low-PER packet, and if the packet counter field CRC is correct, the receiving modem would determine that the packet is a low-PER packet, regardless of the status of the standard whole packet CRC.

[0059] The receiving modem, in cooperation with the retransmission buffer 350, and the errored packet module 310, can be used to detect missing or errored packets in a number of exemplary ways. For example, the errored packet module 310 can detect bit errors in the packet using the standard/whole packet PTM-TC CRC. Alternatively, or in addition, the errored packet module 310 can detect bit errors in the packet counter field if the transmitting

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 37 of 739

modem appended a dedicated CRC to the packet counter field. This CRC is valuable because it can be used by the errored packet module in the receiving modem to determine if a packet has the correct packet number, even if the standard whole packet CRC happens to be in error.

[0060] Alternatively, or in addition, the errored packet module 310, can detect an errored or missing packet by receiving a packet with a correct CRC, either in the standard or packet counter field, which contains a packet counter number that is not the expected packet counter number. For example, if the errored packet module 310, in cooperation with the counter module 360, detects the receipt of a packet with a counter number equal to 5, wherein the errored packet module 310 is expecting to receive a packet with a counter equal to 3, the errored packet module 310 can determine that two packets, namely packets numbered 3 and 4, were lost due to errors.

[0061] Once a packet(s) is found to be in error, there are several exemplary ways in which a receiving modem can communicate information to the transmitting modem indicating that a retransmission of one or more packets is required. For example, the receiving modem, in cooperation with the errored packet module 310, can send an acknowledgment (ACK) message to the transmitting modem for every correctly received message or every predetermined number of packets. As long as the transmitting modem, and in particular the errored packet module 210, receives messages acknowledging receipt of packets in sequential order, there is no need for retransmission of information to the receiving modem. However, if the transmitting modem, and in particular the errored packet module 210, receives a message from the receiving modem, and in particular the errored packet module 310, indicating that a packet was correctly received with a counter value that is out of order, a retransmission by the transmitting modem is required. In the above example, where

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 38 of 739

the receiving modem received a packet with a counter value equal to 5, without receiving packets numbered 3 and 4, the transmitting modem could receive an ACK for the packet with counter value of 2 and then an ACK for the packet with a counter value of 5. The transmitting modem would then determine that it was necessary to retransmit packets with counter values of 3 and 4 since they were not received.

[0062] Alternatively, or in addition, a timeout value could be specified for the transmitting modem. This timeout value could correspond to the amount of time that the transmitting modem should wait for an ACK for particular packet before retransmitting the packet. The timeout value could be set to be at least as long as the round-trip delay required for the transmitting modem to send a packet to the receiving modem and for the receiving modem to send an ACK back to the transmitting modem. If an ACK is not received by the timeout value, the transmitting modem could retransmit the packet.

[0063] Alternatively, or in addition, a negative acknowledgment (NAK) could be sent to the transmitting modem when a packet is detected as errored or missing. In the above example, when the receiving modem received the packet with a counter value of 5, while expecting a counter value of 3, the receiving modem could send a NAK message to the transmitting modem indicating that packets with counter values of 3 and 4 were not correctly received and needed to be retransmitted.

[0064] Alternatively, or in addition, if a packet was received with a correct packet counter CRC and a valid packet counter value a and an incorrect standard whole packet CRC, the receiving modem could send a NAK message to the transmitting modem indicating that a packet with a value of a was incorrectly received and needed to be retransmitted.

[0065] Assuming that errored packets are infrequent, any methodology that sends an ACK for each correctly received packet can require a larger amount of data rate in the message channel that communicates this information back to the transmitting modem. In this case, sending only NAKs has the benefit that it requires sending a message only when an errored or missing packet is detected. Depending on the data rate capabilities of the message channel, and the PER, a retransmission system may use only ACKs, only NAKs, or both ACKs and NAKs at the same time.

[0066] The ACK and NAK messages sent back to the transmitting modem can be transmitted over the same physical channel i.e., phone line, in the opposite direction as the received packets. Since the channel has a limited data rate and is not necessarily error-free, it is important to make sure that these messages are as robust as possible and consume the least amount of data rate. Additionally, since the transmit and receive retransmission memory requirements depend on the round-trip latency of the connection, is important to minimize latency requirements for the message channel. There are several ways these requirements can be addressed.

[0067] The messages can be sent over a separate "low-latency" or "fast" path between the xDSL transceivers. This fast path could include little or even no delay due to interleaving and can be specified to have a latency that is less than 2ms.

[0068] Alternatively, or in addition, the messages can be sent with increasing robustness by repeating transmission of each message a number of times. For example, the message could be repeated x times in order to make sure that even if x-1 messages were corrupted by

the channel, at least one message would be received correctly.

[0069] Alternatively, or in addition, the messages can be sent such that each message is repeated a number of times and each repeated message is sent in a different DMT symbol. For example, the message can be repeated x times and each message sent in one of x DMT symbols. This way, even if x-1 DMT symbols were corrupted by the channel, at least one message would be received correctly.

[0070] Alternatively, or in addition, the messages can be sent such that each message is repeated a number of times and each repeated message is sent in different DMT symbols. For example, the message could be repeated x times and each message sent in one of x DMT symbols. This way, even if x-1 DMT symbols were corrupted by the channel, at least one message would be received correctly.

[0071] Alternatively, or in addition, the messages can be sent such that each message is repeated a number of times and each repeated message is sent a plurality of times in each DMT symbol. For example, the message could be repeated x times and each repeated message sent y times in one of x DMT symbols. This way, even if x-1 DMT symbols were corrupted by the channel and/or large portions of a DMT symbol were corrupted by a channel, the least one message would be received correctly.

[0072] Alternatively, or in addition, the messages can include multiple packet count values in order to reduce the data rate requirements. For example, if packets with counter values of 3 - 9 are correctly (or incorrectly) received an ACK (or NAK) message would be sent to indicate these packet values. For example, the message could contain the values 3 and

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 41 of 739

9 and the receiver of the message would automatically know that all intermediate values (4, 5, 6, 7, 8) are also been indicated in the message.

[0073] Alternatively, or in addition, the DMT sub-carriers that modulate these messages could operate with a much higher SNR margin e.g., 15dB, as compared to the normal 6dB margin of xDSL systems. This way, the messages would have a higher immunity to channel noise.

[0074] Alternatively, or in addition, a receiving modem may need to send an additional ACK or NAK message after already in the process of sending a repeated message. For example, a receiving modem may detect that packets with values 3 to 9 have been correctly received and send an ACK message back to the transmitting modem indicating this information. This message can be repeated x times with each repeated message being transmitted (at least once) on different DMT symbols. While sending the second repeated message on the second DMT symbol, the receiver could detect that packets with values 10 to 17 have now also been correctly received. In this case, the receiving modem could just append this information to the previous message or, alternatively, send a new separate message that is repeated as well x times with each repeated message being transmitted (at least once) on a different DMT symbol.

[0075] Alternatively, or in addition, when repeating a message x times on x DMT symbols, each repeated message can be modulated on a different set of DMT sub-carriers on each DMT symbol. This way, if one or more sub-carriers have a low SNR, the message will still be correctly received.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 42 of 739

[0076] For low-PER packets, the delay due to this retransmission protocol is equal to the delay that results from storing these packets at the receiving modem (RX PTM-TC) to pass in the packets to a higher layer. Low-latency packets do not incur extra delay.

[0077] The transmitting modem must store a packet for retransmission for a time equal to the round trip delay from when the packet is sent to when the retransmission message is received. During this time the transmitting modem continues to receive packets from the higher layer and continues to store these packets in the same way. Therefore the storage requirements in octets can be computed as:

$$\textit{Minimum TX memory (octets)} = \textit{roundtripdelay} * \textit{datarate},$$

where the *roundtripdelay* is the time equal to the round trip delay from when the packet is sent to when the retransmission message is received, and the *datarate* is the data rate of the connection that is transferring the packets.

For ITU-T G.993.2 VDSL2, which is incorporated herein by reference, this can be computed using the VDSL2 profile parameters as:

$$\textit{Minimum TX memory (octets)} = (\textit{DS} + \textit{US Interleaving Delay in octets}) + (\textit{US+DS alpha/beta delay without interleaving}) * (\textit{Bidirectional Net data rate}) = \textit{MAXDLEYOCTET} + (4\ \textit{ms}) * \textit{MBDC},$$

where *MAXDELAYOCTET* and *MBDC* are as specified in the VDSL2 profiles.

[0078] For the receiver, the minimum receiver storage requirements can be determined in a similar manner. More specifically, the RX PTM-TC must store a packet before passing it to the higher layer for a time equal to the round trip delay from when a retransmission message is transmitted to when the retransmitted packet is received. This is equal to storage

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 43 of 739

requirements in octets (same as transmitter):

*Minimum RX memory (octets)= roundtripdelay*datarate,*

where the *roundtripdelay* is the time equal to the round trip from when a retransmission message is transmitted to when the retransmitted packet is received and the *datarate* is the data rate of the connection that is transferring the packets.

[0079] For ITU-T G.993.2 VDSL2 this can be computed using the VDSL2 profile parameters as:

Minimum RX memory (octets) = (DS + US Interleaving Delay in octets) + (US+DS alpha/beta delay without interleaving)(Bidirectional Net data rate) = MAXDLEYOCTET + (4 ms)*MBDC,*

where MAXDELAYOCTET and MBDC are as specified in the ITU-T G.993.2 VDSL2 profiles.

[0080] Table 1: Minimum TX or RX memory requirements for VDSL2

VDSL2 PROFILE	8a,8b,8c,8d	12a,12b	17a	30a
TX or RX memory requirements (octets) = MAXDLEYOCTET +.002MBDC	90,536	99,536	123,304	231,072

The estimates in Table 1 assume that all the entire *MAXDELAYOCTET* and *MBDC* are used for the transfer of the packet stream, i.e., the reverse channel has a very low data rate and no interleaving.

[0081] Some xDSL standards specify minimum storage, i.e., memory, requirements for interleaving of RS codewords. Interleaving with RS coding is an effective way of correcting

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 44 of 739

channel errors due to, for example, impulse noise. For example, VDSL2 requires support of an aggregate bidirectional interleaver and de-interleaver memory of 65Kbytes for the 8a VDSL2 profile. This corresponds to storage requirement of approximately 32Kbytes in a single transceiver.

[0082] Sharing of Memory between the Retransmission Function and one or more of the Interleaving/Deinterleaving/RS Coding/RS Decoding Functions

[0083] From Table 1, it is apparent that the memory requirements to support the retransmission protocol may be more than double the storage requirements of a single transceiver. Additionally, the retransmission protocol provides a different method for correcting channel errors due to, for example, impulse noise.

[0084] Moreover, interleaving and RS coding methods and retransmission protocols provide different advantages with respect to error correction capabilities, latency, buffering requirements, and the like. For example, under certain configuration and noise conditions the interleaving/RS coding provides error correction/coding gain with less delay and overhead than the retransmission protocol (for packets that can be retransmitted). While under other conditions the retransmission protocol will provide better error correction with less delay and overhead than the interleaving/RS coding.

[0085] In some cases, a first portion of the memory can be used for one function and a second portion of the memory for some other function. For example, if the configuration and noise conditions are such that the interleaving/RS coding would not provide good error correction/coding gain, then all the available memory could be used for the retransmission

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 45 of 739

function and none allocated to the interleaving/deinterleaving/RS coding/RS decoding functionality, e.g., the interleaving/deinterleaving could be disabled.

[0086] Likewise, if the configuration and noise conditions are such that the retransmission protocol would not provide good error correction/coding gain, then all the available memory could be used for the interleaving/deinterleaving/RS coding/RS decoding functionality and no memory would be used for the retransmission function, e.g., the retransmission function would be disabled.

[0087] Alternatively, or addition, both methods could be used because both have their advantages, with the system, e.g., the memory management module 370, being able to dynamically allocate a first portion of the memory 250/350 to the interleaving/deinterleaving/RS coding/RS decoding functionality and a second portion of the memory to the retransmission functionality. For example, 40% of the memory could be allocated to the interleaving/deinterleaving/RS coding/RS decoding functionality with the remaining 60% allocated to the retransmission of functionality. However, it should be appreciated, that in general, the memory can be divided, i.e., shared, in any manner.

[0088] The sharing of memory between the retransmission function and the interleaving/deinterleaving/RS coding/RS decoding functions is not restricted to retransmission protocols described in other embodiments that utilize QOS metrics to determine which packets should be retransmitted. In other words, the sharing of memory between the retransmission function and the interleaving/deinterleaving/RS coding/RS decoding functions can be utilized for retransmission systems where all errored packets are retransmitted, i.e., there is no QOS identifier in the retransmission protocol. For example, the

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 46 of 739

FEC/interleaving could be used to meet the INPmin requirement specifically targeting the impulse noise that occurs frequently (e.g., on the order of minutes or seconds) but is short in duration and can therefore be corrected by the FEC/interleaving. For example, the retransmission protocol can be used to correct infrequent errors (on the order of hours) that are long in duration and would not be correctable by the FEC/interleaving. As another example, the FEC/interleaving function may be used in combination with the retransmission function because it is well known that FEC with minimal interleaving provides a 1 dB to 3 dB coding gain when used with a trellis code (as is often the case in xDSL systems). This means that even when the majority of the shared memory is allocated to a retransmission function to address channel noise (such as impulse noise), a smaller amount of memory may be allocated to the FEC/interleaving function for the coding gain advantage.

[0089] Associated with the ability to allocate or partition memory between one or more of the interleaving/deinterleaving/RS coding/RS decoding functionality and retransmission functionality, is the ability to exchange information between transceivers on how to establish this allocation. For example, the transmitting modem may send a message to the receiving modem indicating how much of the available memory is to be allocated to one or more of the interleaving/deinterleaving/RS coding/RS decoding functionality and how much memory is to be allocated to the retransmission functionality. For example, if the receiving modem contains 100kBytes of available memory, the transmitting modem could send a message to the receiving modem indicating that 25kBytes should be allocated to RS coding functionality and 75kBytes should be allocated to the retransmission functionality. Since the receiving modem generally determines the interleaving/RS coding parameters that are used, the receiving modem could use this information to select parameters, e.g., interleaver depth and codeword size, that would result in an interleaving memory requirement that is no more than

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 47 of 739

the amount indicated in the message.

[0090] Alternatively, or addition, the receiving modem can send a message to the transmitting modem indicating how much of the available memory is to be allocated to one or more of the interleaving/deinterleaving/RS coding/RS decoding functionality, and how much memory should be allocated to the retransmission functionality.

[0091] Sharing of memory between a Retransmission Function with Identification of Low-PER and/or Low-Latency Packets and one or more of interleaving/deinterleaving/RS Coding/ RS Decoding functions.

[0092] A way of reducing the total memory requirement of a transceiver that supports the retransmission functionality with the identification of the low-PER and/or the low-latency packets is to define a limit, such as a maximum value, for the data rate of the low-PER packet stream, i.e., the packets requiring retransmission to meet a specific PER requirement. For example, if the total date rate is 50 Mbps, and the roundtrip delay is 10 ms, the minimum TX or RX memory requirement is 50,000,000*.01/8=62500 bytes if the retransmission function must support the case where all the transmitted packet (all 50 Mbps) are low-PER packets. If however, only a portion of the 50 Mbps data rate is allocated to the low-PER packet stream (e.g. 30 Mbps), whereas the remainder of the data rate is allocated to the low-latency packet stream (e.g. 20 Mbps), the minimum TX or RX memory requirement would be 30,000,000*.01/8=37500 bytes (assuming a roundtrip delay of 10ms). In this case, the transmitting modem (or receiving modem) may send a message to the receiving modem (or transmitting modem) that indicates the maximum data rate of the packet traffic that will be used in the retransmission function. Using the example above, the transmitting modem (or

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 48 of 739

receiving modem) would send a message indicating that the low-PER traffic will not exceed 30Mbps, in which case the receiving modem (or transmitting modem) will allocate memory to the retransmission functionality and the interleaving/RS coding (or deinterleaving/RS decoding) functionality accordingly.

[0093] One exemplary advantage of indicating the low-PER and low-latency packets as part of the retransmission protocol is that it provides a DDR-like functionality without the overhead of dynamically re-allocating latency paths. For example, when a video application is turned off (less low-PER packets on the connection), the data application data rate can be increased (more low-latency packets on the connection) without any changes in the transmission parameters.

[0094] The retransmission protocol can also be used with or without underlying FEC/interleaving (or deinterleaving). An exemplary approach is to use the FEC/interleaving to meet the INPmin requirement specifically targeting the impulse noise that occurs frequently, e.g., on the order of minutes or seconds. The retransmission protocol can be used to correct infrequent errors (on the order of hours) that will only typically be a problem for very-low PER applications, such as video.

[0095] When a retransmission protocol is combined with underlying FEC/interleaving (or deinterleaving), the retransmission protocol latency will grow in proportion to the additional FEC/interleaving delay. This is due to the fact that the required receiver buffering corresponds approximately to the round-trip delay time of packet transmission and message acknowledgment.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 49 of 739

[0096] As an example of utilizing the retransmission protocol that identifies one or more of low-PER and low-latency packets with underlying FEC/Interleaving (or deinterleaving), the FEC/interleaving is used to achieve the INPmin requirements within the latency constraint and the retransmission function is used to provide another layer of error correction. The low-PER packets are passed through both the retransmission function and the FEC/interleaver and, as a result, a very low PER is achieved. The low-latency packets are passed through the FEC/Interleaver but not passed through the retransmission function. Since low-latency packets are passed through the FEC/interleaver, they will meet the INPmin and MaxDelay requirements without incurring the extra delay from the retransmission protocol.

[0097] Example configuration parameters:

DS Data rate = 25 Mbps, INPmin=2, MaxDelayDS= 8ms

[0098] Example FEC/Interleaving parameters:

NFEC=128, R=16 which results in an interleaver memory of approximately 14Kbytes for INP=2 with 8 ms of delay.

[0099] Retransmission protocol:

If we assume the US latency is 2ms, the retransmission protocol will add a minimum of 8+2 = 10ms of latency. This means that the total DS latency (FEC/interleaving+ Retransmission) will be approximately 8+10=18ms.

[00100] Memory requirements:

The memory requirements for the retransmission protocol can be calculated as: (10ms) x (25

Mbps) /8 = 31Kbytes. Therefore the transmitter and receiver will both need a total memory of (31+14) =45 Kbytes for the retransmission protocol and FEC/Interleaving function.

[00101] Low-PER packets:

Latency=18ms. The PER is very low because INPmin=2 (from FEC/interleaving) is combined with the error correction of the retransmission function.

[00102] Low-Latency packets:

Latency = 8ms. INP =2 from FEC/interleaving. No additional delay due to retransmission function.

[00103] Although this invention describes the retransmission being done as part of the PTM-TC, it could also be done inside other layer(s) of the xDSL transceiver, such as the PMD or the PMS-TC. Alternatively, it could performed at a layer(s) above the PTM-TC, for example, in a new layer between the PTM-TC and the next higher layer, or in general any layer above the physical layer, e.g., layer 1, 2, 3, 4 or 5.

[00104] In this invention, the term "transmitter" generally refers to the transceiver that transmits the packets. Likewise the term "receiver" generally refers to the transceiver that receives the packets. Therefore the "transmitter" also receives the ACK/NAK messages and the "receiver" also transmits the ACK/NAK messages.

[00105] Figure 2 outlines an exemplary method of operation of a transmitting modem utilizing the retransmission protocol. In particular, control begins in step S100 and continues to step S110. In step S110, a packet is received from a higher layer. Then, in step S120, a

decision is made as to whether the received packet is a retransmitted type packet. If the packet is not a retransmitted type packet, such as a low-latency packet, control jumps to step S125 where the packet is optionally updated (as discussed above) with control continuing to step S130 where the packet is forwarded to the receiver. Control then continues to step S140 where the control sequence ends.

[00106] If the packet is a retransmitted type packet, such as a low-PER packet, control continues to step S150. In step S150, the packet can be updated with information such as a sequence identifier or other information that allows a receiver to be able to determine which packet (or packets) need to be retransmitted. Next, in step S160, the updated packet is stored in the retransmission buffer. Then, in step S170, the packet is forwarded to the receiver. Control then continues to step S180.

[00107] In step S180, a determination is made whether the packet needs to be retransmitted. If the packet needs to be retransmitted, control jumps back to step S170. Otherwise, control continues to step S190.

[00108] In step S190, the packet is deleted from the retransmission buffer. Control then continues to step S140 were the control sequence ends.

[00109] Figure 3 outlines an exemplary method of operation of a receiving modem utilizing the retransmission protocol. In particular, control begins in step S200 and continues to step S210. In step S210, a packet is received from the transmitter. Next, in step S220, a determination is made whether the packet has been identified as a retransmitted type packet. If the packet has not been identified as a retransmittable type packet, control jumps to step

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 52 of 739

S230.

[00110] In step S230, the packet is forwarded to a higher layer. Control then continues to step S240 where the control sequence ends.

[00111] Alternatively, if the received packet is a retransmittable type packet, the packet is stored in the retransmission buffer in step S260. Next, in step S270, the integrity of the packet can be checked, for example utilizing a CRC. Then, in step S280, a determination is made whether the packet needs retransmission. If the packet needs retransmission, control continues to step S290 where the retransmitted packet is obtained, for example, based on the sending of a message(s), one or the other transceiver determining a packet is missing, or the like, as discussed above, with control continuing back to step S270 for an integrity check.

[00112] If the packet does not need retransmission, control continues to step S295 where the packet is forwarded to a higher layer and deleted from the retransmission buffer. Control then continues to step S240 where the control sequence ends.

[00113] Figure 4 outlines an exemplary memory allocation method for sharing memory between the retransmission function and one or more of the interleaving/deinterleaving functionality and coding functionality. In particular, control begins in step S300 and continues to step S305. In step S305, a message is sent/received specifying the available memory. Typically, the receiver will send a message to the transmitter specifying the available memory, but the transmitter could also send a message to the receiver. Next, in step S310, a determination is made as to how the memory should be allocated. As discussed, this allocation can be based on one or more of error correction capability, latency, buffering

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 53 of 739

requirements, SNR, impulse noise, or in general, any communication parameter. Next, in step S320, the memory allocation is communicated to another transceiver. Then, in step S330, a determination can made as to whether the allocation is compatible. If the received allocation is not compatible, control continues to step S360 wherein another allocation can be requested, with control continuing back to step S320.

[00114] Alternatively, if the allocation is compatible, in step S340 the memory is allocated based on the received allocation. Control then continues to step S350 where the control sequence ends.

[00115] Figure 5 illustrates an exemplary memory sharing methodology for use with a retransmission function and one or more of interleaving/deinterleaving functionality, RS coding/decoding functionality. In particular, control begins in step S400 and continues to step S410. In step S410, the memory allocation is received from, for example, a memory management module that may be located in the same transceiver, or at a remote transceiver. Next, in step S420, the memory sharing configuration is established and then, in step S430, the memory is shared between a retransmission function and one or more of the interleaving/deinterleaving functionality, RS coding/decoding functionality. Control then continues to step S440.

[00116] In step S440, a determination is made whether the memory sharing configuration should be changed. For example, the memory sharing configuration can be dynamically changed based on changes in the communication channel or data type(s) being sent on the communication channel. More specifically, for example, if the communications channel was not performing well, e.g., an increase in bit errors, it may be advantageous to increase the

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 54 of 739

retransmission capability while decreasing the FEC/interleaving capability or vise-versa, which could have an impact on how the memory sharing should be configured.

[00117] If the memory sharing configuration should be changed, control continues to step S450 where another allocation can be requested, with control continuing back to step S410. Otherwise, control continues to step S460 where the control sequence ends.

[00118] While the above-described flowcharts have been discussed in relation to a particular sequence of events, it should be appreciated that changes to this sequence can occur without materially effecting the operation of the invention. Additionally, the exact sequence of events need not occur as set forth in the exemplary embodiments, but rather the steps can be performed by one or the other transceiver in the communication system provided both transceivers are aware of the technique being used for initialization. Additionally, the exemplary techniques illustrated herein are not limited to the specifically illustrated embodiments but can also be utilized with the other exemplary embodiments and each described feature is individually and separately claimable.

[00119] The above-described system can be implemented on wired and/or wireless telecommunications devices, such a modem, a multicarrier modem, a DSL modem, an ADSL modem, an xDSL modem, a VDSL modem, a linecard, test equipment, a multicarrier transceiver, a wired and/or wireless wide/local area network system, a satellite communication system, network-based communication systems, such as an IP, Ethernet or ATM system, a modem equipped with diagnostic capabilities, or the like, or on a separate programmed general purpose computer having a communications device or in conjunction

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 55 of 739

with any of the following communications protocols: CDSL, ADSL2, ADSL2+, VDSL1, VDSL2, HDSL, DSL Lite, IDSL, RADSL, SDSL, UDSL or the like.

[00120] Additionally, the systems, methods and protocols of this invention can be implemented on a special purpose computer, a programmed microprocessor or microcontroller and peripheral integrated circuit element(s), an ASIC or other integrated circuit, a digital signal processor, a hard-wired electronic or logic circuit such as discrete element circuit, a programmable logic device such as PLD, PLA, FPGA, PAL, a modem, a transmitter/receiver, any comparable means, or the like. In general, any device capable of implementing a state machine that is in turn capable of implementing the methodology illustrated herein can be used to implement the various communication methods, protocols and techniques according to this invention.

[00121] Furthermore, the disclosed methods may be readily implemented in software using object or object-oriented software development environments that provide portable source code that can be used on a variety of computer or workstation platforms. Alternatively, the disclosed system may be implemented partially or fully in hardware using standard logic circuits or VLSI design. Whether software or hardware is used to implement the systems in accordance with this invention is dependent on the speed and/or efficiency requirements of the system, the particular function, and the particular software or hardware systems or microprocessor or microcomputer systems being utilized. The communication systems, methods and protocols illustrated herein can be readily implemented in hardware and/or software using any known or later developed systems or structures, devices and/or software by those of ordinary skill in the applicable art from the functional description

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 56 of 739

provided herein and with a general basic knowledge of the computer and telecommunications arts.

[00122] Moreover, the disclosed methods may be readily implemented in software that can be stored on a storage medium, executed on programmed general-purpose computer with the cooperation of a controller and memory, a special purpose computer, a microprocessor, or the like. In these instances, the systems and methods of this invention can be implemented as program embedded on personal computer such as an applet, JAVA® or CGI script, as a resource residing on a server or computer workstation, as a routine embedded in a dedicated communication system or system component, or the like. The system can also be implemented by physically incorporating the system and/or method into a software and/or hardware system, such as the hardware and software systems of a communications transceiver.

[00123] It is therefore apparent that there has been provided, in accordance with the present invention, systems and methods for packet retransmission and memory sharing. While this invention has been described in conjunction with a number of embodiments, it is evident that many alternatives, modifications and variations would be or are apparent to those of ordinary skill in the applicable arts. Accordingly, it is intended to embrace all such alternatives, modifications, equivalents and variations that are within the spirit and scope of this invention.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 57 of 739

Claims:

1. A method of packet retransmission comprising:

transmitting or receiving a plurality of packets;

identifying at least one packet of the plurality of packets as a packet that should not be retransmitted.

2. The method of claim 1, wherein the packet is any grouping of bytes.

3. The method of claim 1, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

4. The method of claim 1, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

5. The method of claim 4, wherein the identifying step comprises using a special value for a sequence identifier (SID).

6. The method of claim 4, wherein the appended bit field comprises a dedicated CRC.

7. The method of claim 1, wherein the at least one packet is not stored for retransmission.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 58 of 739

8. The method of claim 1, wherein the at least one packet is passed immediately to a high layer.

9. A packet retransmission module capable of transmitting or receiving a plurality of packets and capable of identifying at least one packet of the plurality of packets as a packet that should not be retransmitted.

10. The module of claim 9, wherein the packet is any grouping of bytes.

11. The module of claim 9, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

12. The module of claim 9, wherein the module is capable of appending a bit field comprising a sequence identifier (SID) to each packet.

13. The module of claim 12, wherein the identifying comprises using a special value for the SID.

14. The module of claim 12, wherein the appended bit field comprises a dedicated CRC.

15. The module of claim 9, wherein the at least one packet is not stored by the module for retransmission.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 59 of 739

16. The module of claim 9, wherein the at least one packet is passed by the module immediately to a high layer.

17. The module of claim 9, wherein the module is implemented in one or more of a wireless transceiver, a wireless LAN station, a wired transceiver, a DSL modem, an ADSL modem, an xDSL modem, a VDSL modem, a multicarrier transceiver, a general purpose computer, a special purpose computer, a programmed microprocessor, a microcontroller and peripheral integrated circuit element(s), an ASIC, a digital signal processor, a hard-wired electronic or logic circuit and a programmable logic device.

18. The module of claim 9, wherein the module is implemented in one or more of a PTM-TC, ATM-TC, PMD and PMS-TC.

19. A method comprising sharing memory between an interleaving and/or deinterleaving memory and a packet retransmission memory.

20. A method comprising allocating a first portion of shared memory for retransmission and a second portion of the shared memory for interleaving and/or deinterleaving.

21. The method of claim 20, further comprising transmitting or receiving a message indicating how to allocate the shared memory.

22. The method of claim 19 or 20, further comprising transmitting or receiving a message indicating how to share the memory.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 60 of 739

23. A memory capable of being shared between an interleaving and/or deinterleaving buffer and a packet retransmission buffer.

24. A module capable of allocating a first portion of shared memory for retransmission and a second portion of the shared memory for interleaving and/or deinterleaving.

25. The module of claim 24, wherein the module is capable of transmitting or receiving a message indicating how to allocate the shared memory.

26. The module of claim 24, wherein the module is capable of transmitting or receiving a message indicating how to share the memory.

27. The module of claim 24, wherein the module is one or more of a wireless transceiver, a wireless LAN station, a wired transceiver, a DSL modem, an ADSL modem, an xDSL modem, a VDSL modem, a multicarrier transceiver, a general purpose computer, a special purpose computer, a programmed microprocessor, a microcontroller and peripheral integrated circuit element(s), an ASIC, a digital signal processor, a hard-wired electronic or logic circuit and a programmable logic device.

28. A method of packet retransmission comprising:

transmitting or receiving a plurality of packets;

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 61 of 739

identifying at least one packet of the plurality of packets as a packet that should be retransmitted and at least one packet of the plurality of packets as a packet that should not be retransmitted.

29. The method of claim 28, wherein the packet is any grouping of bytes.

30. The method of claim 28, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

31. The method of claim 28, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

32. The method of claim 31, wherein the identifying step comprises using a special value for a sequence identifier (SID).

33. The method of claim 31, wherein the appended bit field comprises a dedicated CRC.

34. The method of claim 28, wherein at least one packet is stored for retransmission.

35. The method of claim 28, wherein at least one packet is passed immediately to a high layer.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 62 of 739

36. A packet handling method comprising:

receiving a stream of packets;

identifying a first number of packets in the stream of packets as low-latency packets;

identifying a second number of packets in the stream of packets as low-error packets;

forwarding the low-latency and low-error packets to a transceiver or a higher layer; and

storing the low-error packets for error correction.

37. The method of claim 36, further comprising appending the low-error packets with an identifier.

38. A method of allocating memory in a transceiver comprising:

analyzing one or more communication parameters;

identifying a memory allocation; and

allocating memory based on the memory allocation to a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding.

39. A memory sharing method in a transceiver comprising:

receiving a memory allocation;

establishing a shared memory for one or more of interleaving, deinterleaving, RS coding, RS decoding and packet retransmission functions; and

sharing the shared memory between a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding functions.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 63 of 739

40. The method of claim 39, further comprising determining a compatibility of the memory allocation.

41. The method of claim 39, wherein the compatibility of the memory allocation is based on channel performance metrics.

42. Means for performing the functionality of any of the aforementioned claims.

43. An information storage media comprising information that when executed performs the functionality of any of the aforementioned claims.

44. Any one or more of the features as substantially described herein.

45. Means for packet retransmission comprising:

means for transmitting or receiving a plurality of packets;

means for identifying at least one packet of the plurality of packets as a packet that should not be retransmitted.

46. The means of claim 45, wherein the packet is any grouping of bytes.

47. The means of claim 45, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 64 of 739

48. The means of claim 45, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

49. The means of claim 48, wherein the means for identifying comprises using a special value for a sequence identifier (SID).

50. The means of claim 48, wherein the appended bit field comprises a dedicated CRC.

51. The means of claim 45, wherein the at least one packet is not stored for retransmission.

52. The means of claim 45, wherein the at least one packet is passed immediately to a high layer.

53. Means for sharing memory between an interleaving and/or deinterleaving function and a packet retransmission function.

54. Means for allocating a first portion of shared memory for retransmission and a second portion of the shared memory for interleaving and/or deinterleaving.

55. The means of claim 54, further comprising means for transmitting or receiving a message indicating how to allocate the shared memory.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 65 of 739

56. The means of claim 54, further comprising means for transmitting or receiving a message indicating how to share the memory.

57. Means for sharing a memory between an interleaving and/or deinterleaving function and a packet retransmission function.

58. Means for packet retransmission comprising:

means for transmitting or receiving a plurality of packets;

means for identifying at least one packet of the plurality of packets as a packet that should be retransmitted and at least one packet of the plurality of packets as a packet that should not be retransmitted.

59. The means of claim 58, wherein the packet is any grouping of bytes.

60. The means of claim 58, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

61. The means of claim 58, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

62. The means of claim 61, wherein the means for identifying comprises using a special value for the sequence identifier (SID).

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 66 of 739

63. The means of claim 58, wherein the appended bit field comprises a dedicated CRC.

64. The means of claim 58, wherein at least one packet is stored for retransmission.

65. The means of claim 58, wherein at least one packet is passed immediately to a high layer.

66. A packet handling means comprising:

means for receiving a stream of packets;

means for identifying a first number of packets in the stream of packets as low-latency packets;

means for identifying a second number of packets in the stream of packets as low-error packets;

means for forwarding the low-latency and low-error packets to a transceiver or higher layer; and

means for storing the low-error packets for error correction.

67. The means of claim 66, further comprising means for appending the low-error packets with an identifier.

68. Means for allocating memory in a transceiver comprising:

means for analyzing one or more communication parameters;

means for identifying a memory allocation; and

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 67 of 739

means for allocating memory based on the memory allocation to a retransmission function and one or more of an interleaving, deinterleaving, RS coding and RS decoding function.

69. Means for memory sharing in a transceiver comprising:

means for receiving a memory allocation;

means for establishing a shared memory for one or more of interleaving, deinterleaving, RS coding, RS decoding and packet retransmission function; and

means for sharing the shared memory between a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding functionality.

70. The means of claim 69, further comprising means for determining a compatibility of the memory allocation.

71. The means of claim 69, wherein the compatibility of the memory allocation is based on channel performance metrics.

72. A transceiver capable of performing packet retransmission comprising:

a transmission management module configurable to transmit or receive a plurality of packets; and

a QOS module configurable to identify at least one packet of the plurality of packets as a packet that should not be retransmitted.

73. The transceiver of claim 72, wherein the packet is any grouping of bytes.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 68 of 739

74. The transceiver of claim 72, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

75. The transceiver of claim 72, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

76. The transceiver of claim 75, wherein the QOS module uses a special value for a sequence identifier (SID).

77. The transceiver of claim 75, wherein the appended bit field comprises a dedicated CRC.

78. The transceiver of claim 72, wherein the at least one packet is not stored for retransmission.

79. The transceiver of claim 72, wherein the at least one packet is passed immediately to a high layer.

80. A memory capable of being shared between interleaving and/or deinterleaving and packet retransmission.

81. A memory management module capable of allocating a first portion of shared memory for retransmission and capable of allocating a second portion of the shared memory to one or more of interleaving and deinterleaving functionality.

82. The module of claim 81, further comprising a module for transmitting or receiving a message indicating how to allocate the shared memory.

83. The module of claim 81, further comprising a module for transmitting or receiving a message indicating how to share the memory.

84. A module capable of being shared between interleaving and/or deinterleaving and packet retransmission.

85. A transceiver capable of performing packet retransmission comprising:

a transmission management module configurable to transmit or receive a plurality of packets; and

a QOS module configurable to identify at least one packet of the plurality of packets as a packet that should be retransmitted and at least one packet of the plurality of packets as a packet that should not be retransmitted.

86. The transceiver of claim 85, wherein the packet is any grouping of bytes.

87. The transceiver of claim 85, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

88. The transceiver of claim 85, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 70 of 739

89. The transceiver of claim 88, wherein the identifying step comprises using a special value for a sequence identifier (SID).

90. The transceiver of claim 88, wherein the appended bit field comprises a dedicated CRC.

91. The transceiver of claim 85, wherein at least one packet is stored for retransmission.

92. The transceiver of claim 85, wherein at least one packet is passed immediately to a high layer.

93. A transceiver capable of handling a stream of packets comprising:

a QOS module capable of identifying a first number of packets in the stream of packets as low-latency packets and a second number of packets in the stream of packets as low-error packets;

a transmission management module capable of forwarding the low-latency and low-error packets to another transceiver; and

a buffer module capable of storing the low-error packets for error correction.

94. The transceiver of claim 93, further comprising a packet QOS assignment module capable of appending the low-error packets with an identifier.

95. A transceiver capable of having an allocatable memory comprising:

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 71 of 739

a controller capable of analyzing one or more communication parameters; and

a memory management module capable of identifying a memory allocation and allocating a shared memory based on the memory allocation to a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding functions.

96. A transceiver capable of sharing memory comprising:

a controller capable of receiving a memory allocation; and

a memory management module capable of establishing a shared memory for a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding functions.

97. The transceiver claim 96, wherein the memory management module further determines a compatibility of the memory allocation.

98. The transceiver of claim 96, wherein the memory allocation is based on one or more communication channel performance metrics.

99. In a communication environment where packets are being transmitted, a method for allocating a first portion of shared memory for retransmission of packets and a second portion of the shared memory for interleaving and/or deinterleaving.

100. The method of claim 99, wherein all errored packets are retransmitted.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 72 of 739

101. The method of claims 19, 20 and 99, wherein a retransmission function identifies packets that should not be retransmitted.

102. The method of claim 99, wherein all packets are being transmitted without an assigned a QOS level.

103. A packet communication method comprising:

in a first mode of operation:

transmitting or receiving a plurality of packets;

identifying at least one packet of the plurality of packets as a packet that should not be retransmitted;

in a second mode of operation:

transmitting or receiving a plurality of packets;

allocating a first portion of shared memory for retransmission of packets and a second portion of the shared memory for one or more of interleaving, deinterleaving, coding, decoding and error correction; and

in a third mode of operation:

transmitting or receiving a plurality of packets;

identifying at least one packet of the plurality of packets as a retransmittable-type packet;

identifying at least one packet of the plurality of packets as a non-retransmittable-type packet;

allocating a first portion of shared memory for retransmission of the retransmittable-type packets and a second portion of the shared memory for one or more of interleaving, deinterleaving, coding, decoding and error correction.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 73 of 739

104. The method of claim 103, wherein the non-retransmittable-type packet is a low-latency packet.

105. The method of claim 103, wherein the retransmittable-type packet is a low-error packet.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 74 of 739

ABSTRACT

Through the identification of different packet-types, packets can be handled based on an assigned packet handling identifier. This identifier can, for example, enable forwarding of latency-sensitive packets without delay and allow error-sensitive packets to be stored for possible retransmission. In another embodiment, and optionally in conjunction with retransmission protocols including a packet handling identifier, a memory used for retransmission of packets can be shared with other transceiver functionality such as, coding, decoding, interleaving, deinterleaving, error correction, and the like.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 75 of 739

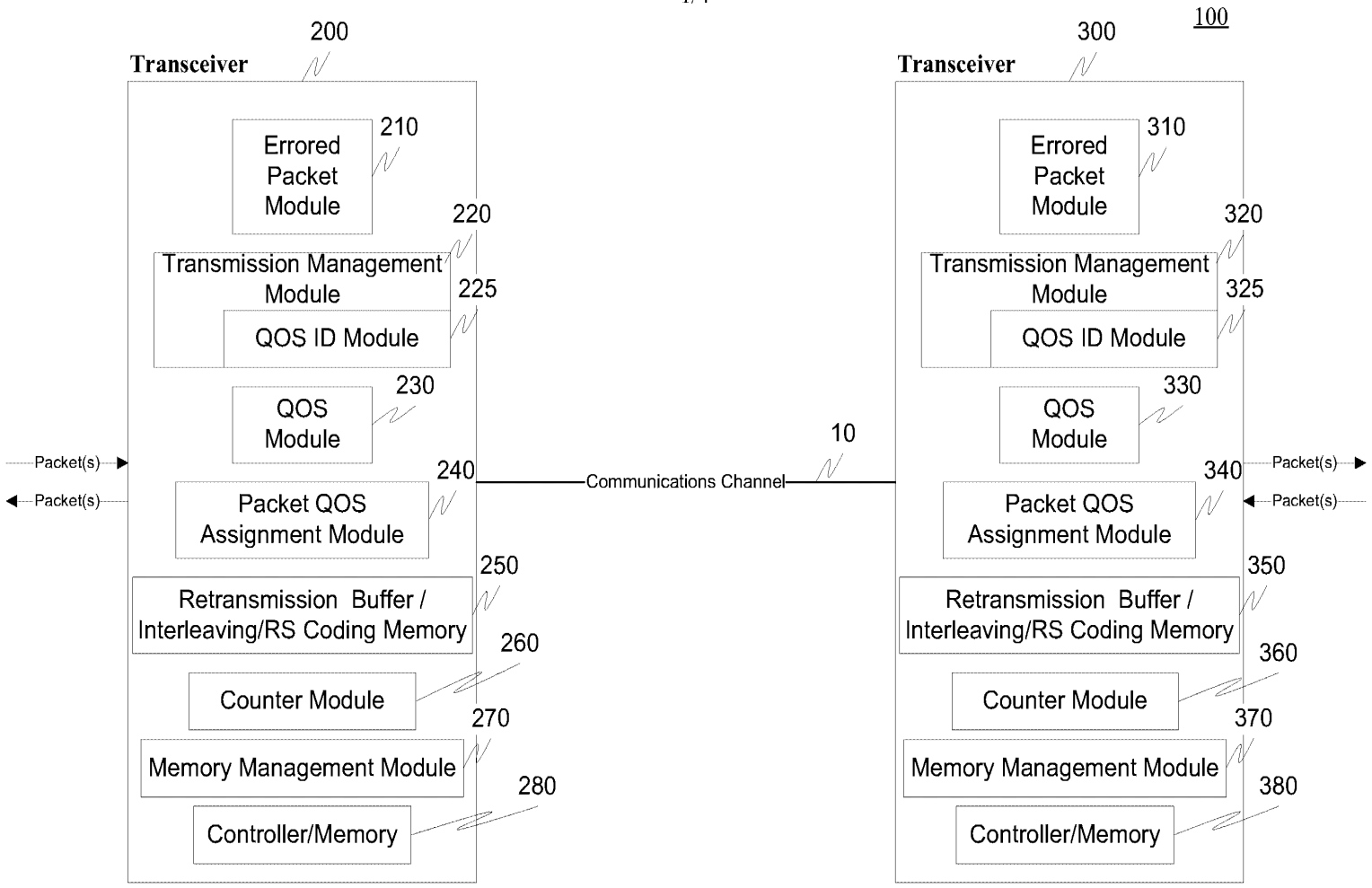


Fig. 1

IPR2022-00833
CommScope, Inc. Exhibit 1001
Page 76 of 739

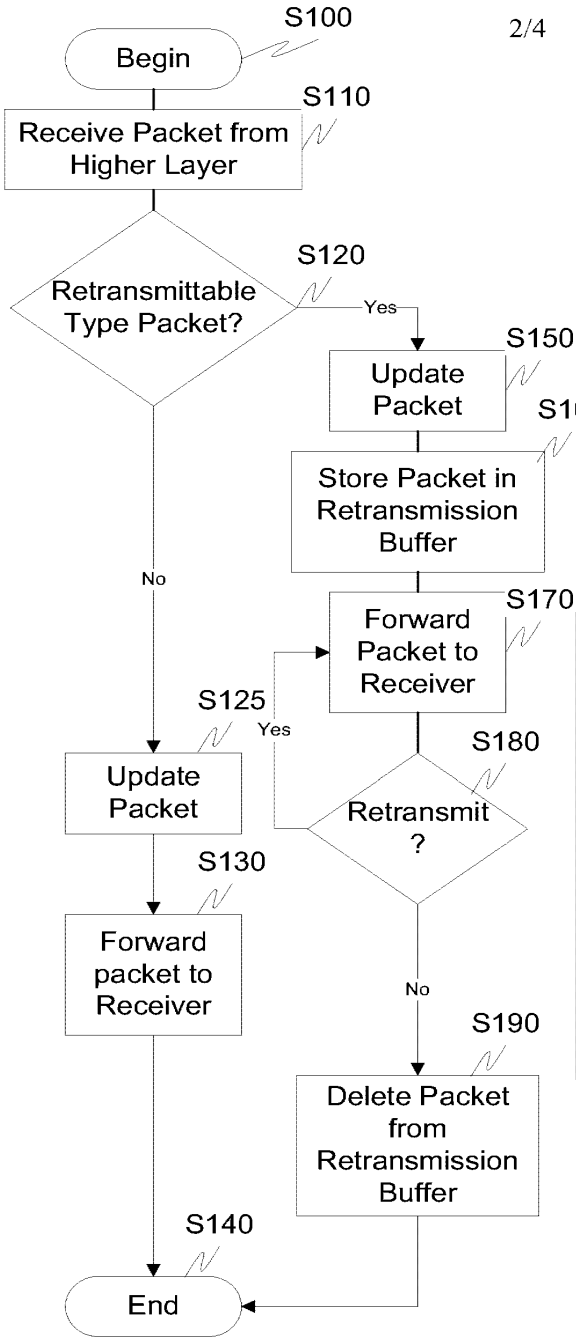

S100
Begin
S110
Receive Packet from Higher Layer
S120
Retransmittable Type Packet?
Yes
No
S150
Update Packet
S160
Store Packet in Retransmission Buffer
S170
Forward Packet to Receiver
S180
Retransmit ?
Yes
No
S125
Update Packet
S130
Forward packet to Receiver
S190
Delete Packet from Retransmission Buffer
S140
End

Fig. 2

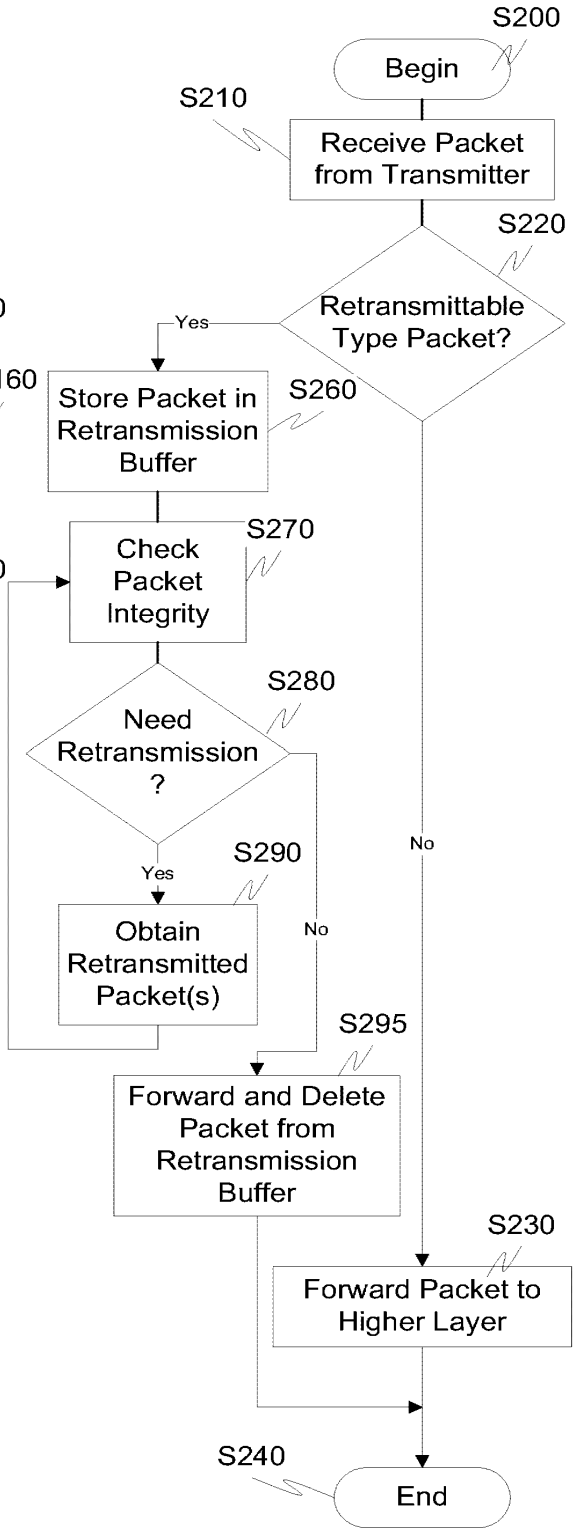

S200
Begin
S210
Receive Packet from Transmitter
S220
Retransmittable Type Packet?
Yes
No
S260
Store Packet in Retransmission Buffer
S270
Check Packet Integrity
S280
Need Retransmission ?
Yes
No
S290
Obtain Retransmitted Packet(s)
S295
Forward and Delete Packet from Retransmission Buffer
S230
Forward Packet to Higher Layer
S240
End

Fig. 3

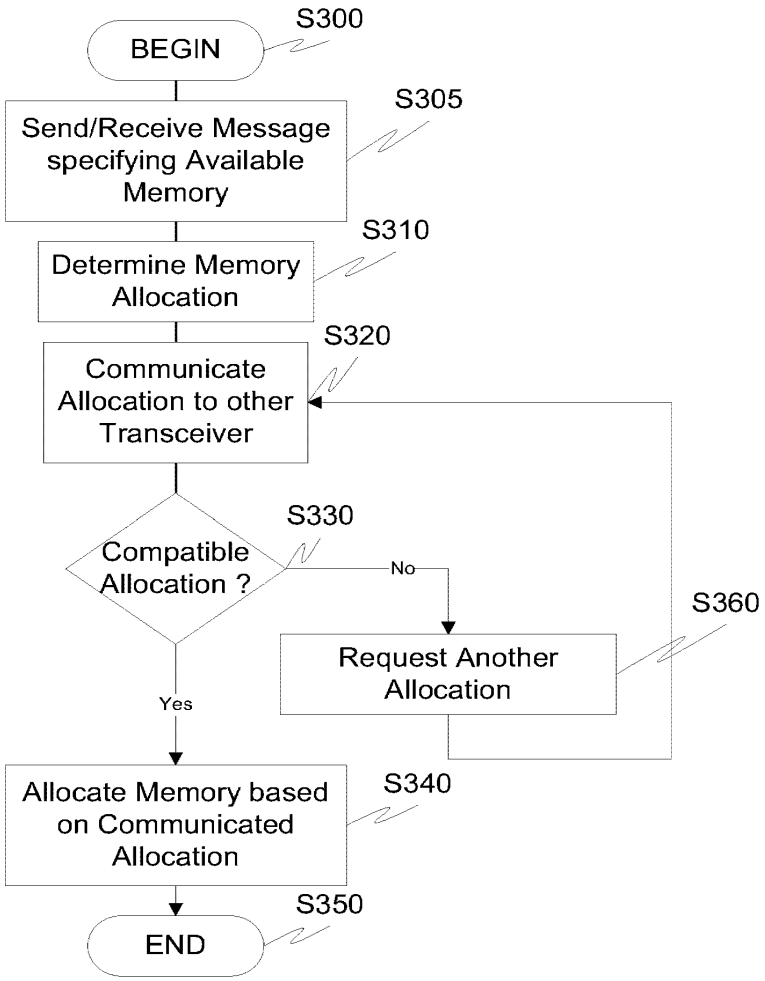

S300
BEGIN
S305
Send/Receive Message specifying Available Memory
S310
Determine Memory Allocation
S320
Communicate Allocation to other Transceiver
S330
Compatible Allocation ?
No
S360
Request Another Allocation
Yes
S340
Allocate Memory based on Communicated Allocation
S350
END

Fig. 4

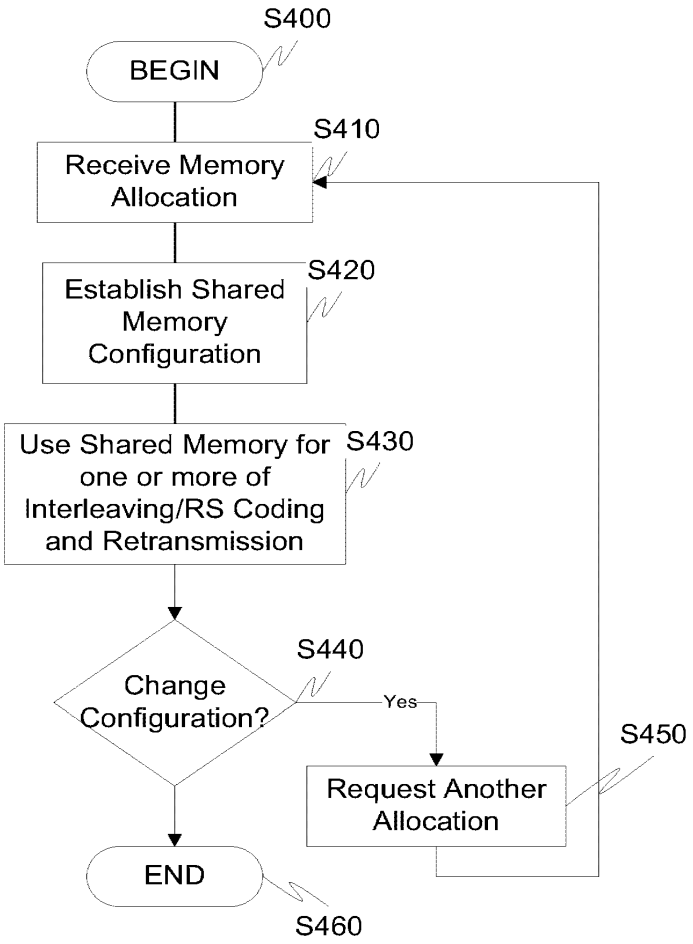

S400
BEGIN
S410
Receive Memory Allocation
S420
Establish Shared Memory Configuration
S430
Use Shared Memory for one or more of Interleaving/RS Coding and Retransmission
S440
Change Configuration?
Yes
S450
Request Another Allocation
END
S460

Fig. 5

PACKET RETRANSMISSION AND MEMORY SHARING

RELATED APPLICATION DATA

[0001] This application is a Continuation of U.S. Patent Application No. 13/766,059, filed February 13, 2013, now U.S. Patent No. 8,645,784, which is a Continuation of U.S. Patent Application No. 12/783,758, filed May 20, 2010, now U.S. Patent No. 8,407,546, which is a Continuation of U.S. Patent Application No. 12/295,828, filed October 2, 2008, now U.S. Patent No. 8,335,956, which is a national stage application under 35 U.S.C. 371 of PCT Application No. PCT/US2007/066522 having an international filing date of April 12, 2007, which designated the United States, which PCT application claims the benefit of and priority under 35 U.S.C. § 119(e) to U.S. Patent Application Nos. 60/792,236, filed April 12, 2006, entitled "xDSL Packet Retransmission Mechanism," and 60/849,650, filed October 5, 2006, entitled "xDSL Packet Retransmission Mechanism with Examples," each of which are ~~both~~ incorporated herein by reference in their entirety.

BACKGROUND

Field of the Invention

[0002] This invention generally relates to communication systems. More specifically, an exemplary embodiment of this invention relates to retransmission of packets in a communication environment. An exemplary embodiment of this invention also relates to memory sharing between transmission functions and other transceiver functions.

SUMMARY

[0003] Exemplary aspects of the invention relate to handling of packets and the assignment of a packet handling identifier. Exemplary aspects relate to sharing of resources

between retransmitted packets and other transceiver functions. In addition, exemplary aspects relate to sharing of resources between packets associated with the packet handling identifier and other transceiver functions.

[0004] More specifically, aspects of the invention relate to assigning a packet handling identifier to one or more packets. Based on the packet handling identifier, a packet can either be, for example, forwarded directly to another communication device (or layer) or, alternatively, held for possible retransmission protocols. For example, packets received from, for example, a higher-layer of a communication device, can be designated to have a specific packet handling identifier, such as a Quality of Service (QOS) level. The QOS level of a packet indicates the importance of certain service metrics (or characteristics) of one or more packets.

[0005] Two exemplary QOS metrics are delay (or latency) and Packet Error Rate (PER). While these two metrics are used for illustrative purposes herein, it should be appreciated that other metrics can also be used with this invention. For example, other QOS metrics could include one or more of a Bit Error Rate (BER), data rate, delay variation (or jitter), packet loss rate, time between error events (TBE), or the like.

[0006] As an example, in the case where the two QOS metrics are latency and PER, packets containing, for example, video information (such as IPTV) may have the requirement for a very low packet error rate but can often tolerate higher delay. In contrast, voice or data (e.g., gaming) traffic may have very low latency requirements but can tolerate a higher packet error rate. For this particular example, the video packets could be designated as "low-PER" QOS packets and the voice or data packets could be designated as "low-latency" QOS

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 81 of 739

packets. For example, a specific QOS identifier could be assigned to the low-latency packets while a different QOS identifier could be assigned to the low-PER packets. The low-latency packets could be forwarded directly to another transceiver, or a higher layer, while the low-PER packets can be stored in a retransmission buffer, e.g., memory, that can be used to reduce packet error.

[0007] As mentioned above, exemplary aspects also relate to sharing of resources between a retransmission function and other transceiver functions.

[0008] The exemplary systems and methods of this invention can utilize memory, such as a retransmission buffer, for the storing of packets for retransmission functions. Since other transceiver functions may also require memory to perform certain functionality, an exemplary aspect of this invention also relates to sharing the memory for retransmission functions with the memory required for other transceiver functions. For example, memory can be dynamically allocated based on configuration settings or noise conditions and, for example, the memory divided between one or more of interleaving/deinterleaving, RS Coding/Decoding functionality and the functionality used retransmission.

[0009] Aspects of the invention thus relate to identification of one or more packets.

[0010] Additional aspects of the invention relate to identifying one or more packets that can be retransmitted.

[0011] Still further aspects of the invention relate to identifying one or more packets that

should not be retransmitted.

[0012] Aspects of the invention also relate to retransmission of one or more of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-data frame, a PTM-TC codeword, and RS codeword and a DMT symbols.

[0013] Still further aspects of the invention relate to appending an identifier to a packet.

[0014] Still further aspects of the invention relate to appending a sequence identifier to at least one packet.

[0015] Aspects of the invention also relate to routing one or more packets based on a packet handling identifier.

[0016] Aspects of the invention also relate to retransmitting a packet.

[0017] Aspects of the invention further relate to retransmit a packet based on a retransmission request.

[0018] Still further aspects of the invention relate to sharing memory between a retransmission function and one or more of an interleaver, deinterleaver, coder, decoder and other transceiver functionalities.

[0019] Other more specific aspects of the invention relate to sharing memory between a

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 83 of 739

retransmission buffer (or memory) and interleaving/deinterleaving and/or coding/decoding functionality.

[0020] Additional exemplary, non-limiting aspects of the invention are:

1. A method of packet retransmission comprising:

transmitting or receiving a plurality of packets;

identifying at least one packet of the plurality of packets as a packet that should not be retransmitted.

2. The method of aspect 1, wherein the packet is any grouping of bytes.

3. The method of aspect 1, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

4. The method of aspect 1, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

5. The method of aspect 4, wherein the identifying step comprises using a special value for a sequence identifier (SID).

6. The method of aspect 4, wherein the appended bit field comprises a dedicated CRC.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 84 of 739

7. The method of aspect 1, wherein the at least one packet is not stored for retransmission.

8. The method of aspect 1, wherein the at least one packet is passed immediately to a high layer.

9. A packet retransmission module capable of transmitting or receiving a plurality of packets and capable of identifying at least one packet of the plurality of packets as a packet that should not be retransmitted.

10. The module of aspect 9, wherein the packet is any grouping of bytes.

11. The module of aspect 9, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

12. The module of aspect 9, wherein the module is capable of appending a bit field comprising a sequence identifier (SID) to each packet.

13. The module of aspect 12, wherein the identifying comprises using a special value for the SID.

14. The module of aspect 12, wherein the appended bit field comprises a dedicated CRC.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 85 of 739

15. The module of aspect 9, wherein the at least one packet is not stored by the module for retransmission.

16. The module of aspect 9, wherein the at least one packet is passed by the module immediately to a high layer.

17. The module of aspect 9, wherein the module is implemented in one or more of a wireless transceiver, a wireless LAN station, a wired transceiver, a DSL modem, an ADSL modem, an xDSL modem, a VDSL modem, a multicarrier transceiver, a general purpose computer, a special purpose computer, a programmed microprocessor, a microcontroller and peripheral integrated circuit element(s), an ASIC, a digital signal processor, a hard-wired electronic or logic circuit and a programmable logic device.

18. The module of aspect 9, wherein the module is implemented in one or more of a PTM-TC, ATM-TC, PMD and PMS-TC.

19. A method comprising sharing memory between an interleaving and/or deinterleaving memory and a packet retransmission memory.

20. A method comprising allocating a first portion of shared memory for retransmission and a second portion of the shared memory for interleaving and/or deinterleaving.

21. The method of aspect 20, further comprising transmitting or receiving a message indicating how to allocate the shared memory.

22. The method of aspect 19 or 20, further comprising transmitting or receiving a message indicating how to share the memory.

23. A memory capable of being shared between an interleaving and/or deinterleaving buffer and a packet retransmission buffer.

24. A module capable of allocating a first portion of shared memory for retransmission and a second portion of the shared memory for interleaving and/or deinterleaving.

25. The module of aspect 24, wherein the module is capable of transmitting or receiving a message indicating how to allocate the shared memory.

26. The module of aspect 24, wherein the module is capable of transmitting or receiving a message indicating how to share the memory.

27. The module of aspect 24, wherein the module is one or more of a wireless transceiver, a wireless LAN station, a wired transceiver, a DSL modem, an ADSL modem, an xDSL modem, a VDSL modem, a multicarrier transceiver, a general purpose computer, a special purpose computer, a programmed microprocessor, a microcontroller and peripheral

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 87 of 739

integrated circuit element(s), an ASIC, a digital signal processor, a hard-wired electronic or logic circuit and a programmable logic device.

28. A method of packet retransmission comprising:

transmitting or receiving a plurality of packets;

identifying at least one packet of the plurality of packets as a packet that should be retransmitted and at least one packet of the plurality of packets as a packet that should not be retransmitted.

29. The method of aspect 28, wherein the packet is any grouping of bytes.

30. The method of aspect 28, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

31. The method of aspect 28, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

32. The method of aspect 31, wherein the identifying step comprises using a special value for a sequence identifier (SID).

33. The method of aspect 31, wherein the appended bit field comprises a dedicated CRC.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 88 of 739

34. The method of aspect 28, wherein at least one packet is stored for retransmission.

35. The method of aspect 28, wherein at least one packet is passed immediately to a high layer.

36. A packet handling method comprising:

receiving a stream of packets;

identifying a first number of packets in the stream of packets as low-latency packets;

identifying a second number of packets in the stream of packets as low-error packets;

forwarding the low-latency and low-error packets to a transceiver or a higher layer; and

storing the low-error packets for error correction.

37. The method of aspect 36, further comprising appending the low-error packets with an identifier.

38. A method of allocating memory in a transceiver comprising:

analyzing one or more communication parameters;

identifying a memory allocation; and

allocating memory based on the memory allocation to a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 89 of 739

39. A memory sharing method in a transceiver comprising:

receiving a memory allocation;

establishing a shared memory for one or more of interleaving, deinterleaving, RS coding, RS decoding and packet retransmission functions; and

sharing the shared memory between a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding functions.

40. The method of aspect 39, further comprising determining a compatibility of the memory allocation.

41. The method of aspect 39, wherein the compatibility of the memory allocation is based on channel performance metrics.

42. Means for performing the functionality of any of the aforementioned aspects.

43. An information storage media comprising information that when executed performs the functionality of any of the aforementioned aspects.

44. Any one or more of the features as substantially described herein.

45. Means for packet retransmission comprising:

means for transmitting or receiving a plurality of packets;

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 90 of 739

means for identifying at least one packet of the plurality of packets as a packet that should not be retransmitted.

46. The means of aspect 45, wherein the packet is any grouping of bytes.

47. The means of aspect 45, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

48. The means of aspect 45, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

49. The means of aspect 48, wherein the means for identifying comprises using a special value for a sequence identifier (SID).

50. The means of aspect 48, wherein the appended bit field comprises a dedicated CRC.

51. The means of aspect 45, wherein the at least one packet is not stored for retransmission.

52. The means of aspect 45, wherein the at least one packet is passed immediately to a high layer.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 91 of 739

53. Means for sharing memory between an interleaving and/or deinterleaving function and a packet retransmission function.

54. Means for allocating a first portion of shared memory for retransmission and a second portion of the shared memory for interleaving and/or deinterleaving.

55. The means of aspect 54, further comprising means for transmitting or receiving a message indicating how to allocate the shared memory.

56. The means of aspect 54, further comprising means for transmitting or receiving a message indicating how to share the memory.

57. Means for sharing a memory between an interleaving and/or deinterleaving function and a packet retransmission function.

58. Means for packet retransmission comprising:

means for transmitting or receiving a plurality of packets;

means for identifying at least one packet of the plurality of packets as a packet that should be retransmitted and at least one packet of the plurality of packets as a packet that should not be retransmitted.

59. The means of aspect 58, wherein the packet is any grouping of bytes.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 92 of 739

60. The means of aspect 58, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

61. The means of aspect 58, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

62. The means of aspect 61, wherein the means for identifying comprises using a special value for the sequence identifier (SID).

63. The means of aspect 58, wherein the appended bit field comprises a dedicated CRC.

64. The means of aspect 58, wherein at least one packet is stored for retransmission.

65. The means of aspect 58, wherein at least one packet is passed immediately to a high layer.

66. A packet handling means comprising:

means for receiving a stream of packets;

means for identifying a first number of packets in the stream of packets as low-latency packets;

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 93 of 739

means for identifying a second number of packets in the stream of packets as low-error packets;

means for forwarding the low-latency and low-error packets to a transceiver or higher layer; and

means for storing the low-error packets for error correction.

67. The means of aspect 66, further comprising means for appending the low-error packets with an identifier.

68. Means for allocating memory in a transceiver comprising:

means for analyzing one or more communication parameters;

means for identifying a memory allocation; and

means for allocating memory based on the memory allocation to a retransmission function and one or more of an interleaving, deinterleaving, RS coding and RS decoding function.

69. Means for memory sharing in a transceiver comprising:

means for receiving a memory allocation;

means for establishing a shared memory for one or more of interleaving, deinterleaving, RS coding, RS decoding and packet retransmission function; and

means for sharing the shared memory between a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding functionality.

70. The means of aspect 69, further comprising means for determining a compatibility of the memory allocation.

71. The means of aspect 69, wherein the compatibility of the memory allocation is based on channel performance metrics.

72. A transceiver capable of performing packet retransmission comprising:

a transmission management module configurable to transmit or receive a plurality of packets; and

a QOS module configurable to identify at least one packet of the plurality of packets as a packet that should not be retransmitted.

73. The transceiver of aspect 72, wherein the packet is any grouping of bytes.

74. The transceiver of aspect 72, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

75. The transceiver of aspect 72, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

76. The transceiver of aspect 75, wherein the QOS module uses a special value for a sequence identifier (SID).

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 95 of 739

77. The transceiver of aspect 75, wherein the appended bit field comprises a dedicated CRC.

78. The transceiver of aspect 72, wherein the at least one packet is not stored for retransmission.

79. The transceiver of aspect 72, wherein the at least one packet is passed immediately to a high layer.

80. A memory capable of being shared between interleaving and/or deinterleaving and packet retransmission.

81. A memory management module capable of allocating a first portion of shared memory for retransmission and capable of allocating a second portion of the shared memory to one or more of interleaving and deinterleaving functionality.

82. The module of aspect 81, further comprising a module for transmitting or receiving a message indicating how to allocate the shared memory.

83. The module of aspect 81, further comprising a module for transmitting or receiving a message indicating how to share the memory.

84. A module capable of being shared between interleaving and/or deinterleaving and packet retransmission.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 96 of 739

85. A transceiver capable of performing packet retransmission comprising:

a transmission management module configurable to transmit or receive a plurality of packets; and

a QOS module configurable to identify at least one packet of the plurality of packets as a packet that should be retransmitted and at least one packet of the plurality of packets as a packet that should not be retransmitted.

86. The transceiver of aspect 85, wherein the packet is any grouping of bytes.

87. The transceiver of aspect 85, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

88. The transceiver of aspect 85, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

89. The transceiver of aspect 88, wherein the identifying step comprises using a special value for a sequence identifier (SID).

90. The transceiver of aspect 88, wherein the appended bit field comprises a dedicated CRC.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 97 of 739

91. The transceiver of aspect 85, wherein at least one packet is stored for retransmission.

92. The transceiver of aspect 85, wherein at least one packet is passed immediately to a high layer.

93. A transceiver capable of handling a stream of packets comprising:

a QOS module capable of identifying a first number of packets in the stream of packets as low-latency packets and a second number of packets in the stream of packets as low-error packets;

a transmission management module capable of forwarding the low-latency and low-error packets to another transceiver; and

a buffer module capable of storing the low-error packets for error correction.

94. The transceiver of aspect 93, further comprising a packet QOS assignment module capable of appending the low-error packets with an identifier.

95. A transceiver capable of having an allocatable memory comprising:

a controller capable of analyzing one or more communication parameters; and

a memory management module capable of identifying a memory allocation and allocating a shared memory based on the memory allocation to a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding functions.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 98 of 739

96. A transceiver capable of sharing memory comprising:

a controller capable of receiving a memory allocation; and

a memory management module capable of establishing a shared memory for a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding functions.

97. The transceiver aspect 96, wherein the memory management module further determines a compatibility of the memory allocation.

98. The transceiver of aspect 96, wherein the memory allocation is based on one or more communication channel performance metrics.

99. In a communication environment where packets are being transmitted, a method for allocating a first portion of shared memory for retransmission of packets and a second portion of the shared memory for interleaving and/or deinterleaving.

100. The method of aspect 99, wherein all errored packets are retransmitted.

101. The method of aspects 19, 20 and 99, wherein a retransmission function identifies packets that should not be retransmitted.

102. The method of aspect 99, wherein all packets are being transmitted without an assigned a QOS level.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 99 of 739

103. A packet communication method comprising:

in a first mode of operation:

transmitting or receiving a plurality of packets;

identifying at least one packet of the plurality of packets as a packet that should not be retransmitted;

in a second mode of operation:

transmitting or receiving a plurality of packets;

allocating a first portion of shared memory for retransmission of packets and a second portion of the shared memory for one or more of interleaving, deinterleaving, coding, decoding and error correction; and

in a third mode of operation:

transmitting or receiving a plurality of packets;

identifying at least one packet of the plurality of packets as a retransmittable-type packet;

identifying at least one packet of the plurality of packets as a non-retransmittable-type packet;

allocating a first portion of shared memory for retransmission of the retransmittable-type packets and a second portion of the shared memory for one or more of interleaving, deinterleaving, coding, decoding and error correction.

104. The method of aspect 103, wherein the retransmittable-type packet is a low-latency packet.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 100 of 739

105. The method of aspect 103, wherein the retransmittable-type packet is a low-error packet.

[0021] These and other features and advantages of this invention are described in, or are apparent from, the following detailed description of the exemplary embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] The exemplary embodiments of the invention will be described in detail, with reference to the following figures wherein:

[0023] Fig. 1 illustrates an exemplary communication system according this invention.

[0024] Figure 2 is a flowchart outlining an exemplary method for packet retransmission according this invention.

[0025] Figure 3 is a flowchart outlining an exemplary method for retransmitted packet reception according this invention.

[0026] Figure 4 is a flowchart outlining an exemplary method for memory allocation according to this invention.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 101 of 739

[0027] Figure 5 is a flowchart outlining an exemplary method for memory sharing according this invention.

DETAILED DESCRIPTION

[0028] The exemplary embodiments of this invention will be described in relation to packet retransmission and/or memory sharing in an xDSL environment. However, it should be appreciated, that in general, the systems and methods of this invention will work equally well for any type of communication system in any environment.

[0029] The exemplary systems and methods of this invention will also be described in relation to multicarrier modems, such as xDSL modems and VDSL modems, and associated communication hardware, software and communication channels. However, to avoid unnecessarily obscuring the present invention, the following description omits well-known structures and devices that may be shown in block diagram form or otherwise summarized.

[0030] For purposes of explanation, numerous details are set forth in order to provide a thorough understanding of the present invention. It should be appreciated however that the present invention may be practiced in a variety of ways beyond the specific details set forth herein.

[0031] Furthermore, while the exemplary embodiments illustrated herein show the various components of the system collocated, it is to be appreciated that the various components of the system can be located at distant portions of a distributed network, such as a communications network and/or the Internet, or within a dedicated secure, unsecured and/or encrypted system. Thus, it should be appreciated that the components of the system can be

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 102 of 739

combined into one or more devices, such as a modem, or collocated on a particular node of a distributed network, such as a telecommunications network. As will be appreciated from the following description, and for reasons of computational efficiency, the components of the system can be arranged at any location within a distributed network without affecting the operation of the system. For example, the various components can be located in a Central Office modem (CO, ATU-C, VTU-O), a Customer Premises modem (CPE, ATU-R, VTU-R), an xDSL management device, or some combination thereof. Similarly, one or more functional portions of the system could be distributed between a modem and an associated computing device.

[0032] Furthermore, it should be appreciated that the various links, including communications channel 10, connecting the elements (not shown) can be wired or wireless links, or any combination thereof, or any other known or later developed element(s) that is capable of supplying and/or communicating data to and from the connected elements. The term module as used herein can refer to any known or later developed hardware, software, firmware, or combination thereof that is capable of performing the functionality associated with that element. The terms determine, calculate and compute, and variations thereof, as used herein are used interchangeably and include any type of methodology, process, mathematical operation or technique. Transmitting modem and Transmitting transceiver as well as Receiving modem and Receiving transceiver are used interchangeably herein.

[0033] Moreover, while some of the exemplary embodiments described herein are directed toward a transmitter portion of a transceiver performing interleaving and/or coding on transmitted information, it should be appreciated that a corresponding deinterleaving

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 103 of 739

and/or decoding is performed by a receiving portion of a transceiver. Thus, while perhaps not specifically illustrated in every example, this disclosure is intended to include this corresponding functionality in both the same transceiver and/or another transceiver.

[0034] Communication system 100 comprises a portion of a transceiver 200 and a portion of a transceiver 300. The transceiver 200, in addition to well known componentry, comprises an errored packet module 210, a transmission management module 220, a QOS ID module 225, a QOS module 230, a packet QOS assignment module 240, a retransmission buffer/interleaving/deinterleaving/RS coding/RS Decoding memory 250, a counter module 260, a memory management module ~~27D~~270 and a controller/memory 280.

[0035] Connected via communication channel 10 to transceiver 200 is transceiver 300. The transceiver 300, in addition to well known componentry, comprises an errored packet module 310, a transmission management module 320, a QOS ID module 325, a QOS module 330, a packet QOS assignment module 340, a retransmission buffer/interleaving/deinterleaving/RS coding/RS Decoding memory 350, a counter module 360, a memory management module 370 and a controller/memory 380.

[0036] As discussed above, the systems, methods and protocols discussed herein will be described in relation to xDSL systems, such as those specified in ADSL2 ITU-T ~~G.993.2~~G.992.3, ADSL2+ ITU ~~G.993.5~~G992.5, and VDSL2 ITU G.993.2, which are incorporated herein by reference in their entirety.

[0037] In operation, a first aspect of the invention relates to retransmission of one or

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 104 of 739

more packets, the retransmission identifier being implemented at any transmission layer where packet boundaries are defined. For example, it can be implemented in the Packet Transmission Mode TC (PTM-TC) of xDSL systems. For reference, "Annex A" which is of record in the identified provisional filing and incorporated by reference herein contains the PTM-TC of ADSL2 and VDSL2 systems as specified in the ITU-T G.992.3 ADSL2 standard.

[0038] As discussed herein, the invention will generally be described in relation to the retransmission mechanism being incorporated as part of the PTM-TC however, it should be appreciated that it can also be implemented inside other layer(s) of a communication device, such as an xDSL transceiver, such as within the PMD or PMS-TC.

[0039] The retransmission techniques disclosed herein can also be performed at a layer above the PTM-TC, for example, in a new layer between the PTM-TC and the next higher layer, or at any layer above the physical layer, e.g., layers 2, 3, 4, 5, etc.

[0040] Additionally, while "packet" is used herein, the term "packet" includes any basic data unit, i.e., a grouping of bytes. For example, a packet could be an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data frame, a PTM-TC codeword, an RS Codeword, a DMT symbol, or, in general, any grouping of data bytes or information. A packet could also be a combination of one or more of the above. For example, a packet could be constructed by concatenating any number of ATM cells to create a larger grouping of bits. For example, five 53-byte ATM cells could be combined into a 265 byte packet or four 65 PTM-TC codewords could be combined into a 260 byte packet. A packet could also be based on dividing any of the above groupings of bytes. For example, larger IP or Ethernet packets

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 105 of 739

could be divided into smaller groups of bytes to be used as a "packet" with the retransmission functionality described herein. For example, a ~~1501~~1500 byte IP packet could be divided into three 500 byte packets and used by the retransmission protocol. If the retransmission function is implemented as part of the PTM-TC, packets are received from a higher-layer in the xDSL transmitter PTM-TC and sent via the xDSL transmitter PMS-TC and PMD over the communication channel to the xDSL receiver. The xDSL receiver PMD and PMS-TC process the received signal and pass the results to the PTM-TC, which processes the information and passes the received packet up to a higher layer(s).

[0041] Packets received from the higher layer at the xDSL transmitter PTM-TC can be designated to have a QOS level. The QOS level of a packet can indicate the importance of certain service metrics (or characteristics) of this (or more) packet(s). Two exemplary QOS metrics are delay (or latency) and PER. Although, as discussed above, these two characteristics are the focus of the invention, any number of different QOS metrics could also be used.

[0042] As an example, in the case where the 2 QOS metrics are latency and PER, a first set of packets carrying certain information may have a requirement for very low PER but may be able to tolerate higher delay. Other packets containing information such as voice or data traffic may have very low delay requirements but can tolerate a higher PER. According to an exemplary embodiment of this invention, the first set of packets would be designated as "low-PER" QOS packets whereas voice or data packets would be designated at "low-latency" QOS packets. The QOS level (or metric) of a packet could be designated in a number of ways. For example:

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 106 of 739

i) Certain bit fields in the header of data portions of each packet could contain certain values that specify the QOS requirements a packet. For example, the packet header could contain bit fields that indicate if the packet has a "low-PER" QOS requirement or a "low-latency" QOS requirement. These fields could be read by the transmitting modem and/or receiving modem to determine the QOS level of each packet.

ii) When sending packets from higher layer to the PTM-TC, the higher layer could indicate on a packet by packet basis the QOS requirements of each packet. For example, there could be a separate signal on the interface that indicates if a packet being transferred has a "low-PER" QOS requirement or a "low-latency" QOS requirement.

iii) When sending packets from higher layer to the PTM-TC, there could be a separate interface (or channel) for packets with different QOS requirements. For example, one channel could be used to transfer packets that have a "low-PER" QOS requirement and a second channel could used to transfer packets that have a "low-latency" QOS requirement. This general concept could also be scaled to accommodate a plurality of different QOS requirements and a plurality of channels.

iv) As in the case of Pre-Emption in the PTM-TC (see Annex A), two logically separated γ-interfaces could be used for the transport of a low-PER and low-latency packet flow through a single bearer channel. This general idea could then be scaled to support any number of packet types.

[0043] Other mechanisms can also be used to designate the QOS level of a packet – provided the transmitter and/or receiver retransmission protocol is capable of knowing the QOS level for one or more packets.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 107 of 739

[0044] Once the QOS level is known by the PTM-TCs, an efficient packet retransmission can be designed. The exemplary packet retransmission methods and protocols can be designed to include any one or more of the following system level characteristics:

- All packets are received from the higher layer and passed to the higher layers in the correct order.
- "Low-latency" QOS packets will not incur any extra delay due to retransmission.
- Only packets with "low-PER" QOS should be retransmitted, and therefore only low-PER packets will incur the extra delay due to the retransmission mechanism.
- Flow control can be minimized such that the transmitter can generally accept all packets from the higher layer at the required data rate without holding-off (or "blocking") packets from the higher layer during the retransmission process.
- Packet delay-variation/jitter can be minimal.
- A "DRR-like" functionality in a single bearer without requiring latency/interleaver OLR.

[0045] The transceiver 200, in cooperation with the QOS module 230, receives packets from a higher-layer. In cooperation with the packet QOS assignment module 240, a packet Sequence ID (SID) is appended to the received packets. The packets, in cooperation with the transmission management module 220, can then be transmitted in the order in which they were received.

[0046] The QOS Module 230, if not already performed by a high layer, also identifies packets based on the QOS requirement of the packet(s). Then, in cooperation with the packet

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 108 of 739

QOS assignment module 240, a QOS identifier is associated with the packet as discussed hereinafter.

[0047] If, for example, the packet is identified as a low-PER packet, and assigned such an identifier by the QOS module 230, when the transmission management module 220 receives the packet, the packet is identified by the QOS ID module 225 as being a low-PER packet and the packet is forwarded for storage in the retransmission buffer 250. Alternatively, if the packet has been labeled as a low-latency packet, and identified as such by the by the QOS ID module 225, the packet can be transmitted to the receiving modem in cooperation with the transmission management module 220.

[0048] The low-PER packets can be stored for a sufficient amount of time to wait for a retransmission message from the receiver PTM-TC. During this time, the transmitting modem can continue to receive packets from one or more higher layers, label these packets, if needed, and store these packets, if they are identified as low-PER packets, in the same way. The resulting minimum storage requirements for the transmitter PTM-TC are estimated below.

[0049] For successful retransmission, the receiving modem should be able to inform the transmitting modem which packet, or packets, need to be retransmitted. One exemplary way of performing this is by transmitting packets with an appended bit field that contains a counter indicating the place of each packet in a stream of packets. This counter value is also known as a Sequence ID (SID). For example, a bit field containing a 16-bit counter could be appended to each packet and the counter module 260 would be incremented by one after each

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 109 of 739

packet was transmitted. In cooperation with the packet assignment module 240, a packet counter field could be appended to the packet in a number of places, for example, at the beginning or end of the packet, or at the beginning or end of the packet header.

[0050] Packets received from a higher-layer may already have information in a header or data field of the packet that contains the packet count, or sequence, information. In addition, the packet counter field may be appended with an additional CRC field that contains a cyclic redundancy check that is computed on the packet counter field bits only. This CRC can be used by the receiver to determine if the packet counter field is received correctly, i.e., without bit errors. This CRC can be in addition to the standard CRC inserted by the standard PTM-TC (the standard packet PTM-TC CRC is a CRC that covers all bits in a packet). The standard packet CRC may also cover the new packet counter field in its CRC as well. This helps if the receiving modem uses the presence or absence of the packet counter field in a packet to detect if the packet has a low-PER or low-latency requirement (discussed below).

[0051] Alternatively, or in addition, the packet counter field (with or without a dedicated CRC) can be appended only to the packets with a specific QOS requirement, whereas all other packets can be transmitted without modification. For example, all video packets with low-PER QOS could contain the appended packet counter field whereas all the voice/data low-latency packets could be transmitted unchanged. One exemplary benefit of this is that the overhead (rate loss) due to adding the packet counter field is incurred only when transmitting low-PER packets.

[0052] Alternatively, or in addition, all low-PER and low-latency packets can be

transmitted with the low packet counter field (with or without a dedicated CRC). In this case, the packet counter field of the low-latency packets may contain a special value indicating that a packet is not a low-PER packet. Also, the packet counter field of the low-latency packet may not even contain a count value, since the low-latency packets are not intended to be retransmitted. In this case, the packet counter field could contain a counter value only for low-PER packets and the counter value would only be incremented when a low-PER packet was transmitted. As an example, if the packet counter field is 16 bits, the special value of all zeros could be used to indicate that a packet is a low-latency packet. In this case, low-PER packets could contain counter values from one up to 2^{16}-1, but not including all zeros, since this special zero value can be used to indicate a low-latency packet.

[0053] The receiving modem, e.g., receiver PTM-TC, which in this case is illustrated as the transceiver 300 and includes comparable functionality to that described in relation to transceiver 200, receives packets from the transmitting modem via the PMS-TC. If the received packet is identified as a low-latency packet by the QOS ID module 325, the packet is passed to a higher-layer. If a received packet is identified by the QOS ID module 325 as a low-PER packet, the packet is forwarded, with the cooperation of the transmission management module 320, to the retransmission buffer 350 for a minimum amount of time before passing to a higher-layer.

[0054] The storage time in the retransmission buffer 350 helps ensure that the retransmission protocol provides a constant delay, e.g., no delay variation seen by the upper layers. This way, if a packet needs to be retransmitted, the receiving modem can continue to provide packets to the higher-layers at a constant rate while waiting for the retransmitted

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 111 of 739

packet(s) to arrive from the transmitting modem. The resulting minimum memory (or storage) requirements for the receiving PTM-TC are estimated below.

[0055] Alternatively, low-PER packets without errors may not be stored for a minimum amount of time before passing to a higher-layer. The error-free low-PER packets can be passed to the higher-layer immediately just like the low-latency packets. However, when a low-PER packet is in error, it is stored along with all of the following low-PER packets before passing to a higher-layer in order to wait for the retransmitted packet(s) to arrive. This will cause a delay variation on the low-PER packets whenever a retransmission occurs. However, this delay variation would not apply to the low-latency packets.

[0056] The QOS ID module 325 can detect that a packet is either low-PER or low-latency using several different methods. For example, if all low-PER and low-latency packets contain the appended packet counter field, then the receiving modem, in cooperation with the counter module 360, detects a low-latency packet when a packet counter field contains the designated special value, which was inserted by the transmitting modem, indicating the packet is a low-latency packet.

[0057] Alternatively, or in addition, the receiver could detect a low-PER packet when the packet counter field contains a valid packet counter value. Additionally, if a dedicated CRC is appended to the packet counter field, the CRC could be used to detect if the packet counter field bits are in error.

[0058] If the packet counter field, including the CRC, is only appended to low-PER

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 112 of 739

packets, the absence or presence of this field in a packet can be used by the receiving modem, and in particular the QOS ID module, to detect a low-delay packet. For example, the receiving modem can examine the position in the packet where the packet counter field would be, if it was a low-PER packet, and if the packet counter field CRC fails while the standard whole packet CRC is correct, the receiving modem could determine that the packet is a low-delay packet, since it does not contain the packet counter field. Likewise, for example, the receiving modem can examine the position in the packet were the packet counter field would be, if it was a low-PER packet, and if the packet counter field CRC is correct, the receiving modem would determine that the packet is a low-PER packet, regardless of the status of the standard whole packet CRC.

[0059] The receiving modem, in cooperation with the retransmission buffer 350, and the errored packet module 310, can be used to detect missing or errored packets in a number of exemplary ways. For example, the errored packet module 310 can detect bit errors in the packet using the standard/whole packet PTM-TC CRC. Alternatively, or in addition, the errored packet module 310 can detect bit errors in the packet counter field if the transmitting modem appended a dedicated CRC to the packet counter field. This CRC is valuable because it can be used by the errored packet module in the receiving modem to determine if a packet has the correct packet number, even if the standard whole packet CRC happens to be in error.

[0060] Alternatively, or in addition, the errored packet module 310, can detect an errored or missing packet by receiving a packet with a correct CRC, either in the standard or packet counter field, which contains a packet counter number that is not the expected packet counter number. For example, if the errored packet module 310, in cooperation with the counter

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 113 of 739

module 360, detects the receipt of a packet with a counter number equal to 5, wherein the errored packet module 310 is expecting to receive a packet with a counter equal to 3, the errored packet module 310 can determine that two packets, namely packets numbered 3 and 4, were lost due to errors.

[0061] Once a packet(s) is found to be in error, there are several exemplary ways in which a receiving modem can communicate information to the transmitting modem indicating that a retransmission of one or more packets is required. For example, the receiving modem, in cooperation with the errored packet module 310, can send an acknowledgment (ACK) message to the transmitting modem for every correctly received message or every predetermined number of packets. As long as the transmitting modem, and in particular the errored packet module 210, receives messages acknowledging receipt of packets in sequential order, there is no need for retransmission of information to the receiving modem. However, if the transmitting modem, and in particular the errored packet module 210, receives a message from the receiving modem, and in particular the errored packet module 310, indicating that a packet was correctly received with a counter value that is out of order, a retransmission by the transmitting modem is required. In the above example, where the receiving modem received a packet with a counter value equal to 5, without receiving packets numbered 3 and 4, the transmitting modem could receive an ACK for the packet with counter value of 2 and then an ACK for the packet with a counter value of 5. The transmitting modem would then determine that it was necessary to retransmit packets with counter values of 3 and 4 since they were not received.

[0062] Alternatively, or in addition, a timeout value could be specified for the

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 114 of 739

transmitting modem. This timeout value could correspond to the amount of time that the transmitting modem should wait for an ACK for particular packet before retransmitting the packet. The timeout value could be set to be at least as long as the round-trip delay required for the transmitting modem to send a packet to the receiving modem and for the receiving modem to send an ACK back to the transmitting modem. If an ACK is not received by the timeout value, the transmitting modem could retransmit the packet.

[0063] Alternatively, or in addition, a negative acknowledgment (NAK) could be sent to the transmitting modem when a packet is detected as errored or missing. In the above example, when the receiving modem received the packet with a counter value of 5, while expecting a counter value of 3, the receiving modem could send a NAK message to the transmitting modem indicating that packets with counter values of 3 and 4 were not correctly received and needed to be retransmitted.

[0064] Alternatively, or in addition, if a packet was received with a correct packet counter CRC and a valid packet counter value *a* and an incorrect standard whole packet CRC, the receiving modem could send a NAK message to the transmitting modem indicating that a packet with a value of *a* was incorrectly received and needed to be retransmitted.

[0065] Assuming that errored packets are infrequent, any methodology that sends an ACK for each correctly received packet can require a larger amount of data rate in the message channel that communicates this information back to the transmitting modem. In this case, sending only NAKs has the benefit that it requires sending a message only when an errored or missing packet is detected. Depending on the data rate capabilities of the message

channel, and the PER, a retransmission system may use only ACKs, only NAKs, or both ACKs and NAKs at the same time.

[0066] The ACK and NAK messages sent back to the transmitting modem can be transmitted over the same physical channel i.e., phone line, in the opposite direction as the received packets. Since the channel has a limited data rate and is not necessarily error-free, it is important to make sure that these messages are as robust as possible and consume the least amount of data rate. Additionally, since the transmit and receive retransmission memory requirements depend on the round-trip latency of the connection, is important to minimize latency requirements for the message channel. There are several ways these requirements can be addressed.

[0067] The messages can be sent over a separate "low-latency" or "fast" path between the xDSL transceivers. This fast path could include little or even no delay due to interleaving and can be specified to have a latency that is less than 2ms.

[0068] Alternatively, or in addition, the messages can be sent with increasing robustness by repeating transmission of each message a number of times. For example, the message could be repeated x times in order to make sure that even if x-1 messages were corrupted by the channel, at least one message would be received correctly.

[0069] Alternatively, or in addition, the messages can be sent such that each message is repeated a number of times and each repeated message is sent in a different DMT symbol. For example, the message can be repeated x times and each message sent in one of x DMT

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 116 of 739

symbols. This way, even if x-1 DMT symbols were corrupted by the channel, at least one message would be received correctly.

[0070] Alternatively, or in addition, the messages can be sent such that each message is repeated a number of times and each repeated message is sent in different DMT symbols. For example, the message could be repeated x times and each message sent in one of x DMT symbols. This way, even if x-1 DMT symbols were corrupted by the channel, at least one message would be received correctly.

[0071] Alternatively, or in addition, the messages can be sent such that each message is repeated a number of times and each repeated message is sent a plurality of times in each DMT symbol. For example, the message could be repeated x times and each repeated message sent y times in one of x DMT symbols. This way, even if x-1 DMT symbols were corrupted by the channel and/or large portions of a DMT symbol were corrupted by a channel, the least one message would be received correctly.

[0072] Alternatively, or in addition, the messages can include multiple packet count values in order to reduce the data rate requirements. For example, if packets with counter values of 3 - 9 are correctly (or incorrectly) received an ACK (or NAK) message would be sent to indicate these packet values. For example, the message could contain the values 3 and 9 and the receiver of the message would automatically know that all intermediate values (4, 5, 6, 7, 8) are also been indicated in the message.

[0073] Alternatively, or in addition, the DMT sub-carriers that modulate these messages

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 117 of 739

could operate with a much higher SNR margin e.g., 15dB, as compared to the normal 6dB margin of xDSL systems. This way, the messages would have a higher immunity to channel noise.

[0074] Alternatively, or in addition, a receiving modem may need to send an additional ACK or NAK message after already in the process of sending a repeated message. For example, a receiving modem may detect that packets with values 3 to 9 have been correctly received and send an ACK message back to the transmitting modem indicating this information. This message can be repeated x times with each repeated message being transmitted (at least once) on different DMT symbols. While sending the second repeated message on the second DMT symbol, the receiver could detect that packets with values 10 to 17 have now also been correctly received. In this case, the receiving modem could just append this information to the previous message or, alternatively, send a new separate message that is repeated as well x times with each repeated message being transmitted (at least once) on a different DMT symbol.

[0075] Alternatively, or in addition, when repeating a message x times on x DMT symbols, each repeated message can be modulated on a different set of DMT sub-carriers on each DMT symbol. This way, if one or more sub-carriers have a low SNR, the message will still be correctly received.

[0076] For low-PER packets, the delay due to this retransmission protocol is equal to the delay that results from storing these packets at the receiving modem (RX PTM-TC) to pass in the packets to a higher layer. Low-latency packets do not incur extra delay.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 118 of 739

[0077] The transmitting modem must store a packet for retransmission for a time equal to the round trip delay from when the packet is sent to when the retransmission message is received. During this time the transmitting modem continues to receive packets from the higher layer and continues to store these packets in the same way. Therefore the storage requirements in octets can be computed as:

*Minimum TX memory (octets)= roundtripdelay*datarate,*

where the *roundtripdelay* is the time equal to the round trip delay from when the packet is sent to when the retransmission message is received, and the *datarate* is the data rate of the connection that is transferring the packets.

For ITU-T G.993.2 VDSL2, which is incorporated herein by reference, this can be computed using the VDSL2 profile parameters as:

Minimum TX memory (octets) = (DS + US Interleaving Delay in octets) + (US+DS alpha/beta delay without interleaving)(Bidirectional Net data rate) = MAXDLEYOCTET + (4 ms)*MBDC,*

where *MAXDELAYOCTET* and *MBDC* are as specified in the VDSL2 profiles.

[0078] For the receiver, the minimum receiver storage requirements can be determined in a similar manner. More specifically, the RX PTM-TC must store a packet before passing it to the higher layer for a time equal to the round trip delay from when a retransmission message is transmitted to when the retransmitted packet is received. This is equal to storage requirements in octets (same as transmitter):

*Minimum RX memory (octets)= roundtripdelay*datarate,*

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 119 of 739

where the *roundtripdelay* is the time equal to the round trip from when a retransmission message is transmitted to when the retransmitted packet is received and the *datarate* is the data rate of the connection that is transferring the packets.

[0079] For ITU-T G.993.2 VDSL2 this can be computed using the VDSL2 profile parameters as:

Minimum RX memory (octets) = (DS + US Interleaving Delay in octets) + (US+DS alpha/beta delay without interleaving)(Bidirectional Net data rate) = MAXDLEYOCTET + (4 ms)*MBDC,*

where MAXDELAYOCTET and MBDC are as specified in the ITU-T G.993.2 VDSL2 profiles.

[0080] Table 1: Minimum TX or RX memory requirements for VDSL2

VDSL2 PROFILE	8a,8b,8c,8d	12a,12b	17a	30a
TX or RX memory requirements (octets) = MAXDLEYOCTET +.002MBDC	90,536	99,536	123,304	231,072

The estimates in Table 1 assume that all the entire *MAXDELAYOCTET* and *MBDC* are used for the transfer of the packet stream, i.e., the reverse channel has a very low data rate and no interleaving.

[0081] Some xDSL standards specify minimum storage, i.e., memory, requirements for interleaving of RS codewords. Interleaving with RS coding is an effective way of correcting channel errors due to, for example, impulse noise. For example, VDSL2 requires support of

an aggregate bidirectional interleaver and de-interleaver memory of 65Kbytes for the 8a VDSL2 profile. This corresponds to storage requirement of approximately 32Kbytes in a single transceiver.

[0082] Sharing of Memory between the Retransmission Function and one or more of the Interleaving/Deinterleaving/RS Coding/RS Decoding Functions

[0083] From Table 1, it is apparent that the memory requirements to support the retransmission protocol may be more than double the storage requirements of a single transceiver. Additionally, the retransmission protocol provides a different method for correcting channel errors due to, for example, impulse noise.

[0084] Moreover, interleaving and RS coding methods and retransmission protocols provide different advantages with respect to error correction capabilities, latency, buffering requirements, and the like. For example, under certain configuration and noise conditions the interleaving/RS coding provides error correction/coding gain with less delay and overhead than the retransmission protocol (for packets that can be retransmitted). While under other conditions the retransmission protocol will provide better error correction with less delay and overhead than the interleaving/RS coding.

[0085] In some cases, a first portion of the memory can be used for one function and a second portion of the memory for some other function. For example, if the configuration and noise conditions are such that the interleaving/RS coding would not provide good error correction/coding gain, then all the available memory could be used for the retransmission

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 121 of 739

function and none allocated to the interleaving/deinterleaving/RS coding/RS decoding functionality, e.g., the interleaving/deinterleaving could be disabled.

[0086] Likewise, if the configuration and noise conditions are such that the retransmission protocol would not provide good error correction/coding gain, then all the available memory could be used for the interleaving/deinterleaving/RS coding/RS decoding functionality and no memory would be used for the retransmission function, e.g., the retransmission function would be disabled.

[0087] Alternatively, or addition, both methods could be used because both have their advantages, with the system, e.g., the memory management module 370, being able to dynamically allocate a first portion of the memory 250/350 to the interleaving/deinterleaving/RS coding/RS decoding functionality and a second portion of the memory to the retransmission functionality. For example, 40% of the memory could be allocated to the interleaving/deinterleaving/RS coding/RS decoding functionality with the remaining 60% allocated to the retransmission of functionality. However, it should be appreciated, that in general, the memory can be divided, i.e., shared, in any manner.

[0088] The sharing of memory between the retransmission function and the interleaving/deinterleaving/RS coding/RS decoding functions is not restricted to retransmission protocols described in other embodiments that utilize QOS metrics to determine which packets should be retransmitted. In other words, the sharing of memory between the retransmission function and the interleaving/deinterleaving/RS coding/RS decoding functions can be utilized for retransmission systems where all errored packets are

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 122 of 739

retransmitted, i.e., there is no QOS identifier in the retransmission protocol. For example, the FEC/interleaving could be used to meet the INPmin requirement specifically targeting the impulse noise that occurs frequently (e.g., on the order of minutes or seconds) but is short in duration and can therefore be corrected by the FEC/interleaving. For example, the retransmission protocol can be used to correct infrequent errors (on the order of hours) that are long in duration and would not be correctable by the FEC/interleaving. As another example, the FEC/interleaving function may be used in combination with the retransmission function because it is well known that FEC with minimal interleaving provides a 1 dB to 3 dB coding gain when used with a trellis code (as is often the case in xDSL systems). This means that even when the majority of the shared memory is allocated to a retransmission function to address channel noise (such as impulse noise), a smaller amount of memory may be allocated to the FEC/interleaving function for the coding gain advantage.

[0089] Associated with the ability to allocate or partition memory between one or more of the interleaving/deinterleaving/RS coding/RS decoding functionality and retransmission functionality, is the ability to exchange information between transceivers on how to establish this allocation. For example, the transmitting modem may send a message to the receiving modem indicating how much of the available memory is to be allocated to one or more of the interleaving/deinterleaving/RS coding/RS decoding functionality and how much memory is to be allocated to the retransmission functionality. For example, if the receiving modem contains 100kBytes of available memory, the transmitting modem could send a message to the receiving modem indicating that 25kBytes should be allocated to RS coding functionality and 75kBytes should be allocated to the retransmission functionality. Since the receiving modem generally determines the interleaving/RS coding parameters that are used, the

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 123 of 739

receiving modem could use this information to select parameters, e.g., interleaver depth and codeword size, that would result in an interleaving memory requirement that is no more than the amount indicated in the message.

[0090] Alternatively, or addition, the receiving modem can send a message to the transmitting modem indicating how much of the available memory is to be allocated to one or more of the interleaving/deinterleaving/RS coding/RS decoding functionality, and how much memory should be allocated to the retransmission functionality.

[0091] Sharing of memory between a Retransmission Function with Identification of Low-PER and/or Low-Latency Packets and one or more of interleaving/deinterleaving/RS Coding/ RS Decoding functions.

[0092] A way of reducing the total memory requirement of a transceiver that supports the retransmission functionality with the identification of the low-PER and/or the low-latency packets is to define a limit, such as a maximum value, for the data rate of the low-PER packet stream, i.e., the packets requiring retransmission to meet a specific PER requirement. For example, if the total date rate is 50 Mbps, and the roundtrip delay is 10 ms, the minimum TX or RX memory requirement is 50,000,000*.01/8=62500 bytes if the retransmission function must support the case where all the transmitted packet (all 50 Mbps) are low-PER packets. If however, only a portion of the 50 Mbps data rate is allocated to the low-PER packet stream (e.g. 30 Mbps), whereas the remainder of the data rate is allocated to the low-latency packet stream (e.g. 20 Mbps), the minimum TX or RX memory requirement would be 30,000,000*.01/8=37500 bytes (assuming a roundtrip delay of 10ms). In this case, the

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 124 of 739

transmitting modem (or receiving modem) may send a message to the receiving modem (or transmitting modem) that indicates the maximum data rate of the packet traffic that will be used in the retransmission function. Using the example above, the transmitting modem (or receiving modem) would send a message indicating that the low-PER traffic will not exceed 30Mbps, in which case the receiving modem (or transmitting modem) will allocate memory to the retransmission functionality and the interleaving/RS coding (or deinterleaving/RS decoding) functionality accordingly.

[0093] One exemplary advantage of indicating the low-PER and low-latency packets as part of the retransmission protocol is that it provides a DDR-like functionality without the overhead of dynamically re-allocating latency paths. For example, when a video application is turned off (less low-PER packets on the connection), the data application data rate can be increased (more low-latency packets on the connection) without any changes in the transmission parameters.

[0094] The retransmission protocol can also be used with or without underlying FEC/interleaving (or deinterleaving). An exemplary approach is to use the FEC/interleaving to meet the INPmin requirement specifically targeting the impulse noise that occurs frequently, e.g., on the order of minutes or seconds. The retransmission protocol can be used to correct infrequent errors (on the order of hours) that will only typically be a problem for very-low PER applications, such as video.

[0095] When a retransmission protocol is combined with underlying FEC/interleaving (or deinterleaving), the retransmission protocol latency will grow in proportion to the additional

FEC/interleaving delay. This is due to the fact that the required receiver buffering corresponds approximately to the round-trip delay time of packet transmission and message acknowledgment.

[0096] As an example of utilizing the retransmission protocol that identifies one or more of low-PER and low-latency packets with underlying FEC/Interleaving (or deinterleaving), the FEC/interleaving is used to achieve the INPmin requirements within the latency constraint and the retransmission function is used to provide another layer of error correction. The low-PER packets are passed through both the retransmission function and the FEC/interleaver and, as a result, a very low PER is achieved. The low-latency packets are passed through the FEC/Interleaver but not passed through the retransmission function. Since low-latency packets are passed through the FEC/interleaver, they will meet the INPmin and MaxDelay requirements without incurring the extra delay from the retransmission protocol.

[0097] Example configuration parameters:

DS Data rate = 25 Mbps, INPmin=2, MaxDelayDS= 8ms

[0098] Example FEC/Interleaving parameters:

NFEC=128, R=16 which results in an interleaver memory of approximately 14Kbytes for INP=2 with 8 ms of delay.

[0099] Retransmission protocol:

If we assume the US latency is 2ms, the retransmission protocol will add a minimum of 8+2

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 126 of 739

= 10ms of latency. This means that the total DS latency (FEC/interleaving+ Retransmission) will be approximately 8+10=18ms.

[00100] Memory requirements:

The memory requirements for the retransmission protocol can be calculated as: (10ms) x (25 Mbps) /8 = 31Kbytes. Therefore the transmitter and receiver will both need a total memory of (31+14) =45 Kbytes for the retransmission protocol and FEC/Interleaving function.

[00101] Low-PER packets:

Latency=18ms. The PER is very low because INPmin=2 (from FEC/interleaving) is combined with the error correction of the retransmission function.

[00102] Low-Latency packets:

Latency = 8ms. INP =2 from FEC/interleaving. No additional delay due to retransmission function.

[00103] Although this invention describes the retransmission being done as part of the PTM-TC, it could also be done inside other layer(s) of the xDSL transceiver, such as the PMD or the PMS-TC. Alternatively, it could performed at a layer(s) above the PTM-TC, for example, in a new layer between the PTM-TC and the next higher layer, or in general any layer above the physical layer, e.g., layer 1, 2, 3, 4 or 5.

[00104] In this invention, the term "transmitter" generally refers to the transceiver that transmits the packets. Likewise the term "receiver" generally refers to the transceiver that

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 127 of 739

receives the packets. Therefore the "transmitter" also receives the ACK/NAK messages and the "receiver" also transmits the ACK/NAK messages.

[00105] Figure 2 outlines an exemplary method of operation of a transmitting modem utilizing the retransmission protocol. In particular, control begins in step S100 and continues to step S110. In step S110, a packet is received from a higher layer. Then, in step S120, a decision is made as to whether the received packet is a retransmitted type packet. If the packet is not a retransmitted type packet, such as a low-latency packet, control jumps to step S125 where the packet is optionally updated (as discussed above) with control continuing to step S130 where the packet is forwarded to the receiver. Control then continues to step S140 where the control sequence ends.

[00106] If the packet is a retransmitted type packet, such as a low-PER packet, control continues to step S150. In step S150, the packet can be updated with information such as a sequence identifier or other information that allows a receiver to be able to determine which packet (or packets) need to be retransmitted. Next, in step S160, the updated packet is stored in the retransmission buffer. Then, in step S170, the packet is forwarded to the receiver. Control then continues to step S180.

[00107] In step S180, a determination is made whether the packet needs to be retransmitted. If the packet needs to be retransmitted, control jumps back to step S170. Otherwise, control continues to step S190.

[00108] In step S190, the packet is deleted from the retransmission buffer. Control then

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 128 of 739

continues to step S140 ~~were~~where the control sequence ends.

[00109] Figure 3 outlines an exemplary method of operation of a receiving modem utilizing the retransmission protocol. In particular, control begins in step S200 and continues to step S210. In step S210, a packet is received from the transmitter. Next, in step S220, a determination is made whether the packet has been identified as a retransmitted type packet. If the packet has not been identified as a retransmittable type packet, control jumps to step S230.

[00110] In step S230, the packet is forwarded to a higher layer. Control then continues to step S240 where the control sequence ends.

[00111] Alternatively, if the received packet is a retransmittable type packet, the packet is stored in the retransmission buffer in step S260. Next, in step S270, the integrity of the packet can be checked, for example utilizing a CRC. Then, in step S280, a determination is made whether the packet needs retransmission. If the packet needs retransmission, control continues to step S290 where the retransmitted packet is obtained, for example, based on the sending of a message(s), one or the other transceiver determining a packet is missing, or the like, as discussed above, with control continuing back to step S270 for an integrity check.

[00112] If the packet does not need retransmission, control continues to step S295 where the packet is forwarded to a higher layer and deleted from the retransmission buffer. Control then continues to step S240 where the control sequence ends.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 129 of 739

[00113] Figure 4 outlines an exemplary memory allocation method for sharing memory between the retransmission function and one or more of the interleaving/deinterleaving functionality and coding functionality. In particular, control begins in step S300 and continues to step S305. In step S305, a message is sent/received specifying the available memory. Typically, the receiver will send a message to the transmitter specifying the available memory, but the transmitter could also send a message to the receiver. Next, in step S310, a determination is made as to how the memory should be allocated. As discussed, this allocation can be based on one or more of error correction capability, latency, buffering requirements, SNR, impulse noise, or in general, any communication parameter. Next, in step S320, the memory allocation is communicated to another transceiver. Then, in step S330, a determination can made as to whether the allocation is compatible. If the received allocation is not compatible, control continues to step S360 wherein another allocation can be requested, with control continuing back to step S320.

[00114] Alternatively, if the allocation is compatible, in step S340 the memory is allocated based on the received allocation. Control then continues to step S350 where the control sequence ends.

[00115] Figure 5 illustrates an exemplary memory sharing methodology for use with a retransmission function and one or more of interleaving/deinterleaving functionality, RS coding/decoding functionality. In particular, control begins in step S400 and continues to step S410. In step S410, the memory allocation is received from, for example, a memory management module that may be located in the same transceiver, or at a remote transceiver. Next, in step S420, the memory sharing configuration is established and then, in step S430,

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 130 of 739

the memory is shared between a retransmission function and one or more of the interleaving/deinterleaving functionality, RS coding/decoding functionality. Control then continues to step S440.

[00116] In step S440, a determination is made whether the memory sharing configuration should be changed. For example, the memory sharing configuration can be dynamically changed based on changes in the communication channel or data type(s) being sent on the communication channel. More specifically, for example, if the communications channel was not performing well, e.g., an increase in bit errors, it may be advantageous to increase the retransmission capability while decreasing the FEC/interleaving capability or vise-versa, which could have an impact on how the memory sharing should be configured.

[00117] If the memory sharing configuration should be changed, control continues to step S450 where another allocation can be requested, with control continuing back to step S410. Otherwise, control continues to step S460 where the control sequence ends.

[00118] While the above-described flowcharts have been discussed in relation to a particular sequence of events, it should be appreciated that changes to this sequence can occur without materially effecting the operation of the invention. Additionally, the exact sequence of events need not occur as set forth in the exemplary embodiments, but rather the steps can be performed by one or the other transceiver in the communication system provided both transceivers are aware of the technique being used for initialization. Additionally, the exemplary techniques illustrated herein are not limited to the specifically illustrated embodiments but can also be utilized with the other exemplary embodiments and each

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 131 of 739

described feature is individually and separately claimable.

[00119] The above-described system can be implemented on wired and/or wireless telecommunications devices, such a modem, a multicarrier modem, a DSL modem, an ADSL modem, an xDSL modem, a VDSL modem, a linecard, test equipment, a multicarrier transceiver, a wired and/or wireless wide/local area network system, a satellite communication system, network-based communication systems, such as an IP, Ethernet or ATM system, a modem equipped with diagnostic capabilities, or the like, or on a separate programmed general purpose computer having a communications device or in conjunction with any of the following communications protocols: CDSL, ADSL2, ADSL2+, VDSL1, VDSL2, HDSL, DSL Lite, IDSL, RADSL, SDSL, UDSL or the like.

[00120] Additionally, the systems, methods and protocols of this invention can be implemented on a special purpose computer, a programmed microprocessor or microcontroller and peripheral integrated circuit element(s), an ASIC or other integrated circuit, a digital signal processor, a hard-wired electronic or logic circuit such as discrete element circuit, a programmable logic device such as PLD, PLA, FPGA, PAL, a modem, a transmitter/receiver, any comparable means, or the like. In general, any device capable of implementing a state machine that is in turn capable of implementing the methodology illustrated herein can be used to implement the various communication methods, protocols and techniques according to this invention.

[00121] Furthermore, the disclosed methods may be readily implemented in software using object or object-oriented software development environments that provide portable

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 132 of 739

source code that can be used on a variety of computer or workstation platforms. Alternatively, the disclosed system may be implemented partially or fully in hardware using standard logic circuits or VLSI design. Whether software or hardware is used to implement the systems in accordance with this invention is dependent on the speed and/or efficiency requirements of the system, the particular function, and the particular software or hardware systems or microprocessor or microcomputer systems being utilized. The communication systems, methods and protocols illustrated herein can be readily implemented in hardware and/or software using any known or later developed systems or structures, devices and/or software by those of ordinary skill in the applicable art from the functional description provided herein and with a general basic knowledge of the computer and telecommunications arts.

[00122] Moreover, the disclosed methods may be readily implemented in software that can be stored on a storage medium, executed on programmed general-purpose computer with the cooperation of a controller and memory, a special purpose computer, a microprocessor, or the like. In these instances, the systems and methods of this invention can be implemented as program embedded on personal computer such as an applet, JAVA® or CGI script, as a resource residing on a server or computer workstation, as a routine embedded in a dedicated communication system or system component, or the like. The system can also be implemented by physically incorporating the system and/or method into a software and/or hardware system, such as the hardware and software systems of a communications transceiver.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 133 of 739

[00123] It is therefore apparent that there has been provided, in accordance with the present invention, systems and methods for packet retransmission and memory sharing. While this invention has been described in conjunction with a number of embodiments, it is evident that many alternatives, modifications and variations would be or are apparent to those of ordinary skill in the applicable arts. Accordingly, it is intended to embrace all such alternatives, modifications, equivalents and variations that are within the spirit and scope of this invention.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 134 of 739

ABSTRACT

Through the identification of different packet-types, packets can be handled based on an assigned packet handling identifier. This identifier can, for example, enable forwarding of latency-sensitive packets without delay and allow error-sensitive packets to be stored for possible retransmission. In another embodiment, and optionally in conjunction with retransmission protocols including a packet handling identifier, a memory used for retransmission of packets can be shared with other transceiver functionality such as, coding, decoding, interleaving, deinterleaving, error correction, and the like.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 135 of 739

PACKET RETRANSMISSION AND MEMORY SHARING

RELATED APPLICATION DATA

[0001] This application is a Continuation of U.S. Patent Application No. 13/766,059, filed February 13, 2013, now U.S. Patent No. 8,645,784, which is a Continuation of U.S. Patent Application No. 12/783,758, filed May 20, 2010, now U.S. Patent No. 8,407,546, which is a Continuation of U.S. Patent Application No. 12/295,828, filed October 2, 2008, now U.S. Patent No. 8,335,956, which is a national stage application under 35 U.S.C. 371 of PCT Application No. PCT/US2007/066522 having an international filing date of April 12, 2007, which designated the United States, which PCT application claims the benefit of and priority under 35 U.S.C. § 119(e) to U.S. Patent Application Nos. 60/792,236, filed April 12, 2006, entitled "xDSL Packet Retransmission Mechanism," and 60/849,650, filed October 5, 2006, entitled "xDSL Packet Retransmission Mechanism with Examples," each of which are incorporated herein by reference in their entirety.

BACKGROUND

Field of the Invention

[0002] This invention generally relates to communication systems. More specifically, an exemplary embodiment of this invention relates to retransmission of packets in a communication environment. An exemplary embodiment of this invention also relates to memory sharing between transmission functions and other transceiver functions.

SUMMARY

[0003] Exemplary aspects of the invention relate to handling of packets and the assignment of a packet handling identifier. Exemplary aspects relate to sharing of resources

between retransmitted packets and other transceiver functions. In addition, exemplary aspects relate to sharing of resources between packets associated with the packet handling identifier and other transceiver functions.

[0004] More specifically, aspects of the invention relate to assigning a packet handling identifier to one or more packets. Based on the packet handling identifier, a packet can either be, for example, forwarded directly to another communication device (or layer) or, alternatively, held for possible retransmission protocols. For example, packets received from, for example, a higher-layer of a communication device, can be designated to have a specific packet handling identifier, such as a Quality of Service (QOS) level. The QOS level of a packet indicates the importance of certain service metrics (or characteristics) of one or more packets.

[0005] Two exemplary QOS metrics are delay (or latency) and Packet Error Rate (PER). While these two metrics are used for illustrative purposes herein, it should be appreciated that other metrics can also be used with this invention. For example, other QOS metrics could include one or more of a Bit Error Rate (BER), data rate, delay variation (or jitter), packet loss rate, time between error events (TBE), or the like.

[0006] As an example, in the case where the two QOS metrics are latency and PER, packets containing, for example, video information (such as IPTV) may have the requirement for a very low packet error rate but can often tolerate higher delay. In contrast, voice or data (e.g., gaming) traffic may have very low latency requirements but can tolerate a higher packet error rate. For this particular example, the video packets could be designated as "low-PER" QOS packets and the voice or data packets could be designated as "low-latency" QOS

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 137 of 739

packets. For example, a specific QOS identifier could be assigned to the low-latency packets while a different QOS identifier could be assigned to the low-PER packets. The low-latency packets could be forwarded directly to another transceiver, or a higher layer, while the low-PER packets can be stored in a retransmission buffer, e.g., memory, that can be used to reduce packet error.

[0007] As mentioned above, exemplary aspects also relate to sharing of resources between a retransmission function and other transceiver functions.

[0008] The exemplary systems and methods of this invention can utilize memory, such as a retransmission buffer, for the storing of packets for retransmission functions. Since other transceiver functions may also require memory to perform certain functionality, an exemplary aspect of this invention also relates to sharing the memory for retransmission functions with the memory required for other transceiver functions. For example, memory can be dynamically allocated based on configuration settings or noise conditions and, for example, the memory divided between one or more of interleaving/deinterleaving, RS Coding/Decoding functionality and the functionality used retransmission.

[0009] Aspects of the invention thus relate to identification of one or more packets.

[0010] Additional aspects of the invention relate to identifying one or more packets that can be retransmitted.

[0011] Still further aspects of the invention relate to identifying one or more packets that

should not be retransmitted.

[0012] Aspects of the invention also relate to retransmission of one or more of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-data frame, a PTM-TC codeword, and RS codeword and a DMT symbols.

[0013] Still further aspects of the invention relate to appending an identifier to a packet.

[0014] Still further aspects of the invention relate to appending a sequence identifier to at least one packet.

[0015] Aspects of the invention also relate to routing one or more packets based on a packet handling identifier.

[0016] Aspects of the invention also relate to retransmitting a packet.

[0017] Aspects of the invention further relate to retransmit a packet based on a retransmission request.

[0018] Still further aspects of the invention relate to sharing memory between a retransmission function and one or more of an interleaver, deinterleaver, coder, decoder and other transceiver functionalities.

[0019] Other more specific aspects of the invention relate to sharing memory between a

retransmission buffer (or memory) and interleaving/deinterleaving and/or coding/decoding functionality.

[0020] Additional exemplary, non-limiting aspects of the invention are:

1. A method of packet retransmission comprising:

transmitting or receiving a plurality of packets;

identifying at least one packet of the plurality of packets as a packet that should not be retransmitted.

2. The method of aspect 1, wherein the packet is any grouping of bytes.

3. The method of aspect 1, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

4. The method of aspect 1, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

5. The method of aspect 4, wherein the identifying step comprises using a special value for a sequence identifier (SID).

6. The method of aspect 4, wherein the appended bit field comprises a dedicated CRC.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 140 of 739

7. The method of aspect 1, wherein the at least one packet is not stored for retransmission.

8. The method of aspect 1, wherein the at least one packet is passed immediately to a high layer.

9. A packet retransmission module capable of transmitting or receiving a plurality of packets and capable of identifying at least one packet of the plurality of packets as a packet that should not be retransmitted.

10. The module of aspect 9, wherein the packet is any grouping of bytes.

11. The module of aspect 9, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

12. The module of aspect 9, wherein the module is capable of appending a bit field comprising a sequence identifier (SID) to each packet.

13. The module of aspect 12, wherein the identifying comprises using a special value for the SID.

14. The module of aspect 12, wherein the appended bit field comprises a dedicated CRC.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 141 of 739

15. The module of aspect 9, wherein the at least one packet is not stored by the module for retransmission.

16. The module of aspect 9, wherein the at least one packet is passed by the module immediately to a high layer.

17. The module of aspect 9, wherein the module is implemented in one or more of a wireless transceiver, a wireless LAN station, a wired transceiver, a DSL modem, an ADSL modem, an xDSL modem, a VDSL modem, a multicarrier transceiver, a general purpose computer, a special purpose computer, a programmed microprocessor, a microcontroller and peripheral integrated circuit element(s), an ASIC, a digital signal processor, a hard-wired electronic or logic circuit and a programmable logic device.

18. The module of aspect 9, wherein the module is implemented in one or more of a PTM-TC, ATM-TC, PMD and PMS-TC.

19. A method comprising sharing memory between an interleaving and/or deinterleaving memory and a packet retransmission memory.

20. A method comprising allocating a first portion of shared memory for retransmission and a second portion of the shared memory for interleaving and/or deinterleaving.

21. The method of aspect 20, further comprising transmitting or receiving a message indicating how to allocate the shared memory.

22. The method of aspect 19 or 20, further comprising transmitting or receiving a message indicating how to share the memory.

23. A memory capable of being shared between an interleaving and/or deinterleaving buffer and a packet retransmission buffer.

24. A module capable of allocating a first portion of shared memory for retransmission and a second portion of the shared memory for interleaving and/or deinterleaving.

25. The module of aspect 24, wherein the module is capable of transmitting or receiving a message indicating how to allocate the shared memory.

26. The module of aspect 24, wherein the module is capable of transmitting or receiving a message indicating how to share the memory.

27. The module of aspect 24, wherein the module is one or more of a wireless transceiver, a wireless LAN station, a wired transceiver, a DSL modem, an ADSL modem, an xDSL modem, a VDSL modem, a multicarrier transceiver, a general purpose computer, a special purpose computer, a programmed microprocessor, a microcontroller and peripheral

integrated circuit element(s), an ASIC, a digital signal processor, a hard-wired electronic or logic circuit and a programmable logic device.

28. A method of packet retransmission comprising:

transmitting or receiving a plurality of packets;

identifying at least one packet of the plurality of packets as a packet that should be retransmitted and at least one packet of the plurality of packets as a packet that should not be retransmitted.

29. The method of aspect 28, wherein the packet is any grouping of bytes.

30. The method of aspect 28, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

31. The method of aspect 28, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

32. The method of aspect 31, wherein the identifying step comprises using a special value for a sequence identifier (SID).

33. The method of aspect 31, wherein the appended bit field comprises a dedicated CRC.

34. The method of aspect 28, wherein at least one packet is stored for retransmission.

35. The method of aspect 28, wherein at least one packet is passed immediately to a high layer.

36. A packet handling method comprising:

receiving a stream of packets;

identifying a first number of packets in the stream of packets as low-latency packets;

identifying a second number of packets in the stream of packets as low-error packets;

forwarding the low-latency and low-error packets to a transceiver or a higher layer; and

storing the low-error packets for error correction.

37. The method of aspect 36, further comprising appending the low-error packets with an identifier.

38. A method of allocating memory in a transceiver comprising:

analyzing one or more communication parameters;

identifying a memory allocation; and

allocating memory based on the memory allocation to a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding.

39. A memory sharing method in a transceiver comprising:

receiving a memory allocation;

establishing a shared memory for one or more of interleaving, deinterleaving, RS coding, RS decoding and packet retransmission functions; and

sharing the shared memory between a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding functions.

40. The method of aspect 39, further comprising determining a compatibility of the memory allocation.

41. The method of aspect 39, wherein the compatibility of the memory allocation is based on channel performance metrics.

42. Means for performing the functionality of any of the aforementioned aspects.

43. An information storage media comprising information that when executed performs the functionality of any of the aforementioned aspects.

44. Any one or more of the features as substantially described herein.

45. Means for packet retransmission comprising:

means for transmitting or receiving a plurality of packets;

means for identifying at least one packet of the plurality of packets as a packet that should not be retransmitted.

46. The means of aspect 45, wherein the packet is any grouping of bytes.

47. The means of aspect 45, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

48. The means of aspect 45, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

49. The means of aspect 48, wherein the means for identifying comprises using a special value for a sequence identifier (SID).

50. The means of aspect 48, wherein the appended bit field comprises a dedicated CRC.

51. The means of aspect 45, wherein the at least one packet is not stored for retransmission.

52. The means of aspect 45, wherein the at least one packet is passed immediately to a high layer.

53. Means for sharing memory between an interleaving and/or deinterleaving function and a packet retransmission function.

54. Means for allocating a first portion of shared memory for retransmission and a second portion of the shared memory for interleaving and/or deinterleaving.

55. The means of aspect 54, further comprising means for transmitting or receiving a message indicating how to allocate the shared memory.

56. The means of aspect 54, further comprising means for transmitting or receiving a message indicating how to share the memory.

57. Means for sharing a memory between an interleaving and/or deinterleaving function and a packet retransmission function.

58. Means for packet retransmission comprising:

means for transmitting or receiving a plurality of packets;

means for identifying at least one packet of the plurality of packets as a packet that should be retransmitted and at least one packet of the plurality of packets as a packet that should not be retransmitted.

59. The means of aspect 58, wherein the packet is any grouping of bytes.

60. The means of aspect 58, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

61. The means of aspect 58, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

62. The means of aspect 61, wherein the means for identifying comprises using a special value for the sequence identifier (SID).

63. The means of aspect 58, wherein the appended bit field comprises a dedicated CRC.

64. The means of aspect 58, wherein at least one packet is stored for retransmission.

65. The means of aspect 58, wherein at least one packet is passed immediately to a high layer.

66. A packet handling means comprising:

means for receiving a stream of packets;

means for identifying a first number of packets in the stream of packets as low-latency packets;

means for identifying a second number of packets in the stream of packets as low-error packets;

means for forwarding the low-latency and low-error packets to a transceiver or higher layer; and

means for storing the low-error packets for error correction.

67. The means of aspect 66, further comprising means for appending the low-error packets with an identifier.

68. Means for allocating memory in a transceiver comprising:

means for analyzing one or more communication parameters;

means for identifying a memory allocation; and

means for allocating memory based on the memory allocation to a retransmission function and one or more of an interleaving, deinterleaving, RS coding and RS decoding function.

69. Means for memory sharing in a transceiver comprising:

means for receiving a memory allocation;

means for establishing a shared memory for one or more of interleaving, deinterleaving, RS coding, RS decoding and packet retransmission function; and

means for sharing the shared memory between a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding functionality.

70. The means of aspect 69, further comprising means for determining a compatibility of the memory allocation.

71. The means of aspect 69, wherein the compatibility of the memory allocation is based on channel performance metrics.

72. A transceiver capable of performing packet retransmission comprising:

a transmission management module configurable to transmit or receive a plurality of packets; and

a QOS module configurable to identify at least one packet of the plurality of packets as a packet that should not be retransmitted.

73. The transceiver of aspect 72, wherein the packet is any grouping of bytes.

74. The transceiver of aspect 72, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

75. The transceiver of aspect 72, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

76. The transceiver of aspect 75, wherein the QOS module uses a special value for a sequence identifier (SID).

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 151 of 739

77. The transceiver of aspect 75, wherein the appended bit field comprises a dedicated CRC.

78. The transceiver of aspect 72, wherein the at least one packet is not stored for retransmission.

79. The transceiver of aspect 72, wherein the at least one packet is passed immediately to a high layer.

80. A memory capable of being shared between interleaving and/or deinterleaving and packet retransmission.

81. A memory management module capable of allocating a first portion of shared memory for retransmission and capable of allocating a second portion of the shared memory to one or more of interleaving and deinterleaving functionality.

82. The module of aspect 81, further comprising a module for transmitting or receiving a message indicating how to allocate the shared memory.

83. The module of aspect 81, further comprising a module for transmitting or receiving a message indicating how to share the memory.

84. A module capable of being shared between interleaving and/or deinterleaving and packet retransmission.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 152 of 739

85. A transceiver capable of performing packet retransmission comprising:

a transmission management module configurable to transmit or receive a plurality of packets; and

a QOS module configurable to identify at least one packet of the plurality of packets as a packet that should be retransmitted and at least one packet of the plurality of packets as a packet that should not be retransmitted.

86. The transceiver of aspect 85, wherein the packet is any grouping of bytes.

87. The transceiver of aspect 85, wherein the packet is one of an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data Frame, a PTM-TC codeword, an RS codeword and a DMT symbol.

88. The transceiver of aspect 85, wherein a bit field comprising a sequence identifier (SID) is appended to each packet.

89. The transceiver of aspect 88, wherein the identifying step comprises using a special value for a sequence identifier (SID).

90. The transceiver of aspect 88, wherein the appended bit field comprises a dedicated CRC.

91. The transceiver of aspect 85, wherein at least one packet is stored for retransmission.

92. The transceiver of aspect 85, wherein at least one packet is passed immediately to a high layer.

93. A transceiver capable of handling a stream of packets comprising:

a QOS module capable of identifying a first number of packets in the stream of packets as low-latency packets and a second number of packets in the stream of packets as low-error packets;

a transmission management module capable of forwarding the low-latency and low-error packets to another transceiver; and

a buffer module capable of storing the low-error packets for error correction.

94. The transceiver of aspect 93, further comprising a packet QOS assignment module capable of appending the low-error packets with an identifier.

95. A transceiver capable of having an allocatable memory comprising:

a controller capable of analyzing one or more communication parameters; and

a memory management module capable of identifying a memory allocation and allocating a shared memory based on the memory allocation to a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding functions.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 154 of 739

96. A transceiver capable of sharing memory comprising:

a controller capable of receiving a memory allocation; and

a memory management module capable of establishing a shared memory for a retransmission function and one or more of interleaving, deinterleaving, RS coding and RS decoding functions.

97. The transceiver aspect 96, wherein the memory management module further determines a compatibility of the memory allocation.

98. The transceiver of aspect 96, wherein the memory allocation is based on one or more communication channel performance metrics.

99. In a communication environment where packets are being transmitted, a method for allocating a first portion of shared memory for retransmission of packets and a second portion of the shared memory for interleaving and/or deinterleaving.

100. The method of aspect 99, wherein all errored packets are retransmitted.

101. The method of aspects 19, 20 and 99, wherein a retransmission function identifies packets that should not be retransmitted.

102. The method of aspect 99, wherein all packets are being transmitted without an assigned a QOS level.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 155 of 739

103. A packet communication method comprising:

in a first mode of operation:

transmitting or receiving a plurality of packets;

identifying at least one packet of the plurality of packets as a packet that should not be retransmitted;

in a second mode of operation:

transmitting or receiving a plurality of packets;

allocating a first portion of shared memory for retransmission of packets and a second portion of the shared memory for one or more of interleaving, deinterleaving, coding, decoding and error correction; and

in a third mode of operation:

transmitting or receiving a plurality of packets;

identifying at least one packet of the plurality of packets as a retransmittable-type packet;

identifying at least one packet of the plurality of packets as a non-retransmittable-type packet;

allocating a first portion of shared memory for retransmission of the retransmittable-type packets and a second portion of the shared memory for one or more of interleaving, deinterleaving, coding, decoding and error correction.

104. The method of aspect 103, wherein the retransmittable-type packet is a low-latency packet.

105. The method of aspect 103, wherein the retransmittable-type packet is a low-error packet.

[0021] These and other features and advantages of this invention are described in, or are apparent from, the following detailed description of the exemplary embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] The exemplary embodiments of the invention will be described in detail, with reference to the following figures wherein:

[0023] Fig. 1 illustrates an exemplary communication system according this invention.

[0024] Figure 2 is a flowchart outlining an exemplary method for packet retransmission according this invention.

[0025] Figure 3 is a flowchart outlining an exemplary method for retransmitted packet reception according this invention.

[0026] Figure 4 is a flowchart outlining an exemplary method for memory allocation according to this invention.

[0027] Figure 5 is a flowchart outlining an exemplary method for memory sharing

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 157 of 739

according this invention.

DETAILED DESCRIPTION

[0028] The exemplary embodiments of this invention will be described in relation to packet retransmission and/or memory sharing in an xDSL environment. However, it should be appreciated, that in general, the systems and methods of this invention will work equally well for any type of communication system in any environment.

[0029] The exemplary systems and methods of this invention will also be described in relation to multicarrier modems, such as xDSL modems and VDSL modems, and associated communication hardware, software and communication channels. However, to avoid unnecessarily obscuring the present invention, the following description omits well-known structures and devices that may be shown in block diagram form or otherwise summarized.

[0030] For purposes of explanation, numerous details are set forth in order to provide a thorough understanding of the present invention. It should be appreciated however that the present invention may be practiced in a variety of ways beyond the specific details set forth herein.

[0031] Furthermore, while the exemplary embodiments illustrated herein show the various components of the system collocated, it is to be appreciated that the various components of the system can be located at distant portions of a distributed network, such as a communications network and/or the Internet, or within a dedicated secure, unsecured and/or encrypted system. Thus, it should be appreciated that the components of the system can be combined into one or more devices, such as a modem, or collocated on a particular node of a

distributed network, such as a telecommunications network. As will be appreciated from the following description, and for reasons of computational efficiency, the components of the system can be arranged at any location within a distributed network without affecting the operation of the system. For example, the various components can be located in a Central Office modem (CO, ATU-C, VTU-O), a Customer Premises modem (CPE, ATU-R, VTU-R), an xDSL management device, or some combination thereof. Similarly, one or more functional portions of the system could be distributed between a modem and an associated computing device.

[0032] Furthermore, it should be appreciated that the various links, including communications channel 10, connecting the elements (not shown) can be wired or wireless links, or any combination thereof, or any other known or later developed element(s) that is capable of supplying and/or communicating data to and from the connected elements. The term module as used herein can refer to any known or later developed hardware, software, firmware, or combination thereof that is capable of performing the functionality associated with that element. The terms determine, calculate and compute, and variations thereof, as used herein are used interchangeably and include any type of methodology, process, mathematical operation or technique. Transmitting modem and Transmitting transceiver as well as Receiving modem and Receiving transceiver are used interchangeably herein.

[0033] Moreover, while some of the exemplary embodiments described herein are directed toward a transmitter portion of a transceiver performing interleaving and/or coding on transmitted information, it should be appreciated that a corresponding deinterleaving and/or decoding is performed by a receiving portion of a transceiver. Thus, while perhaps

not specifically illustrated in every example, this disclosure is intended to include this corresponding functionality in both the same transceiver and/or another transceiver.

[0034] Communication system 100 comprises a portion of a transceiver 200 and a portion of a transceiver 300. The transceiver 200, in addition to well known componentry, comprises an errored packet module 210, a transmission management module 220, a QOS ID module 225, a QOS module 230, a packet QOS assignment module 240, a retransmission buffer/interleaving/deinterleaving/RS coding/RS Decoding memory 250, a counter module 260, a memory management module 270 and a controller/memory 280.

[0035] Connected via communication channel 10 to transceiver 200 is transceiver 300. The transceiver 300, in addition to well known componentry, comprises an errored packet module 310, a transmission management module 320, a QOS ID module 325, a QOS module 330, a packet QOS assignment module 340, a retransmission buffer/interleaving/deinterleaving/RS coding/RS Decoding memory 350, a counter module 360, a memory management module 370 and a controller/memory 380.

[0036] As discussed above, the systems, methods and protocols discussed herein will be described in relation to xDSL systems, such as those specified in ADSL2 ITU-T G.992.3, ADSL2+ ITU G992.5, and VDSL2 ITU G.993.2, which are incorporated herein by reference in their entirety.

[0037] In operation, a first aspect of the invention relates to retransmission of one or more packets, the retransmission identifier being implemented at any transmission layer

where packet boundaries are defined. For example, it can be implemented in the Packet Transmission Mode TC (PTM-TC) of xDSL systems. For reference, "Annex A" which is of record in the identified provisional filing and incorporated by reference herein contains the PTM-TC of ADSL2 and VDSL2 systems as specified in the ITU-T G.992.3 ADSL2 standard.

[0038] As discussed herein, the invention will generally be described in relation to the retransmission mechanism being incorporated as part of the PTM-TC however, it should be appreciated that it can also be implemented inside other layer(s) of a communication device, such as an xDSL transceiver, such as within the PMD or PMS-TC.

[0039] The retransmission techniques disclosed herein can also be performed at a layer above the PTM-TC, for example, in a new layer between the PTM-TC and the next higher layer, or at any layer above the physical layer, e.g., layers 2, 3, 4, 5, etc.

[0040] Additionally, while "packet" is used herein, the term "packet" includes any basic data unit, i.e., a grouping of bytes. For example, a packet could be an IP packet, an Ethernet packet, an ATM cell, a PTM packet, an ADSL Mux-Data frame, a PTM-TC codeword, an RS Codeword, a DMT symbol, or, in general, any grouping of data bytes or information. A packet could also be a combination of one or more of the above. For example, a packet could be constructed by concatenating any number of ATM cells to create a larger grouping of bits. For example, five 53-byte ATM cells could be combined into a 265 byte packet or four 65 PTM-TC codewords could be combined into a 260 byte packet. A packet could also be based on dividing any of the above groupings of bytes. For example, larger IP or Ethernet packets could be divided into smaller groups of bytes to be used as a "packet" with the retransmission

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 161 of 739

functionality described herein. For example, a 1500 byte IP packet could be divided into three 500 byte packets and used by the retransmission protocol. If the retransmission function is implemented as part of the PTM-TC, packets are received from a higher-layer in the xDSL transmitter PTM-TC and sent via the xDSL transmitter PMS-TC and PMD over the communication channel to the xDSL receiver. The xDSL receiver PMD and PMS-TC process the received signal and pass the results to the PTM-TC, which processes the information and passes the received packet up to a higher layer(s).

[0041] Packets received from the higher layer at the xDSL transmitter PTM-TC can be designated to have a QOS level. The QOS level of a packet can indicate the importance of certain service metrics (or characteristics) of this (or more) packet(s). Two exemplary QOS metrics are delay (or latency) and PER. Although, as discussed above, these two characteristics are the focus of the invention, any number of different QOS metrics could also be used.

[0042] As an example, in the case where the 2 QOS metrics are latency and PER, a first set of packets carrying certain information may have a requirement for very low PER but may be able to tolerate higher delay. Other packets containing information such as voice or data traffic may have very low delay requirements but can tolerate a higher PER. According to an exemplary embodiment of this invention, the first set of packets would be designated as "low-PER" QOS packets whereas voice or data packets would be designated at "low-latency" QOS packets. The QOS level (or metric) of a packet could be designated in a number of ways. For example:

i) Certain bit fields in the header of data portions of each packet could contain

certain values that specify the QOS requirements a packet. For example, the packet header could contain bit fields that indicate if the packet has a "low-PER" QOS requirement or a "low-latency" QOS requirement. These fields could be read by the transmitting modem and/or receiving modem to determine the QOS level of each packet.

ii) When sending packets from higher layer to the PTM-TC, the higher layer could indicate on a packet by packet basis the QOS requirements of each packet. For example, there could be a separate signal on the interface that indicates if a packet being transferred has a "low-PER" QOS requirement or a "low-latency" QOS requirement.

iii) When sending packets from higher layer to the PTM-TC, there could be a separate interface (or channel) for packets with different QOS requirements. For example, one channel could be used to transfer packets that have a "low-PER" QOS requirement and a second channel could used to transfer packets that have a "low-latency" QOS requirement. This general concept could also be scaled to accommodate a plurality of different QOS requirements and a plurality of channels.

iv) As in the case of Pre-Emption in the PTM-TC (see Annex A), two logically separated γ-interfaces could be used for the transport of a low-PER and low-latency packet flow through a single bearer channel. This general idea could then be scaled to support any number of packet types.

[0043] Other mechanisms can also be used to designate the QOS level of a packet – provided the transmitter and/or receiver retransmission protocol is capable of knowing the QOS level for one or more packets.

[0044] Once the QOS level is known by the PTM-TCs, an efficient packet retransmission

can be designed. The exemplary packet retransmission methods and protocols can be designed to include any one or more of the following system level characteristics:

- All packets are received from the higher layer and passed to the higher layers in the correct order.
- "Low-latency" QOS packets will not incur any extra delay due to retransmission.
- Only packets with "low-PER" QOS should be retransmitted, and therefore only low-PER packets will incur the extra delay due to the retransmission mechanism.
- Flow control can be minimized such that the transmitter can generally accept all packets from the higher layer at the required data rate without holding-off (or "blocking") packets from the higher layer during the retransmission process.
- Packet delay-variation/jitter can be minimal.
- A "DRR-like" functionality in a single bearer without requiring latency/interleaver OLR.

[0045] The transceiver 200, in cooperation with the QOS module 230, receives packets from a higher-layer. In cooperation with the packet QOS assignment module 240, a packet Sequence ID (SID) is appended to the received packets. The packets, in cooperation with the transmission management module 220, can then be transmitted in the order in which they were received.

[0046] The QOS Module 230, if not already performed by a high layer, also identifies packets based on the QOS requirement of the packet(s). Then, in cooperation with the packet QOS assignment module 240, a QOS identifier is associated with the packet as discussed

hereinafter.

[0047] If, for example, the packet is identified as a low-PER packet, and assigned such an identifier by the QOS module 230, when the transmission management module 220 receives the packet, the packet is identified by the QOS ID module 225 as being a low-PER packet and the packet is forwarded for storage in the retransmission buffer 250. Alternatively, if the packet has been labeled as a low-latency packet, and identified as such by the by the QOS ID module 225, the packet can be transmitted to the receiving modem in cooperation with the transmission management module 220.

[0048] The low-PER packets can be stored for a sufficient amount of time to wait for a retransmission message from the receiver PTM-TC. During this time, the transmitting modem can continue to receive packets from one or more higher layers, label these packets, if needed, and store these packets, if they are identified as low-PER packets, in the same way. The resulting minimum storage requirements for the transmitter PTM-TC are estimated below.

[0049] For successful retransmission, the receiving modem should be able to inform the transmitting modem which packet, or packets, need to be retransmitted. One exemplary way of performing this is by transmitting packets with an appended bit field that contains a counter indicating the place of each packet in a stream of packets. This counter value is also known as a Sequence ID (SID). For example, a bit field containing a 16-bit counter could be appended to each packet and the counter module 260 would be incremented by one after each packet was transmitted. In cooperation with the packet assignment module 240, a packet

counter field could be appended to the packet in a number of places, for example, at the beginning or end of the packet, or at the beginning or end of the packet header.

[0050] Packets received from a higher-layer may already have information in a header or data field of the packet that contains the packet count, or sequence, information. In addition, the packet counter field may be appended with an additional CRC field that contains a cyclic redundancy check that is computed on the packet counter field bits only. This CRC can be used by the receiver to determine if the packet counter field is received correctly, i.e., without bit errors. This CRC can be in addition to the standard CRC inserted by the standard PTM-TC (the standard packet PTM-TC CRC is a CRC that covers all bits in a packet). The standard packet CRC may also cover the new packet counter field in its CRC as well. This helps if the receiving modem uses the presence or absence of the packet counter field in a packet to detect if the packet has a low-PER or low-latency requirement (discussed below).

[0051] Alternatively, or in addition, the packet counter field (with or without a dedicated CRC) can be appended only to the packets with a specific QOS requirement, whereas all other packets can be transmitted without modification. For example, all video packets with low-PER QOS could contain the appended packet counter field whereas all the voice/data low-latency packets could be transmitted unchanged. One exemplary benefit of this is that the overhead (rate loss) due to adding the packet counter field is incurred only when transmitting low-PER packets.

[0052] Alternatively, or in addition, all low-PER and low-latency packets can be transmitted with the low packet counter field (with or without a dedicated CRC). In this case,

the packet counter field of the low-latency packets may contain a special value indicating that a packet is not a low-PER packet. Also, the packet counter field of the low-latency packet may not even contain a count value, since the low-latency packets are not intended to be retransmitted. In this case, the packet counter field could contain a counter value only for low-PER packets and the counter value would only be incremented when a low-PER packet was transmitted. As an example, if the packet counter field is 16 bits, the special value of all zeros could be used to indicate that a packet is a low-latency packet. In this case, low-PER packets could contain counter values from one up to 2^{16}-1, but not including all zeros, since this special zero value can be used to indicate a low-latency packet.

[0053] The receiving modem, e.g., receiver PTM-TC, which in this case is illustrated as the transceiver 300 and includes comparable functionality to that described in relation to transceiver 200, receives packets from the transmitting modem via the PMS-TC. If the received packet is identified as a low-latency packet by the QOS ID module 325, the packet is passed to a higher-layer. If a received packet is identified by the QOS ID module 325 as a low-PER packet, the packet is forwarded, with the cooperation of the transmission management module 320, to the retransmission buffer 350 for a minimum amount of time before passing to a higher-layer.

[0054] The storage time in the retransmission buffer 350 helps ensure that the retransmission protocol provides a constant delay, e.g., no delay variation seen by the upper layers. This way, if a packet needs to be retransmitted, the receiving modem can continue to provide packets to the higher-layers at a constant rate while waiting for the retransmitted packet(s) to arrive from the transmitting modem. The resulting minimum memory (or

storage) requirements for the receiving PTM-TC are estimated below.

[0055] Alternatively, low-PER packets without errors may not be stored for a minimum amount of time before passing to a higher-layer. The error-free low-PER packets can be passed to the higher-layer immediately just like the low-latency packets. However, when a low-PER packet is in error, it is stored along with all of the following low-PER packets before passing to a higher-layer in order to wait for the retransmitted packet(s) to arrive. This will cause a delay variation on the low-PER packets whenever a retransmission occurs. However, this delay variation would not apply to the low-latency packets.

[0056] The QOS ID module 325 can detect that a packet is either low-PER or low-latency using several different methods. For example, if all low-PER and low-latency packets contain the appended packet counter field, then the receiving modem, in cooperation with the counter module 360, detects a low-latency packet when a packet counter field contains the designated special value, which was inserted by the transmitting modem, indicating the packet is a low-latency packet.

[0057] Alternatively, or in addition, the receiver could detect a low-PER packet when the packet counter field contains a valid packet counter value. Additionally, if a dedicated CRC is appended to the packet counter field, the CRC could be used to detect if the packet counter field bits are in error.

[0058] If the packet counter field, including the CRC, is only appended to low-PER packets, the absence or presence of this field in a packet can be used by the receiving modem,

and in particular the QOS ID module, to detect a low-delay packet. For example, the receiving modem can examine the position in the packet where the packet counter field would be, if it was a low-PER packet, and if the packet counter field CRC fails while the standard whole packet CRC is correct, the receiving modem could determine that the packet is a low-delay packet, since it does not contain the packet counter field. Likewise, for example, the receiving modem can examine the position in the packet were the packet counter field would be, if it was a low-PER packet, and if the packet counter field CRC is correct, the receiving modem would determine that the packet is a low-PER packet, regardless of the status of the standard whole packet CRC.

[0059] The receiving modem, in cooperation with the retransmission buffer 350, and the errored packet module 310, can be used to detect missing or errored packets in a number of exemplary ways. For example, the errored packet module 310 can detect bit errors in the packet using the standard/whole packet PTM-TC CRC. Alternatively, or in addition, the errored packet module 310 can detect bit errors in the packet counter field if the transmitting modem appended a dedicated CRC to the packet counter field. This CRC is valuable because it can be used by the errored packet module in the receiving modem to determine if a packet has the correct packet number, even if the standard whole packet CRC happens to be in error.

[0060] Alternatively, or in addition, the errored packet module 310, can detect an errored or missing packet by receiving a packet with a correct CRC, either in the standard or packet counter field, which contains a packet counter number that is not the expected packet counter number. For example, if the errored packet module 310, in cooperation with the counter module 360, detects the receipt of a packet with a counter number equal to 5, wherein the

errored packet module 310 is expecting to receive a packet with a counter equal to 3, the errored packet module 310 can determine that two packets, namely packets numbered 3 and 4, were lost due to errors.

[0061] Once a packet(s) is found to be in error, there are several exemplary ways in which a receiving modem can communicate information to the transmitting modem indicating that a retransmission of one or more packets is required. For example, the receiving modem, in cooperation with the errored packet module 310, can send an acknowledgment (ACK) message to the transmitting modem for every correctly received message or every predetermined number of packets. As long as the transmitting modem, and in particular the errored packet module 210, receives messages acknowledging receipt of packets in sequential order, there is no need for retransmission of information to the receiving modem. However, if the transmitting modem, and in particular the errored packet module 210, receives a message from the receiving modem, and in particular the errored packet module 310, indicating that a packet was correctly received with a counter value that is out of order, a retransmission by the transmitting modem is required. In the above example, where the receiving modem received a packet with a counter value equal to 5, without receiving packets numbered 3 and 4, the transmitting modem could receive an ACK for the packet with counter value of 2 and then an ACK for the packet with a counter value of 5. The transmitting modem would then determine that it was necessary to retransmit packets with counter values of 3 and 4 since they were not received.

[0062] Alternatively, or in addition, a timeout value could be specified for the transmitting modem. This timeout value could correspond to the amount of time that the

transmitting modem should wait for an ACK for particular packet before retransmitting the packet. The timeout value could be set to be at least as long as the round-trip delay required for the transmitting modem to send a packet to the receiving modem and for the receiving modem to send an ACK back to the transmitting modem. If an ACK is not received by the timeout value, the transmitting modem could retransmit the packet.

[0063] Alternatively, or in addition, a negative acknowledgment (NAK) could be sent to the transmitting modem when a packet is detected as errored or missing. In the above example, when the receiving modem received the packet with a counter value of 5, while expecting a counter value of 3, the receiving modem could send a NAK message to the transmitting modem indicating that packets with counter values of 3 and 4 were not correctly received and needed to be retransmitted.

[0064] Alternatively, or in addition, if a packet was received with a correct packet counter CRC and a valid packet counter value a and an incorrect standard whole packet CRC, the receiving modem could send a NAK message to the transmitting modem indicating that a packet with a value of a was incorrectly received and needed to be retransmitted.

[0065] Assuming that errored packets are infrequent, any methodology that sends an ACK for each correctly received packet can require a larger amount of data rate in the message channel that communicates this information back to the transmitting modem. In this case, sending only NAKs has the benefit that it requires sending a message only when an errored or missing packet is detected. Depending on the data rate capabilities of the message channel, and the PER, a retransmission system may use only ACKs, only NAKs, or both

ACKs and NAKs at the same time.

[0066] The ACK and NAK messages sent back to the transmitting modem can be transmitted over the same physical channel i.e., phone line, in the opposite direction as the received packets. Since the channel has a limited data rate and is not necessarily error-free, it is important to make sure that these messages are as robust as possible and consume the least amount of data rate. Additionally, since the transmit and receive retransmission memory requirements depend on the round-trip latency of the connection, is important to minimize latency requirements for the message channel. There are several ways these requirements can be addressed.

[0067] The messages can be sent over a separate "low-latency" or "fast" path between the xDSL transceivers. This fast path could include little or even no delay due to interleaving and can be specified to have a latency that is less than 2ms.

[0068] Alternatively, or in addition, the messages can be sent with increasing robustness by repeating transmission of each message a number of times. For example, the message could be repeated x times in order to make sure that even if x-1 messages were corrupted by the channel, at least one message would be received correctly.

[0069] Alternatively, or in addition, the messages can be sent such that each message is repeated a number of times and each repeated message is sent in a different DMT symbol. For example, the message can be repeated x times and each message sent in one of x DMT symbols. This way, even if x-1 DMT symbols were corrupted by the channel, at least one

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 172 of 739

message would be received correctly.

[0070] Alternatively, or in addition, the messages can be sent such that each message is repeated a number of times and each repeated message is sent in different DMT symbols. For example, the message could be repeated x times and each message sent in one of x DMT symbols. This way, even if x-1 DMT symbols were corrupted by the channel, at least one message would be received correctly.

[0071] Alternatively, or in addition, the messages can be sent such that each message is repeated a number of times and each repeated message is sent a plurality of times in each DMT symbol. For example, the message could be repeated x times and each repeated message sent y times in one of x DMT symbols. This way, even if x-1 DMT symbols were corrupted by the channel and/or large portions of a DMT symbol were corrupted by a channel, the least one message would be received correctly.

[0072] Alternatively, or in addition, the messages can include multiple packet count values in order to reduce the data rate requirements. For example, if packets with counter values of 3 - 9 are correctly (or incorrectly) received an ACK (or NAK) message would be sent to indicate these packet values. For example, the message could contain the values 3 and 9 and the receiver of the message would automatically know that all intermediate values (4, 5, 6, 7, 8) are also been indicated in the message.

[0073] Alternatively, or in addition, the DMT sub-carriers that modulate these messages could operate with a much higher SNR margin e.g., 15dB, as compared to the normal 6dB

margin of xDSL systems. This way, the messages would have a higher immunity to channel noise.

[0074] Alternatively, or in addition, a receiving modem may need to send an additional ACK or NAK message after already in the process of sending a repeated message. For example, a receiving modem may detect that packets with values 3 to 9 have been correctly received and send an ACK message back to the transmitting modem indicating this information. This message can be repeated x times with each repeated message being transmitted (at least once) on different DMT symbols. While sending the second repeated message on the second DMT symbol, the receiver could detect that packets with values 10 to 17 have now also been correctly received. In this case, the receiving modem could just append this information to the previous message or, alternatively, send a new separate message that is repeated as well x times with each repeated message being transmitted (at least once) on a different DMT symbol.

[0075] Alternatively, or in addition, when repeating a message x times on x DMT symbols, each repeated message can be modulated on a different set of DMT sub-carriers on each DMT symbol. This way, if one or more sub-carriers have a low SNR, the message will still be correctly received.

[0076] For low-PER packets, the delay due to this retransmission protocol is equal to the delay that results from storing these packets at the receiving modem (RX PTM-TC) to pass in the packets to a higher layer. Low-latency packets do not incur extra delay.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 174 of 739

[0077] The transmitting modem must store a packet for retransmission for a time equal to the round trip delay from when the packet is sent to when the retransmission message is received. During this time the transmitting modem continues to receive packets from the higher layer and continues to store these packets in the same way. Therefore the storage requirements in octets can be computed as:

*Minimum TX memory (octets)= roundtripdelay*datarate,*

where the *roundtripdelay* is the time equal to the round trip delay from when the packet is sent to when the retransmission message is received, and the *datarate* is the data rate of the connection that is transferring the packets.

For ITU-T G.993.2 VDSL2, which is incorporated herein by reference, this can be computed using the VDSL2 profile parameters as:

Minimum TX memory (octets) = (DS + US Interleaving Delay in octets) + (US+DS alpha/beta delay without interleaving)(Bidirectional Net data rate) = MAXDLEYOCTET + (4 ms)*MBDC,*

where *MAXDELAYOCTET* and *MBDC* are as specified in the VDSL2 profiles.

[0078] For the receiver, the minimum receiver storage requirements can be determined in a similar manner. More specifically, the RX PTM-TC must store a packet before passing it to the higher layer for a time equal to the round trip delay from when a retransmission message is transmitted to when the retransmitted packet is received. This is equal to storage requirements in octets (same as transmitter):

*Minimum RX memory (octets)= roundtripdelay*datarate,*

where the *roundtripdelay* is the time equal to the round trip from when a retransmission

message is transmitted to when the retransmitted packet is received and the *datarate* is the data rate of the connection that is transferring the packets.

[0079] For ITU-T G.993.2 VDSL2 this can be computed using the VDSL2 profile parameters as:

Minimum RX memory (octets) = (DS + US Interleaving Delay in octets) + (US+DS alpha/beta delay without interleaving)(Bidirectional Net data rate) = MAXDLEYOCTET + (4 ms)*MBDC,*

where MAXDELAYOCTET and MBDC are as specified in the ITU-T G.993.2 VDSL2 profiles.

[0080] Table 1: Minimum TX or RX memory requirements for VDSL2

VDSL2 PROFILE	8a,8b,8c,8d	12a,12b	17a	30a
TX or RX memory requirements (octets) = MAXDLEYOCTET +.002MBDC	90,536	99,536	123,304	231,072

The estimates in Table 1 assume that all the entire *MAXDELAYOCTET* and *MBDC* are used for the transfer of the packet stream, i.e., the reverse channel has a very low data rate and no interleaving.

[0081] Some xDSL standards specify minimum storage, i.e., memory, requirements for interleaving of RS codewords. Interleaving with RS coding is an effective way of correcting channel errors due to, for example, impulse noise. For example, VDSL2 requires support of an aggregate bidirectional interleaver and de-interleaver memory of 65Kbytes for the 8a

VDSL2 profile. This corresponds to storage requirement of approximately 32Kbytes in a single transceiver.

[0082] Sharing of Memory between the Retransmission Function and one or more of the Interleaving/Deinterleaving/RS Coding/RS Decoding Functions

[0083] From Table 1, it is apparent that the memory requirements to support the retransmission protocol may be more than double the storage requirements of a single transceiver. Additionally, the retransmission protocol provides a different method for correcting channel errors due to, for example, impulse noise.

[0084] Moreover, interleaving and RS coding methods and retransmission protocols provide different advantages with respect to error correction capabilities, latency, buffering requirements, and the like. For example, under certain configuration and noise conditions the interleaving/RS coding provides error correction/coding gain with less delay and overhead than the retransmission protocol (for packets that can be retransmitted). While under other conditions the retransmission protocol will provide better error correction with less delay and overhead than the interleaving/RS coding.

[0085] In some cases, a first portion of the memory can be used for one function and a second portion of the memory for some other function. For example, if the configuration and noise conditions are such that the interleaving/RS coding would not provide good error correction/coding gain, then all the available memory could be used for the retransmission function and none allocated to the interleaving/deinterleaving/RS coding/RS decoding

functionality, e.g., the interleaving/deinterleaving could be disabled.

[0086] Likewise, if the configuration and noise conditions are such that the retransmission protocol would not provide good error correction/coding gain, then all the available memory could be used for the interleaving/deinterleaving/RS coding/RS decoding functionality and no memory would be used for the retransmission function, e.g., the retransmission function would be disabled.

[0087] Alternatively, or addition, both methods could be used because both have their advantages, with the system, e.g., the memory management module 370, being able to dynamically allocate a first portion of the memory 250/350 to the interleaving/deinterleaving/RS coding/RS decoding functionality and a second portion of the memory to the retransmission functionality. For example, 40% of the memory could be allocated to the interleaving/deinterleaving/RS coding/RS decoding functionality with the remaining 60% allocated to the retransmission of functionality. However, it should be appreciated, that in general, the memory can be divided, i.e., shared, in any manner.

[0088] The sharing of memory between the retransmission function and the interleaving/deinterleaving/RS coding/RS decoding functions is not restricted to retransmission protocols described in other embodiments that utilize QOS metrics to determine which packets should be retransmitted. In other words, the sharing of memory between the retransmission function and the interleaving/deinterleaving/RS coding/RS decoding functions can be utilized for retransmission systems where all errored packets are retransmitted, i.e., there is no QOS identifier in the retransmission protocol. For example, the

FEC/interleaving could be used to meet the INPmin requirement specifically targeting the impulse noise that occurs frequently (e.g., on the order of minutes or seconds) but is short in duration and can therefore be corrected by the FEC/interleaving. For example, the retransmission protocol can be used to correct infrequent errors (on the order of hours) that are long in duration and would not be correctable by the FEC/interleaving. As another example, the FEC/interleaving function may be used in combination with the retransmission function because it is well known that FEC with minimal interleaving provides a 1 dB to 3 dB coding gain when used with a trellis code (as is often the case in xDSL systems). This means that even when the majority of the shared memory is allocated to a retransmission function to address channel noise (such as impulse noise), a smaller amount of memory may be allocated to the FEC/interleaving function for the coding gain advantage.

[0089] Associated with the ability to allocate or partition memory between one or more of the interleaving/deinterleaving/RS coding/RS decoding functionality and retransmission functionality, is the ability to exchange information between transceivers on how to establish this allocation. For example, the transmitting modem may send a message to the receiving modem indicating how much of the available memory is to be allocated to one or more of the interleaving/deinterleaving/RS coding/RS decoding functionality and how much memory is to be allocated to the retransmission functionality. For example, if the receiving modem contains 100kBytes of available memory, the transmitting modem could send a message to the receiving modem indicating that 25kBytes should be allocated to RS coding functionality and 75kBytes should be allocated to the retransmission functionality. Since the receiving modem generally determines the interleaving/RS coding parameters that are used, the receiving modem could use this information to select parameters, e.g., interleaver depth and

codeword size, that would result in an interleaving memory requirement that is no more than the amount indicated in the message.

[0090] Alternatively, or addition, the receiving modem can send a message to the transmitting modem indicating how much of the available memory is to be allocated to one or more of the interleaving/deinterleaving/RS coding/RS decoding functionality, and how much memory should be allocated to the retransmission functionality.

[0091] Sharing of memory between a Retransmission Function with Identification of Low-PER and/or Low-Latency Packets and one or more of interleaving/deinterleaving/RS Coding/ RS Decoding functions.

[0092] A way of reducing the total memory requirement of a transceiver that supports the retransmission functionality with the identification of the low-PER and/or the low-latency packets is to define a limit, such as a maximum value, for the data rate of the low-PER packet stream, i.e., the packets requiring retransmission to meet a specific PER requirement. For example, if the total date rate is 50 Mbps, and the roundtrip delay is 10 ms, the minimum TX or RX memory requirement is 50,000,000*.01/8=62500 bytes if the retransmission function must support the case where all the transmitted packet (all 50 Mbps) are low-PER packets. If however, only a portion of the 50 Mbps data rate is allocated to the low-PER packet stream (e.g. 30 Mbps), whereas the remainder of the data rate is allocated to the low-latency packet stream (e.g. 20 Mbps), the minimum TX or RX memory requirement would be 30,000,000*.01/8=37500 bytes (assuming a roundtrip delay of 10ms). In this case, the transmitting modem (or receiving modem) may send a message to the receiving modem (or

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 180 of 739

transmitting modem) that indicates the maximum data rate of the packet traffic that will be used in the retransmission function. Using the example above, the transmitting modem (or receiving modem) would send a message indicating that the low-PER traffic will not exceed 30Mbps, in which case the receiving modem (or transmitting modem) will allocate memory to the retransmission functionality and the interleaving/RS coding (or deinterleaving/RS decoding) functionality accordingly.

[0093] One exemplary advantage of indicating the low-PER and low-latency packets as part of the retransmission protocol is that it provides a DDR-like functionality without the overhead of dynamically re-allocating latency paths. For example, when a video application is turned off (less low-PER packets on the connection), the data application data rate can be increased (more low-latency packets on the connection) without any changes in the transmission parameters.

[0094] The retransmission protocol can also be used with or without underlying FEC/interleaving (or deinterleaving). An exemplary approach is to use the FEC/interleaving to meet the INPmin requirement specifically targeting the impulse noise that occurs frequently, e.g., on the order of minutes or seconds. The retransmission protocol can be used to correct infrequent errors (on the order of hours) that will only typically be a problem for very-low PER applications, such as video.

[0095] When a retransmission protocol is combined with underlying FEC/interleaving (or deinterleaving), the retransmission protocol latency will grow in proportion to the additional FEC/interleaving delay. This is due to the fact that the required receiver buffering

corresponds approximately to the round-trip delay time of packet transmission and message acknowledgment.

[0096] As an example of utilizing the retransmission protocol that identifies one or more of low-PER and low-latency packets with underlying FEC/Interleaving (or deinterleaving), the FEC/interleaving is used to achieve the INPmin requirements within the latency constraint and the retransmission function is used to provide another layer of error correction. The low-PER packets are passed through both the retransmission function and the FEC/interleaver and, as a result, a very low PER is achieved. The low-latency packets are passed through the FEC/Interleaver but not passed through the retransmission function. Since low-latency packets are passed through the FEC/interleaver, they will meet the INPmin and MaxDelay requirements without incurring the extra delay from the retransmission protocol.

[0097] Example configuration parameters:

DS Data rate = 25 Mbps, INPmin=2, MaxDelayDS= 8ms

[0098] Example FEC/Interleaving parameters:

NFEC=128, R=16 which results in an interleaver memory of approximately 14Kbytes for INP=2 with 8 ms of delay.

[0099] Retransmission protocol:

If we assume the US latency is 2ms, the retransmission protocol will add a minimum of 8+2 = 10ms of latency. This means that the total DS latency (FEC/interleaving+ Retransmission)

will be approximately 8+10=18ms.

[00100] Memory requirements:

The memory requirements for the retransmission protocol can be calculated as: (10ms) x (25 Mbps) /8 = 31Kbytes. Therefore the transmitter and receiver will both need a total memory of (31+14) =45 Kbytes for the retransmission protocol and FEC/Interleaving function.

[00101] Low-PER packets:

Latency=18ms. The PER is very low because INPmin=2 (from FEC/interleaving) is combined with the error correction of the retransmission function.

[00102] Low-Latency packets:

Latency = 8ms. INP =2 from FEC/interleaving. No additional delay due to retransmission function.

[00103] Although this invention describes the retransmission being done as part of the PTM-TC, it could also be done inside other layer(s) of the xDSL transceiver, such as the PMD or the PMS-TC. Alternatively, it could performed at a layer(s) above the PTM-TC, for example, in a new layer between the PTM-TC and the next higher layer, or in general any layer above the physical layer, e.g., layer 1, 2, 3, 4 or 5.

[00104] In this invention, the term "transmitter" generally refers to the transceiver that transmits the packets. Likewise the term "receiver" generally refers to the transceiver that receives the packets. Therefore the "transmitter" also receives the ACK/NAK messages and

the "receiver" also transmits the ACK/NAK messages.

[00105] Figure 2 outlines an exemplary method of operation of a transmitting modem utilizing the retransmission protocol. In particular, control begins in step S100 and continues to step S110. In step S110, a packet is received from a higher layer. Then, in step S120, a decision is made as to whether the received packet is a retransmitted type packet. If the packet is not a retransmitted type packet, such as a low-latency packet, control jumps to step S125 where the packet is optionally updated (as discussed above) with control continuing to step S130 where the packet is forwarded to the receiver. Control then continues to step S140 where the control sequence ends.

[00106] If the packet is a retransmitted type packet, such as a low-PER packet, control continues to step S150. In step S150, the packet can be updated with information such as a sequence identifier or other information that allows a receiver to be able to determine which packet (or packets) need to be retransmitted. Next, in step S160, the updated packet is stored in the retransmission buffer. Then, in step S170, the packet is forwarded to the receiver. Control then continues to step S180.

[00107] In step S180, a determination is made whether the packet needs to be retransmitted. If the packet needs to be retransmitted, control jumps back to step S170. Otherwise, control continues to step S190.

[00108] In step S190, the packet is deleted from the retransmission buffer. Control then continues to step S140 where the control sequence ends.

[00109] Figure 3 outlines an exemplary method of operation of a receiving modem utilizing the retransmission protocol. In particular, control begins in step S200 and continues to step S210. In step S210, a packet is received from the transmitter. Next, in step S220, a determination is made whether the packet has been identified as a retransmitted type packet. If the packet has not been identified as a retransmittable type packet, control jumps to step S230.

[00110] In step S230, the packet is forwarded to a higher layer. Control then continues to step S240 where the control sequence ends.

[00111] Alternatively, if the received packet is a retransmittable type packet, the packet is stored in the retransmission buffer in step S260. Next, in step S270, the integrity of the packet can be checked, for example utilizing a CRC. Then, in step S280, a determination is made whether the packet needs retransmission. If the packet needs retransmission, control continues to step S290 where the retransmitted packet is obtained, for example, based on the sending of a message(s), one or the other transceiver determining a packet is missing, or the like, as discussed above, with control continuing back to step S270 for an integrity check.

[00112] If the packet does not need retransmission, control continues to step S295 where the packet is forwarded to a higher layer and deleted from the retransmission buffer. Control then continues to step S240 where the control sequence ends.

[00113] Figure 4 outlines an exemplary memory allocation method for sharing memory

between the retransmission function and one or more of the interleaving/deinterleaving functionality and coding functionality. In particular, control begins in step S300 and continues to step S305. In step S305, a message is sent/received specifying the available memory. Typically, the receiver will send a message to the transmitter specifying the available memory, but the transmitter could also send a message to the receiver. Next, in step S310, a determination is made as to how the memory should be allocated. As discussed, this allocation can be based on one or more of error correction capability, latency, buffering requirements, SNR, impulse noise, or in general, any communication parameter. Next, in step S320, the memory allocation is communicated to another transceiver. Then, in step S330, a determination can made as to whether the allocation is compatible. If the received allocation is not compatible, control continues to step S360 wherein another allocation can be requested, with control continuing back to step S320.

[00114] Alternatively, if the allocation is compatible, in step S340 the memory is allocated based on the received allocation. Control then continues to step S350 where the control sequence ends.

[00115] Figure 5 illustrates an exemplary memory sharing methodology for use with a retransmission function and one or more of interleaving/deinterleaving functionality, RS coding/decoding functionality. In particular, control begins in step S400 and continues to step S410. In step S410, the memory allocation is received from, for example, a memory management module that may be located in the same transceiver, or at a remote transceiver. Next, in step S420, the memory sharing configuration is established and then, in step S430, the memory is shared between a retransmission function and one or more of the

interleaving/deinterleaving functionality, RS coding/decoding functionality. Control then continues to step S440.

[00116] In step S440, a determination is made whether the memory sharing configuration should be changed. For example, the memory sharing configuration can be dynamically changed based on changes in the communication channel or data type(s) being sent on the communication channel. More specifically, for example, if the communications channel was not performing well, e.g., an increase in bit errors, it may be advantageous to increase the retransmission capability while decreasing the FEC/interleaving capability or vise-versa, which could have an impact on how the memory sharing should be configured.

[00117] If the memory sharing configuration should be changed, control continues to step S450 where another allocation can be requested, with control continuing back to step S410. Otherwise, control continues to step S460 where the control sequence ends.

[00118] While the above-described flowcharts have been discussed in relation to a particular sequence of events, it should be appreciated that changes to this sequence can occur without materially effecting the operation of the invention. Additionally, the exact sequence of events need not occur as set forth in the exemplary embodiments, but rather the steps can be performed by one or the other transceiver in the communication system provided both transceivers are aware of the technique being used for initialization. Additionally, the exemplary techniques illustrated herein are not limited to the specifically illustrated embodiments but can also be utilized with the other exemplary embodiments and each described feature is individually and separately claimable.

[00119] The above-described system can be implemented on wired and/or wireless telecommunications devices, such a modem, a multicarrier modem, a DSL modem, an ADSL modem, an xDSL modem, a VDSL modem, a linecard, test equipment, a multicarrier transceiver, a wired and/or wireless wide/local area network system, a satellite communication system, network-based communication systems, such as an IP, Ethernet or ATM system, a modem equipped with diagnostic capabilities, or the like, or on a separate programmed general purpose computer having a communications device or in conjunction with any of the following communications protocols: CDSL, ADSL2, ADSL2+, VDSL1, VDSL2, HDSL, DSL Lite, IDSL, RADSL, SDSL, UDSL or the like.

[00120] Additionally, the systems, methods and protocols of this invention can be implemented on a special purpose computer, a programmed microprocessor or microcontroller and peripheral integrated circuit element(s), an ASIC or other integrated circuit, a digital signal processor, a hard-wired electronic or logic circuit such as discrete element circuit, a programmable logic device such as PLD, PLA, FPGA, PAL, a modem, a transmitter/receiver, any comparable means, or the like. In general, any device capable of implementing a state machine that is in turn capable of implementing the methodology illustrated herein can be used to implement the various communication methods, protocols and techniques according to this invention.

[00121] Furthermore, the disclosed methods may be readily implemented in software using object or object-oriented software development environments that provide portable source code that can be used on a variety of computer or workstation platforms.

Alternatively, the disclosed system may be implemented partially or fully in hardware using standard logic circuits or VLSI design. Whether software or hardware is used to implement the systems in accordance with this invention is dependent on the speed and/or efficiency requirements of the system, the particular function, and the particular software or hardware systems or microprocessor or microcomputer systems being utilized. The communication systems, methods and protocols illustrated herein can be readily implemented in hardware and/or software using any known or later developed systems or structures, devices and/or software by those of ordinary skill in the applicable art from the functional description provided herein and with a general basic knowledge of the computer and telecommunications arts.

[00122] Moreover, the disclosed methods may be readily implemented in software that can be stored on a storage medium, executed on programmed general-purpose computer with the cooperation of a controller and memory, a special purpose computer, a microprocessor, or the like. In these instances, the systems and methods of this invention can be implemented as program embedded on personal computer such as an applet, JAVA® or CGI script, as a resource residing on a server or computer workstation, as a routine embedded in a dedicated communication system or system component, or the like. The system can also be implemented by physically incorporating the system and/or method into a software and/or hardware system, such as the hardware and software systems of a communications transceiver.

[00123] It is therefore apparent that there has been provided, in accordance with the present invention, systems and methods for packet retransmission and memory sharing.

While this invention has been described in conjunction with a number of embodiments, it is evident that many alternatives, modifications and variations would be or are apparent to those of ordinary skill in the applicable arts. Accordingly, it is intended to embrace all such alternatives, modifications, equivalents and variations that are within the spirit and scope of this invention.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 190 of 739

ABSTRACT

Through the identification of different packet-types, packets can be handled based on an assigned packet handling identifier. This identifier can, for example, enable forwarding of latency-sensitive packets without delay and allow error-sensitive packets to be stored for possible retransmission. In another embodiment, and optionally in conjunction with retransmission protocols including a packet handling identifier, a memory used for retransmission of packets can be shared with other transceiver functionality such as, coding, decoding, interleaving, deinterleaving, error correction, and the like.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 191 of 739

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Filer:	Jason Vick/Joanne Vos
Attorney Docket Number:	6936-57-PUS-CON-3

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	280	280
Utility Search Fee	1111	1	600	600
Utility Examination Fee	1311	1	720	720
Pages:				
Utility Appl Size fee per 50 sheets >100	1081	1	400	400
Claims:				
Miscellaneous-Filing:				
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**2000**

Electronic Acknowledgement Receipt	
EFS ID:	17958908
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	20-JAN-2014
Filing Date:	
Time Stamp:	16:10:22
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$2000
RAM confirmation Number	11247
Deposit Account	191970
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	ADS.pdf	1566097 9e8a8b2098ed032198d363b9fc7cc7b5a2deb249	no	7
Warnings:					
Information:					
2	Oath or Declaration filed	AIA_Tzannes_Executed_Declaration.pdf	957276 b0116a956340faece3034048dccce2d94382bc51	no	1
Warnings:					
Information:					
3		AMEND_PRELIM_01.pdf	374322 30ab9c2750e54aa70ad46bc9fcbb583aaf836dd1	yes	5

Multipart Description/PDF files in .zip description

Document Description	Start	End
Preliminary Amendment	1	1
Specification	2	2
Claims	3	4
Applicant Arguments/Remarks Made in an Amendment	5	5

Warnings:					
Information:					
4		Specification.pdf	250456 920ddfaab118bcabd6fcf320a42ee67f2a283c18	yes	70

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	52
Claims	53	69
Abstract	70	70

Warnings:

Information:

5	Drawings-only black and white line drawings	FIGURES.pdf	41081 ae5c1f2416688bc7884c226941012420ce46955b	no	4
Warnings:					
Information:					
6		Substitute_Spec_MARKED_UP.pdf	236392 33cf4a7404c0912898662901410585 96f0636a72	yes	56

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Specification	1	55
	Abstract	56	56

Warnings:					
Information:					
7		Substitute_Spec_CLEAN.pdf	221951 de2d5b21ffcd46c97c6b80999fe2d5f9a0c1c8ba	yes	56

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Specification	1	55
	Abstract	56	56

Warnings:					
Information:					
8	Fee Worksheet (SB06)	fee-info.pdf	36760 cc5ef5c6150b1c1908f8494b75f5a692c9176edf	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	3684335		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	6936-57-PUS-CON-3
	Application Number	
Title of Invention	PACKET RETRANSMISSION AND MEMORY SHARING	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Marcos	C.	Tzannes	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Alamo	State/Province	CA	Country of Residence i	US

Mailing Address of Inventor:

Address 1	2479 Roundhill Drive
Address 2	

City	Alamo	State/Province	CA
Postal Code	94507	Country i	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	62574		
Email Address	jvick@sheridanross.com	Add Email	Remove Email

Application Information:

Title of the Invention	PACKET RETRANSMISSION AND MEMORY SHARING		
Attorney Docket Number	6936-57-PUS-CON-3	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	4	Suggested Figure for Publication (if any)	

Filing By Reference :

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	6936-57-PUS-CON-3
	Application Number	
Title of Invention	PACKET RETRANSMISSION AND MEMORY SHARING	

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	62574		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the application number blank.

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
	Continuation of	13/766059	2013-02-13	8645784	2014-02-04
Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13/766059	Continuation of	12/783758	2010-05-20	8407546	2013-03-26

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	6936-57-PUS-CON-3
	Application Number	
Title of Invention	PACKET RETRANSMISSION AND MEMORY SHARING	

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
12/783758	Continuation of	12/295828	2008-10-02	8335956	2012-12-18

Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
12/295828	a 371 of international	PCT/US2007/066522	2007-04-12

Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
PCT/US2007/066522	Claims benefit of provisional	60/849650	2006-10-05

Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
PCT/US2007/066522	Claims benefit of provisional	60/792236	2006-04-12

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) [i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country [i]	Filing Date (YYYY-MM-DD)	Access Code [i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	6936-57-PUS-CON-3
	Application Number	
Title of Invention	PACKET RETRANSMISSION AND MEMORY SHARING	

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Authorization to Permit Access:

☐ Authorization to Permit Access to the Instant Application by the Participating Offices

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	6936-57-PUS-CON-3
	Application Number	
Title of Invention	PACKET RETRANSMISSION AND MEMORY SHARING	

Applicant 1 Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

(•) Assignee	( ) Legal Representative under 35 U.S.C. 117	( ) Joint Inventor
( ) Person to whom the inventor is obligated to assign.	( ) Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here. [X]

Organization Name	TQ DELTA, LLC		
Mailing Address Information:			
Address 1	805 LAS CIMAS PARKWAY		
Address 2	SUITE 240		
City	AUSTIN	**State/Province**	TX
Country [i]	US	Postal Code	78746
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication . An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. [ ]

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	6936-57-PUS-CON-3
	Application Number	
Title of Invention	PACKET RETRANSMISSION AND MEMORY SHARING	

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications

Signature	/Jason H. Vick/			Date (YYYY-MM-DD)	2014-01-20
First Name	Jason H.	Last Name	Vick	Registration Number	45285

Additional Signature may be generated within this form by selecting the Add button. Add

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/AIA/01 (06-12)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	PACKET RETRANSMISSION AND MEMORY SHARING

As the below named inventor, I hereby declare that:

This declaration is directed to:

- [■] The attached application, or
- [ ] United States application or PCT international application number _____ filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: _____ Date (Optional) : _____

Signature: Marcos C. Tzannes

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	1	of	10	Attorney Docket Number	6936-57-PUS-CON-2

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	5524116	06-04-1996	Kalmanek, Jr., et al.	
	2	5663910	09-02-1997	Ko et al.	
	3	5898698	04-27-1999	Bross	
	4	5983382	11-09-1999	Pauls	
	5	6098188	08-01-2000	Kalmanek, Jr., et al.	
	6	6775320	08-10-2004	Tzannes et al.	
	7	6778589	08-17-2004	Ishii	
	8	6337877	01-08-2002	Cole et al.	
	9	6496481	12-17-2002	Wu et al.	
	10	6707822	03-16-2004	Fadavi-Ardekani et al.	
	11	6778596	08-17-2004	Tzannes	
	12	6826589	11-30-2004	Berrada	
	13	7200792	04-03-2007	Kim et al.	
	14	7164654	01-16-2007	Hunzinger et al.	
	15	7174493	02-06-2007	Matsumoto et al.	
	16	7519124	04-14-2009	Oksman et al.	
	17	7600172	10-06-2009	Berens et al.	
	18	7657818	02-02-2010	Cioffi et al.	
	19	7764595	07-27-2010	Treigherman	
	20	7782758	08-24-2010	Wydrowski et al.	
	21	7831890	11-09-2010	Tzannes et al.	
	22	7844882	11-30-2010	Tzannes et al.	
	23	7836381	11-16-2010	Tzannes et al.	
	24	8074138	12-06-2011	Chae et al.	
	25	8149904	04-03-2012	Efland et al.	
	26	8276048	09-25-2012	Tzannes et al.	
	27	8335956	12-18-2012	Tzannes	
	28	8407546	03-26-2013	Tzannes	
	29	8468411	06-18-2013	Tzannes	
	30	8495473	07-23-2013	Tzannes et al.	
	31	8595577	11-26-2013	Tzannes	
	32	8607126	12-10-2013	Tzannes et al.	
	33	8645784	02-04-2014	Tzannes	
	34	2001/0014962	08-16-2001	Obuchi et al.	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	2	of	10	Attorney Docket Number	6936-57-PUS-CON-2

	35	2002/0087710	07-04-2002	Aiken et al.	
	36	2002/0126675	09-12-2002	Yoshimura et al.	
	37	2002/0154600	10-24-2002	Ido et al.	
	38	2003/0067877	04-10-2003	Sivakumar et al.	
	39	2003/0076870	04-24-2003	Moon et al.	
	40	2004/0114536	06-17-2004	O'Rourke	
	41	2004/0148552	07-29-2004	Matsumoto et al.	
	42	2004/0196786	10-07-2004	Laha et al.	
	43	2004/0203455	10-14-2004	Bao et al.	
	44	2005/0180323	08-18-2005	Beightol et al.	
	45	2006/0092871	05-04-2006	Nishibayashi et al.	
	46	2006/0236045	10-19-2006	Keyes Jr.	
	47	2007/0198898	08-23-2007	Ysebaert et al.	
	48	2007/0263528	11-15-2007	Mukherjee	
	49	2008/0212582	09-04-2008	Zwart et al.	
	50	2010/0061376	03-11-2010	Shimizu	

UNPUBLISHED U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code[2] (if known)	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	51	14/075194	11-08-2013	Tzannes	
	52	14/081469	11-15-2013	Tzannes et al.	

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	53	EP 1041756	10-04-2000	LUCENT TECHNOLOGIES INC.		(corresponds to JP 2000-341247)
	54	EP 1225735	07-24-2002	Matsushita Electronic Inc Co Ltd		
	55	EP 1246409	10-02-2002	MITSUBISHI ELECTRIC CORP		

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	3	of	10	Attorney Docket Number	6936-57-PUS-CON-2

	56	EP 1271833	01-02-2003	MITSUBISHI DENKI KABUSHIKI KAISHA		
	57	EP 1367809	01-25-2006	PANASONIC COMMUNICATIONS CO., LTD.		
	58	GB 2389493	12-10-2003	NEC CORP		
	59	JP 06-164648	06-10-1994	MITSUBISHI ELECTRIC CORP		(includes English abstract)
	60	JP 07-254862	10-03-1995	SONY CORP.		(includes English abstract and partial mechanical translation)
	61	JP Hei09-247048	09-19-1997	Y R P IDO TSUSHIN KIBAN KIJIYU		(includes machine translation)
	62	JP Hei11-150764	06-02-1999	SHARP CORP		(includes an machine translation)
	63	JP Hei11-355254A	12-24-1999	SONY CORP		(Includes machine translation of application)
	64	JP 2000-341247	12-08-2000	LUCENT TECHNOLOGIES INC		(includes English abstract) (corresponds to EP 1 041 756 cited herein)
	65	JP 2002-084338	03-22-2002	MATSUSHITA ELECTRIC IND CO LTD		(corresponds to US2002-0154600 cited herein)
	66	JP 2003-008553	01-10-2003	MITSUBISHI ELECTRIC CORP		(corresponds to EP 1271833 cited herein)
	67	JP 2003-509966	03-11-2003	AWARE INC.		(corresponds to WO01/20865 cited herein)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	4	of	10	Attorney Docket Number	6936-57-PUS-CON-2

	68	JP 2003-224615	08-08-2003	SAMSUNG ELECTRONICS CO LTD.		(corresponds to US 7,200,792 cited herein)
	69	JP 2004-007269	01-08-2004	PANASONIC COMM CO LTD		(corresponds to EP 1367809 cited herein)
	70	JP 2004-030506	01-29-2004	NEC CORP		(includes abstract and partial mechanical translation)
	71	JP 2004-056221	02-19-2004	MATSUSHITA ELECTRIC IND CO LTD		(includes abstract and partial mechanical translation)
	72	JP 2004-135013	04-30-2004	MATSUSHITA ELECTRIC IND CO LTD		(includes machine translation)
	73	JP 2005-522963	07-28-2005	INTERDIGITAL TECHNOLOGY CORPORATION		(corresponds to WO 03/090011 cited herein)
	74	JP 2005-526422	09-02-2005	EG TECHNOLOGY INC		(corresponds to WO 03/028296 cited herein)
	75	KR 10-2000-0047827	07-25-2000	KONINCLIKE PHILIPS ELECTRONICS		(corresponds to US 6,826,589 cited herein)
	76	WO 00/52834	09-08-2000	FUJITSU LIMITED		(corresponds to US2001/0014962 cited herein)
	77	WO 01/20865	03-22-2001	AWARE INC.		
	78	WO 03/028296	04-03-2003	EG TECHNOLOGY INC		
	79	WO 03/063060	07-31-2003	Broadcom Corp.		
	80	WO 03/090011	10-30-2003	INTERDIGITAL TECHNOLOGY CORPORATION		

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	5	of	10	Attorney Docket Number	6936-57-PUS-CON-2

	81	WO 2006/044227	04-27-2006	Aware Inc.		

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	82	Shoji, T. et al: "Wireless Access Method to Ensure Each Users QOS in Unpredictable and Various QOS Requirements Wireless Personal Communications," Springer, Dordrecht, NL, Vol. 22, No. 2, Aug. 2002, pp. 139-151
	83	"ITU-T Recommendation G.992.5 - Series G: Transmission Systems and Media, Digital Systems and Networks", International Telecommunication Union, ADSL2, May 2003, 92 pages
	84	"ITU-T Recommendation G.992.3," International Telecommunication Union, ADSL2, Jan. 2005, 436 pages
	85	"VDSL2 ITU-T Recommendation G.993.2," International Telecommunication Union, Feb. 2006, 252 pages
	86	"Sunset xDSL: Prequalification of ADSL Circuits with ATU-C Emulation," Sunrise Telecom Inc., Application Series, 2001, San Jose, USA, page 3, available at http://www.sunrisetelecom.com/technotes/APP-xDSL-8B.pdf
	87	International Search Report for International (PCT) Patent Application No. PCT/US2005/036015, mailed Feb. 8, 2006 (Attorney Ref. No. 6936-54-PCT)
	88	Written Opinion for International (PCT) Patent Application No. PCT/US2005/036015, mailed Feb. 8, 2006 (Attorney Ref. No. 6936-54-PCT)
	89	International Preliminary Report on Patentability for International (PCT) Patent Application No. PCT/US2005/036015, mailed Apr. 26, 2007 (Attorney Ref. No. 6936-54-PCT)
	90	Examiner's First Report for Australian Patent Application No. 2005296086, mailed Jun. 24, 2009 (Attorney's Ref. No. 6936-54-PAU)
	91	Examiner's First Report for Australian Patent Application No. 2011201250 mailed May 13, 2013 (Attorney's Ref. No. 6936-54-PAU-DIV)
	92	Examiner's Report for Canadian Patent Application No. 2,580,280, mailed Sept. 14, 2012 (Attorney's Ref. No.: 6936-54-PCA)
	93	Notification of the First Office Action (including translation) for Chinese Patent Application No. 200580032703, mailed Sep. 25, 2009 (Attorney's Ref. No. 6936-54-PCN)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	6	of	10	Attorney Docket Number	6936-57-PUS-CON-2

	94	Official Action (including translation) for Chinese Patent Application No. 200580032703, dispatched May 18, 2011 (Attorney Ref. No. 6936-54-PCN)
	95	Official Action (including translation) for Chinese Patent Application No. 200580032703.1, dispatched March 28, 2012 (Attorney Ref. No. 6936-54-PCN)
	96	Decision of Refusal (including translation) for Chinese Patent Application No. 200580032703.1, dispatched September 5, 2012 (Attorney Ref. No. 6936-54-PCN)
	97	Official Action for European Application No. 05807443.6, mailed March 6, 2013 (Attorney Ref. No.: 6936-54-PEP)
	98	First Examination Report for Indian Patent Application No. 1208/KOLNP/2007, mailed March 18, 2013 (Attorney Ref. No.: 6936-54-PIN)
	99	Official Action (translation only) for Korean Patent Application No. 10-2007-7008270, mailed Jun. 30, 2011 (Attorney Ref. No. 6936-54-PKR)
	100	Notice of Allowance (including translation) for Korean Patent Application No. 10-2007-7008270, mailed March 29, 2012 (Attorney Ref. No.: 6936-54-PKR)
	101	Official Action (translation only) for Korean Patent Application No. 10-2010-7022463, mailed Jun. 30, 2011 (Attorney Ref. No. 6936-54-PKR-DIV)
	102	Notice of Allowance (including translation) for Korean Patent Application No. 10-2010-7022463, mailed March 29, 2012 (Attorney Ref. No.: 6936-54-PKR-DIV)
	103	Official Action (including translation) for Japanese Patent Application No. 2007-535818, dispatched Jul. 11, 2011 (Attorney Ref. No. 6936-54-PJP)
	104	Notice of Allowance for Japanese Patent Application No. 2007-535818, dispatched Dec. 12, 2011 (Attorney Ref. No. 6936-54-PJP)
	105	Official Action (including translation) for Japanese Patent Application No. 2008-264540, dispatched Jul. 11, 2011 (Attorney Ref. No. 6936-54-PJP-DIV)
	106	Official Action (including translation) for Japanese Patent Application No. 2008-264540, dispatched Dec. 12, 2011 (Attorney Ref. No. 6936-54-PJP-DIV)
	107	Notice of Allowance for Japanese Patent Application No. 2008-264540, mailed March 26, 2012 (Attorney Ref. No.: 6936-54-PJP-DIV)
	108	Invitation to Pay Additional Fees (including partial international search report) for International (PCT) Patent Application No. PCT/US2007/066522, mailed Feb. 6, 2008 (Attorney Ref. No. 6936-57-PCT)
	109	International Search Report for International (PCT) Patent Application No. PCT/US2007/066522, mailed Apr. 14, 2008 (Attorney Ref. No. 6936-57-PCT)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	7	of	10	Attorney Docket Number	6936-57-PUS-CON-2

	110	Written Opinion for International (PCT) Patent Application No. PCT/US2007/066522, mailed Apr. 14, 2008 (Attorney Ref. No. 6936-57-PCT)
	111	International Preliminary Report on Patentability for International (PCT) Patent Application No. PCT/US2007/066522, mailed Oct. 23, 2008 (Attorney Ref. No. 6936-57-PCT)
	112	Examiner's First Report on Australian Patent Application No. 2007257055, mailed Mar. 30, 2010 (Attorney Ref. No. 6936-57-PAU)
	113	Official Action (including translation) for Chinese Patent Application No. 200780012891.0, dispatched Mar. 16, 2011 (Attorney Ref. No. 6936-57-PCN)
	114	Notification of the Second Office Action (including translation) for Chinese Patent Application No. 200780012891.0, dispatched March 7, 2012 (Attorney Ref. No.: 6936-57-PCN)
	115	Notification of the Second Office Action (including translation) for Chinese Patent Application No. 200780012891.0, dispatched Dec. 12, 2012 (Attorney Ref. No.: 6936-57-PCN)
	116	Official Action for Columbian Patent Application No. 08-109-377, dated Nov. 5, 2010 (Attorney Ref. No. 6936-57-PCO)
	117	Examination Report for European Patent Application No. 07811844.5, mailed Apr. 1, 2009 (Attorney Ref. No. 6936-57-PEP)
	118	Official Action for European Patent Application No. 07811844.5, dated Jul. 9, 2010 (Attorney Ref. No. 6936-57-PEP)
	119	Official Action for European Patent Application No. 07811844.5, dated Dec. 21, 2010 (Attorney Ref. No. 6936-57-PEP)
	120	Official Action for European Patent Application No. 07811844.5, dated Dec. 18, 2012 (Attorney Ref. No. 6936-57-PEP)
	121	European Search Report and Opinion for European Patent Application No. 10000017.3, dated Mar. 17, 2010 (Attorney Ref. No. 6936-57-PEP-DIV)
	122	Official Action for European Patent Application No. 10000017.3, dated Nov. 3, 2010 (Attorney Ref. No. 6936-57-PEP-DIV)
	123	Official Action for European Patent Application No. 10000017.3, dated Nov. 20, 2013 (Attorney Ref. No. 6936-57-PEP-DIV)
	124	European Search Report and Opinion for European Patent Application No. 10000016.5, dated Mar. 3, 2010 (Attorney Ref. No. 6936-57-PEP-DIV-2)
	125	Official Action for European Patent Application No. 10000016.5, dated Nov. 3, 2010 (Attorney Ref. No. 6936-57-PEP-DIV-2)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	8	of	10	Attorney Docket Number	6936-57-PUS-CON-2

	126	Official Action for European Patent Application No. 10000016.5, dated Dec. 22, 2011 (Attorney Ref. No. 6936-57-PEP-DIV-2)
	127	Communication Under Rule 71(3) EPC - Intention to Grant for European Patent Application No. 10000016.5, dated Dec. 18, 2012 (Attorney Ref. No. 6936-57-PEP-DIV-2)
	128	Decision to Grant a European Patent Pursuant to Article 97(1) EPC for European Patent Application No. 10000016.5, dated May 31, 2013 (Attorney Ref. No. 6936-57-PEP-DIV-2)
	129	Official Action for Japanese Patent Application No. 2009-505623, dispatched Apr. 4, 2011 (Attorney Ref. No. 6936-57-PJP)
	130	Official Action (including translation) for Japanese Patent Application No. 2009-505623, dispatched Oct. 31, 2011 (Attorney Ref. No. 6936-57-PJP)
	131	Official Action for Japanese Patent Application No. 2010-017356, dispatched Apr. 18, 2011 (Attorney Ref. No. 6936-57-PJP-DIV)
	132	Official Action (including translation) for Japanese Patent Application No. 2010-017356, dispatched Aug. 29, 2011 (Attorney Ref. No. 6936-57-PJP-DIV)
	133	Decision of Final Rejection for Japanese Patent Application No. 2010-017356, dispatched April 23, 2012 (Attorney Ref. No.: 6936-57-PJP-DIV)
	134	Official Action for Japanese Patent Application No. 2012-042978, dispatched June 3, 2013 (Attorney Ref. No.: 6936-57-PJP-DIV-2)
	135	Official Action for Korean Patent Application No. 10-2008-7024792, mailed Aug. 29, 2013 (Attorney Ref. No.: 6936-57-PKR)
	136	Official Action (including translation) for Mexican Patent Application No. MX/a/2008/012505, dated Apr. 22, 2010 (Attorney Ref. No. 6936-57-PMX)
	137	Official Action (including translation) for Mexican Patent Application No. MX/a/2008/012505, dated Aug. 9, 2011 (Attorney Ref. No. 6936-57-PMX)
	138	Official Notification of Intent to Grant (including translation) for Mexican Patent Application No. MX/a/2008/012505, mailed April 3, 2012 (Attorney Ref. No.: 6936-57-PMX)
	139	Official Action (including translation) for Mexican Patent Application No. MX/a/2011/005751, dated June 6, 2013 (Attorney Ref. No. 6936-57-PMX-DIV)
	140	Official Action for U.S. Patent Application No. 11/246,163, mailed Feb. 24, 2009 (Attorney Ref. No. 6936-54)
	141	Official Action for U.S. Patent Application No. 11/246,163, mailed Dec. 9, 2009 (Attorney Ref. No. 6936-54)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	9	of	10	Attorney Docket Number	6936-57-PUS-CON-2

	142	Notice of Allowability for U.S. Patent Application No. 11/246,163, mailed Sep. 7, 2010 (Attorney Ref. No. 6936-54)
	143	Notice of Allowability for U.S. Patent Application No. 12/761,586, mailed Oct. 6, 2010 (Attorney Ref. No. 6936-54-CON)
	144	Notice of Allowability for U.S. Patent Application No. 12/853,020, mailed Oct. 6, 2010 (Attorney Ref. No. 6936-54-CON-2)
	145	Official Action for U.S. Patent Application No. 12/901,699, mailed Jan. 6, 2012 (Attorney Ref. No. 6936-54-CON-3)
	146	Notice of Allowance for U.S. Patent Application No. 12/901,699, mailed July 27, 2012 (Attorney Ref. No. 6936-54-CON-3)
	147	Official Action for U.S. Patent Application No. 13/567,261, mailed Sept. 28, 2012 (Attorney Ref. No.: 6936-54-CON-4)
	148	Notice of Allowance for U.S. Patent Application No. 13/567,261, mailed May 21, 2013 (Attorney Ref. No.: 6936-54-CON-4)
	149	Official Action for U.S. Patent Application No. 13/942,938, mailed Sept. 25, 2013 (Attorney Ref. No.: 6936-54-CON-5)
	150	Notice of Allowance for U.S. Patent Application No. 13/942,938, mailed Oct. 8, 2013 (Attorney Ref. No.: 6936-54-CON-5)
	151	Official Action for U.S. Patent Application No. 12/295,828, mailed Jan. 5, 2012 (Attorney Ref. No. 6936-57-PUS)
	152	Notice of Allowance for U.S. Patent Application No. 12/295,828, mailed August 17, 2012 (Attorney Ref. No.: 6936-57-PUS)
	153	Notice of Allowance for U.S. Patent Application No. 12/783,758, mailed December 26, 2012 (Attorney Ref. No.: 6936-57-PUS-CON)
	154	Official Action for U.S. Patent Application No. 13/766,059, mailed Oct. 2, 2013 (Attorney Ref. No.: 6936-57-PUS-CON-2)
	155	Notice of Allowance for U.S. Patent Application No. 13/766,059, mailed Nov. 25, 2013 (Attorney Ref. No.: 6936-57-PUS-CON-2)
	156	Official Action for U.S. Patent Application No. 12/760,728, mailed April 27, 2012 (Attorney Ref. No.: 6936-57-PUS-DIV)
	157	Official Action for U.S. Patent Application No. 12/760,728, mailed Jan. 2, 2013 (Attorney Ref. No.: 6936-57-PUS-DIV)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	10	of	10	Attorney Docket Number	6936-57-PUS-CON-2

	158	Official Action for U.S. Patent Application No. 12/760,728, mailed June 20, 2013 (Attorney Ref. No.: 6936-57-PUS-DIV)
	159	Official Action for U.S. Patent Application No. 12/760,728, mailed Oct. 2, 2013 (Attorney Ref. No.: 6936-57-PUS-DIV)
	160	Notice of Allowance for U.S. Patent Application No. 12/760,728, mailed Oct. 21, 2013 (Attorney Ref. No.: 6936-57-PUS-DIV)
	161	Official Action for U.S. Patent Application No. 12/783,765, mailed May 17, 2012 (Attorney Ref. No. 6936-57-PUS-DIV-CON)
	162	Official Action for U.S. Patent Application No. 12/783,765, mailed December 17, 2012 (Attorney Ref. No. 6936-57-PUS-DIV-CON)
	163	Notice of Allowance for U.S. Patent Application No. 12/783,765, mailed May 9, 2013 (Attorney Ref. No. 6936-57-PUS-DIV-CON)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

PATENT COOPERATION TREAT

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
T3653-9285WO01		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US2005/036015	11/10/2005	12/10/2004
Applicant		
AWARE, INC.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 4 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language,** the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
      [ ] The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
   b. [ ] With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. [ ] **Certain claims were found unsearchable** (See Box II).

3. [ ] **Unity of invention is lacking** (see Box III).

4. With regard to the **title,**
   [X] the text is approved as submitted by the applicant.
   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**
   [X] the text is approved as submitted by the applicant.
   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings,**
   a. the figure of the **drawings** to be published with the abstract is Figure No. 1
      [X] as suggested by the applicant.
      [ ] as selected by this Authority, because the applicant failed to suggest a figure.
      [ ] as selected by this Authority, because this figure better characterizes the invention.
   b. [ ] none of the figures is to be published with the abstract.

Form PCT/ISA/210 (first sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

ernational application No
, CT/US2005/036015

A. CLASSIFICATION OF SUBJECT MATTER
H04L1/00 H04L27/26

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 707 822 B1 (FADAVI-ARDEKANI JALIL ET AL) 16 March 2004 (2004-03-16) column 1, line 7 - column 2, line 59 column 3, line 5 - column 4, line 21 column 5, line 23 - column 7, line 33 column 8, line 4 - column 9, line 23 figure 2	1-45
A	WO 03/063060 A (BROADCOM CORPORATION) 31 July 2003 (2003-07-31) page 1, line 5 - page 2, line 27 page 17, line 4 - page 18, line 25 figures 1,4 page 7, line 13 - page 9, line 16	1-45

-/--

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 January 2006	08/02/2006

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Marzenke, M

2

Form PCT/ISA/210 (second sheet) (April 2005)

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 217 of 739

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 337 877 B1 (COLE TERRY L ET AL) 8 January 2002 (2002-01-08) column 3, line 21 - column 4, line 29 column 7, line 49 - column 8, line 67 figures 3,10 -----	1-45
A	"SunSet xDSL: Prequalification of ADSL Circuits with ATU-C Emulation" 2001, SUNRISE TELECOM INC., APPLICATION SERIES , SAN JOSE, USA , XP002363272 Retrieved from the Internet: URL:http://www.sunrisetelecom.com/technotes/APP-xDSL-8B.pdf> 'retrieved on 2006-01-17! page 3, right-hand column, paragraph 1 -----	1-45

2

INTERNATIONAL SEARCH REPORT

mation on patent family members

International application No
PCT/US2005/036015

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6707822 B1	16-03-2004	NONE	
WO 03063060 A	31-07-2003	EP 1476978 A2	17-11-2004
US 6337877 B1	08-01-2002	EP 1125408 A1 WO 0013387 A1	22-08-2001 09-03-2000

Form PCT/ISA/210 (patent family annex) (April 2005)

PATENT COOPERATION TREAT

DOCKETED
BY mmj ON 2/9
BY ON
DUE DATE 4-8-06
CALL UP

PCT

From the INTERNATIONAL SEARCHING AUTHORITY

To:
MILES & STOCKBRIDGE P.C.
Attn. Vick, Jason H.
1751 Pinnacle Drive
Suite 500
McLean , VA 22102
UNITED STATES OF AMERICA

RECEIVED
FEB - 9 2006
MILES & STOCKBRIDGE P.C.
TYSONS CORNER

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference T3653-9285WO01	Date of mailing *(day/month/year)* 08/02/2006
International application No. PCT/US2005/036015	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
Applicant AWARE, INC.	International filing date *(day/month/year)* 11/10/2005

1. [X] The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

   Filing of amendments and statement under Article 19:
   The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

   When? The time limit for filing such amendments is normally two months from the date of transmittal of the International Search Report.

   Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Fascimile No.: (41–22) 338.82.70

   For more detailed instructions, see the notes on the accompanying sheet.

2. [ ] The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. [ ] **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

   [ ] the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

   [ ] no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

   Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

   The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

   Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until **30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

   In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

   See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the International Searching Authority European Patent Office, P.B. 5818 Patentlaan 2 NL–2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Authorized officer Ursula Riepert

Form PCT/ISA/220 (January 2004) *(See notes on accompanying sheet)*

*Possible IDS dktd for T3653-9285US01 *

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2005/036015	11.10.2005	12.10.2004

International Patent Classification (IPC) or both national classification and IPC
H04L1/00, H04L27/26

Applicant
AWARE, INC.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notifed the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

DOCKETED
BY mm ON
BY ON
DUE DATE 8-12-06
CALL UP

Name and mailing address of the ISA:

European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized Officer

Marzenke, M

Telephone No. +49 89 2399-8810

Form (PCT/ISA/237) (Cover Sheet) (January 2004)

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐ a sequence listing

   ☐ table(s) related to the sequence listing

   b. format of material:

   ☐ in written format

   ☐ in computer readable form

   c. time of filing/furnishing:

   ☐ contained in the international application as filed.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	5,6,16,17,23,24,32,33,41,42
	No:	Claims	1-4, 7-15, 18-22, 25-31, 34-40,43-45
Inventive step (IS)	Yes:	Claims	
	No:	Claims	5,6,16,17,23,24,32,33,41,42
Industrial applicability (IA)	Yes:	Claims	1-45
	No:	Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

V. Reasoned Statement with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement

I

The following documents are referenced for the first time in this written opinion; the numbering will be adhered to in the rest of the procedure:

D1: US-B1-6 707 822
D2: WO 03/063060 A
D3: US-B1-6 337 877
D4: "SunSet xDSL: Prequalification of ADSL Circuits with ATU-C Emulation", 2001, SUNRISE TELECOM INC., APPLICATION SERIES, XP002363272 Retrieved from the Internet: URL:http://www.sunrisetelecom.com/technotes/APP-xDSL-8B.pdf [retrieved on 2006-01-17]

II

1.1 The present broad formulation of independent method Claim 1 is such that its subject-matter can be read onto prior art Document D1 which discloses according to the wording of Claim 1 (the corresponding features in D1 are given in brackets):

A method for sharing resources *(abstract; column 2, lines 57-59; column 9, lines 10-23)* in a transceiver *(column 5, lines 23-30; fig. 2)*, comprising:
allocating a first portion of shared memory *(fig. 2: IDIM RAM 230; column 3, lines 16-20)* to a first latency path *(e.g. to any interleave path for G.lite or standard ADSL, see column 6, line 66 to column 7, line 17)* and allocating a second portion of the shared memory to a second latency path *(column 6, lines 55-62 and column 7, lines 17-30: additional 4K dedicated memory space are allocated to any fast path).*

Consequently, the features of independent Claim 1 are already known from Document D1 and thus the subject-matter of Claim 1 is not novel. Claim 1 therefore does not meet the requirements of Articles 33(1) and (2) PCT.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 224 of 739

1.2 It should be noted that even if the Applicant were to interpret Claim 1 in such a manner as to enable him to allege that its subject-matter were novel, based on minor differences between the features of this claim and those disclosed in D1, the subject matter of Claim 1 would still not involve an inventive step, Articles 33(1) and (3) of the PCT, with respect to the disclosure of D1especially as this document discloses the same object and the same type of solution as claimed.

2. The subject-matter of Claims 10, 19, 28 and 37 corresponds in terms of transceiver, system, protocol and storage media features respectively to that of Claim 1. Therefore, the objections raised in the previous paragraphs apply equally to Claims 10, 19, 28 and 37 which do consequently not meet the requirements of Articles 33(1) and (2) PCT for lack of novelty.

3. The dependent claims do not appear at present to contain any feature which in combination with the subject-matter of the independent claim to which the respective dependent claim is appended would result in novel and inventive subject-matter, these additional features being either disclosed or rendered obvious by the above cited documents, or being minor details obvious to a person skilled in the art based on common general knowledge of the art (Article 33(1) PCT). In particular, it is noted:

Claims **2-4, 13-15, 20-22, 29-31, 38-40**: Use of interleaving/de-interleaving in two latency paths is known from D1. The latter teaches that depending on the used interleaving depth, several interleaved sessions or paths can be supported using the shared memory *(see column 7, lines 1-5 and 30-33)*;

Claims **5, 6, 16, 17, 23, 24, 32, 33, 41, 42**: Exchanging various information between two modems for determining resources that are available for a connection to be set up represents general common knowledge for the skilled person in the field of xDSL communications. It is therefore considered to be a straightforward design measure for a skilled person having knowledge of the shared memory transceivers in D1 to specifically exchange information regarding the maximum available interleaver memory size in order to accommodate a plurality of latency paths. D1 clearly teaches the skilled person that the memory size is a critical resource in terms of the number of

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 225 of 739

sessions/paths that can be supported contemporaneously (see column 7, lines 1-33). It does therefore not go beyond what can generally be expected from the skilled person in the light of D1 to exchange and use information specifying said critical amount of available shared memory;

Claim **7, 18, 25, 34, 43**: Allocating a shared FCI module to perform the processing of two coder/decoder modules of two latency paths respectively is known from D1 *(see column 6, lines 11-17; fig. 2: FCI 226 writes encoded data for different latency paths into RAM 230 and reads decoded data for different latency paths from it: column 8, line 62 to column 9, line 3)*;

Claims **8, 9, 11, 12, 26, 27, 35, 36, 44, 45**: D1 teaches allocating a portion of memory to a path according to its latency (see column 6, lines 17-18: "Interleave and Fast Path"; column 7, lines 5-20: It is implicit to the skilled person from what is expressly said in D1 that the *interleaved* G.lite path requiring 4 Kbytes of memory imposes a higher processing latency than the fast path requiring only 256 bytes; on this point, the Applicant is also referred to D4 for information, see page 3, right-hand column, "Selecting the Path: Fast vs. Interleaved").

VII. Certain defects in the international application

1. To meet the requirements of Rule 6.3(b) PCT the independent claims should be cast in the two-part form, with those features known in combination from the prior art (see document D1) being placed in a preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in a characterising part (Rule 6.3(b)(ii) PCT).

2. To fulfil the requirements of Rule 5.1(a)(ii) PCT, document D1 should be identified in the description and the relevant background art disclosed therein briefly discussed.

3. The opening part of the description should be brought into conformity with any amended independent claims (Rule 5.1(a)(iii) PCT).

4. Furthermore, following the disclosure of document D1, the statement indicating the

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 226 of 739

technical problem to be solved by the invention (see page 2, paragraphs [0005] and [0006]), requires revision, which should be effected taking the requirements of Rule 5.1(a)(iii) PCT into account.

5. Reference signs placed in parentheses should be inserted into all the claims to increase their intelligibility (Rule 6.2(b) PCT). This applies to both the preamble and the characterising portion.

6. The reference to the "spirit" of the invention should be deleted (see page 23, last line) (Article 6 PCT and PCT-Guidelines 5.30).

7. The expression "herein incorporated by reference" (see page 1, par. [0001] ans [0003]) should be removed from the description (see the PCT-Guidelines, 4.26).

8. The description (see page 7, par. [0033]) refers to "***later*** developed hardware, software or firmware". By definition, it is however unclear what this hardware, software and/or firmware will effectively look like in the future. This formulation, implying in general terms that the extent of protection maybe expanded in some vague and not precisely defined way, should be deleted in accordance with Article 6 PCT and the PCT Guidelines 5.30.

   The same applies to the formulation "later developed systems or structures, devices and/or software" on page 22, paragraph [0070].

9. The description on page 14, paragraph [0050] describes a third latency path for "a voice telephony application, which needs a very low latency but can tolerate BER".

   The next sentence however contradicts the above statement: "In this case, the ***video*** *[not voice ?]* will be transported using an latency path that has a ***large*** amount of interleaving and coding *[i.e. resulting in a high latency and thus contradicting the previously mentioned requirements for voice telephony ?]*". Subsequently, this is again contradicted by the last sentence in paragraph [0050] stipulating that "*no* interleaving or coding" would be applied to said third latency path, further corroborated by the calculation in the following paragraph [0051] clearly assuming ***no*** interleaver memory and ***no*** encoding for the third path.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 227 of 739

The second sentence of paragraph [0050] should thus be deleted for clarification.

10. The Applicant should remove the parentheses around the expression "BER" in Claims 9, 12, 27, 36 and 45 as this term does not represent a reference sign in the sense of Rule 6.2(b) PCT (see also the PCT-Guidelines 5.11).

VIII. Certain observations on the international application

The following objections are raised with respect to Article 6 PCT:

1. Independent Claim 28 (and its dependent Claims 29-36) repeat - word by word - the subject-matter already defined in Claim 1 (and its dependent Claims 2-9), thus contravening the requirement of Article 6 PCT that the claims shall be concise.

   The generic terms "method" and "protocol" used in Claims 1 and 28 respectively belong to the same category "activity" as defined in the Guidelines 5.12 and can be used interchangeably. In fact, a protocol does not consist of anything more than a number of technical method steps.

   The claims need to be recast to include only the minimum necessary number of independent claims in any one category (see Rule 6.1(a) PCT and the PCT-Guidelines, A5.42). In the present case it is considered appropriate to use only one independent claim in the "activity" (method) category.

   Claim 28 and its dependent Claims 29-36 should thus be deleted.

2. Independent Claim 37 refers to "information that ***when executed allows*** sharing of resources in a transceiver, comprising information that allocates ...".

   In its present wording, the claimed information is construed to be ***suitable***, when executed, to share resources. The sharing of resources is thus not limiting the scope of the claim and the claimed information thus does not produce any technical effect whatsoever in terms of technical method steps being performed as a result of the

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 228 of 739

information (or program code) being executed.

It is also unclear, where or on which physical entity the information (or program code) is being executed on. Indeed, the claimed information can only bring about a technical effect in conjunction with a physical device on which it is run or executed. Otherwise, it merely represents program code per se.

The same objections apply to dependent Claims 38-45.

Claim 37 should thus be clarified to read: "An information storage medium comprising information which, when executed on a computer, performs the method as defined in any one of Claims 1 to 9." Claims 39-45 should be deleted.

3. The category of *method* Claims 2-4 is unclear as their additional features solely relate to constituent *means* of the latency paths. It is indeed unclear, which steps of the claimed *method* are effectively to be construed from the claimed (de)interleavers.

   The same objection applies to Claims 29-31 and 38-40.

4. The abbreviation "INP" as presented in Claims 9, 12, 27, 36 and 45 is not clear from the wording of the claim alone and should be replaced by "impulse noise protection" in the light of the description (see page 11, mid-paragraph [0041]).

5. Claim 7 refers to "allocating a shared processing module to a plurality of coding and/or decoding modules". It is unclear, whether or not and if so, to what extent, these modules are part of the transceiver referred to in Claim 1.

   The same lack of clarity arises in Claims 18, 25, 34 and 43.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 229 of 739

RECEIVED
MAY 08 2007
SHERIDAN ROSS PC

PATENT COOPERATION TREA[illegible]

PCT/US2005/036015

3550-54-PCT

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION CONCERNING TRANSMITTAL OF COPY OF INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (CHAPTER I OF THE PATENT COOPERATION TREATY)
(PCT Rule 44bis.1(c))

To:

VICK, Jason, H.
Miles & Stockbridge P.C.
1751 Pinnacle Dr.
Suite 500
McLean, VA 22102
ETATS-UNIS D'AMERIQUE

RECEIVED
MAY 04 2007
MILES & STOCKBRIDGE P.C.
TYSONS CORNER

Date of mailing *(day/month/year)*
26 April 2007 (26.04.2007)

Applicant's or agent's file reference
T3653-9285WO01

IMPORTANT NOTICE

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2005/036015	11 October 2005 (11.10.2005)	12 October 2004 (12.10.2004)

Applicant
AWARE, INC.

The International Bureau transmits herewith a copy of the international preliminary report on patentability (Chapter I of the Patent Cooperation Treaty)

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No. +41 22 338 82 70

Authorized officer
Athina Nickitas-Etienne

e-mail: pt04.pct@wipo.int

Form PCT/IB/326 (January 2004)

PATENT COOPERATION TREAT

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference T3653-9285WO01	**FOR FURTHER ACTION**	See item 4 below
International application No. PCT/US2005/036015	International filing date *(day/month/year)* 11 October 2005 (11.10.2005)	Priority date *(day/month/year)* 12 October 2004 (12.10.2004)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant AWARE, INC.		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 10 sheets, including this cover sheet.

   In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☒	Box No. VII	Certain defects in the international application
☒	Box No. VIII	Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis* .2).

	Date of issuance of this report 17 April 2007 (17.04.2007)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Athina Nickitas-Etienne
Facsimile No. +41 22 338 82 70	e-mail: pt04.pct@wipo.int

Form PCT/IB/373 (January 2004)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

REC'D 07 FEB 2006
WIPO PCT

PCT

To:

see form PCT/ISA/220

RTO4

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)* see form PCT/ISA/210 (second sheet)	
Applicant's or agent's file reference see form PCT/ISA/220	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2005/036015	11.10.2005	12.10.2004

International Patent Classification (IPC) or both national classification and IPC
H04L1/00, H04L27/26

Applicant
AWARE, INC.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notifed the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:	Authorized Officer
European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Marzenke, M Telephone No. +49 89 2399-8810

Form (PCT/ISA/237) (Cover Sheet) (January 2004)

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐ a sequence listing

   ☐ table(s) related to the sequence listing

   b. format of material:

   ☐ in written format

   ☐ in computer readable form

   c. time of filing/furnishing:

   ☐ contained in the international application as filed.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	5,6,16,17,23,24,32,33,41,42
	No:	Claims	1-4, 7-15, 18-22, 25-31, 34-40,43-45
Inventive step (IS)	Yes:	Claims	
	No:	Claims	5,6,16,17,23,24,32,33,41,42
Industrial applicability (IA)	Yes:	Claims	1-45
	No:	Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

V. Reasoned Statement with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement

I

The following documents are referenced for the first time in this written opinion; the numbering will be adhered to in the rest of the procedure:

D1: US-B1-6 707 822
D2: WO 03/063060 A
D3: US-B1-6 337 877
D4: "SunSet xDSL: Prequalification of ADSL Circuits with ATU-C Emulation", 2001, SUNRISE TELECOM INC., APPLICATION SERIES, XP002363272 Retrieved from the Internet: URL:http://www.sunrisetelecom.com/technotes/APP-xDSL-8B.pdf [retrieved on 2006-01-17]

II

1.1 The present broad formulation of independent method Claim 1 is such that its subject-matter can be read onto prior art Document D1 which discloses according to the wording of Claim 1 (the corresponding features in D1 are given in brackets):

A method for sharing resources *(abstract; column 2, lines 57-59; column 9, lines 10-23)* in a transceiver *(column 5, lines 23-30; fig. 2)*, comprising:
allocating a first portion of shared memory *(fig. 2: IDIM RAM 230; column 3, lines 16-20)* to a first latency path *(e.g. to any interleave path for G.lite or standard ADSL, see column 6, line 66 to column 7, line 17)* and allocating a second portion of the shared memory to a second latency path *(column 6, lines 55-62 and column 7, lines 17-30: additional 4K dedicated memory space are allocated to any fast path)*.

Consequently, the features of independent Claim 1 are already known from Document D1 and thus the subject-matter of Claim 1 is not novel. Claim 1 therefore does not meet the requirements of Articles 33(1) and (2) PCT.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 235 of 739

1.2 It should be noted that even if the Applicant were to interpret Claim 1 in such a manner as to enable him to allege that its subject-matter were novel, based on minor differences between the features of this claim and those disclosed in D1, the subject matter of Claim 1 would still not involve an inventive step, Articles 33(1) and (3) of the PCT, with respect to the disclosure of D1especially as this document discloses the same object and the same type of solution as claimed.

2. The subject-matter of Claims 10, 19, 28 and 37 corresponds in terms of transceiver, system, protocol and storage media features respectively to that of Claim 1. Therefore, the objections raised in the previous paragraphs apply equally to Claims 10, 19, 28 and 37 which do consequently not meet the requirements of Articles 33(1) and (2) PCT for lack of novelty.

3. The dependent claims do not appear at present to contain any feature which in combination with the subject-matter of the independent claim to which the respective dependent claim is appended would result in novel and inventive subject-matter, these additional features being either disclosed or rendered obvious by the above cited documents, or being minor details obvious to a person skilled in the art based on common general knowledge of the art (Article 33(1) PCT). In particular, it is noted:

Claims **2-4, 13-15, 20-22, 29-31, 38-40**: Use of interleaving/de-interleaving in two latency paths is known from D1. The latter teaches that depending on the used interleaving depth, several interleaved sessions or paths can be supported using the shared memory *(see column 7, lines 1-5 and 30-33)*;

Claims **5, 6, 16, 17, 23, 24, 32, 33, 41, 42**: Exchanging various information between two modems for determining resources that are available for a connection to be set up represents general common knowledge for the skilled person in the field of xDSL communications. It is therefore considered to be a straightforward design measure for a skilled person having knowledge of the shared memory transceivers in D1 to specifically exchange information regarding the maximum available interleaver memory size in order to accommodate a plurality of latency paths. D1 clearly teaches the skilled person that the memory size is a critical resource in terms of the number of

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 236 of 739

sessions/paths that can be supported contemporaneously (see column 7, lines 1-33). It does therefore not go beyond what can generally be expected from the skilled person in the light of D1 to exchange and use information specifying said critical amount of available shared memory;

Claim **7, 18, 25, 34, 43**: Allocating a shared FCI module to perform the processing of two coder/decoder modules of two latency paths respectively is known from D1 *(see column 6, lines 11-17; fig. 2: FCI 226 writes encoded data for different latency paths into RAM 230 and reads decoded data for different latency paths from it: column 8, line 62 to column 9, line 3)*;

Claims **8, 9, 11, 12, 26, 27, 35, 36, 44, 45**: D1 teaches allocating a portion of memory to a path according to its latency (see column 6, lines 17-18: "Interleave and Fast Path"; column 7, lines 5-20: It is implicit to the skilled person from what is expressly said in D1 that the *interleaved* G.lite path requiring 4 Kbytes of memory imposes a higher processing latency than the fast path requiring only 256 bytes; on this point, the Applicant is also referred to D4 for information, see page 3, right-hand column, "Selecting the Path: Fast vs. Interleaved").

VII. Certain defects in the international application

1. To meet the requirements of Rule 6.3(b) PCT the independent claims should be cast in the two-part form, with those features known in combination from the prior art (see document D1) being placed in a preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in a characterising part (Rule 6.3(b)(ii) PCT).

2. To fulfil the requirements of Rule 5.1(a)(ii) PCT, document D1 should be identified in the description and the relevant background art disclosed therein briefly discussed.

3. The opening part of the description should be brought into conformity with any amended independent claims (Rule 5.1(a)(iii) PCT).

4. Furthermore, following the disclosure of document D1, the statement indicating the

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 237 of 739

technical problem to be solved by the invention (see page 2, paragraphs [0005] and [0006]), requires revision, which should be effected taking the requirements of Rule 5.1(a)(iii) PCT into account.

5. Reference signs placed in parentheses should be inserted into all the claims to increase their intelligibility (Rule 6.2(b) PCT). This applies to both the preamble and the characterising portion.

6. The reference to the "spirit" of the invention should be deleted (see page 23, last line) (Article 6 PCT and PCT-Guidelines 5.30).

7. The expression "herein incorporated by reference" (see page 1, par. [0001] ans [0003]) should be removed from the description (see the PCT-Guidelines, 4.26).

8. The description (see page 7, par. [0033]) refers to "***later*** developed hardware, software or firmware". By definition, it is however unclear what this hardware, software and/or firmware will effectively look like in the future. This formulation, implying in general terms that the extent of protection maybe expanded in some vague and not precisely defined way, should be deleted in accordance with Article 6 PCT and the PCT Guidelines 5.30.

   The same applies to the formulation "later developed systems or structures, devices and/or software" on page 22, paragraph [0070].

9. The description on page 14, paragraph [0050] describes a third latency path for "a voice telephony application, which needs a very low latency but can tolerate BER".

   The next sentence however contradicts the above statement: "In this case, the ***video*** *[not voice ?]* will be transported using an latency path that has a ***large*** amount of interleaving and coding *[i.e. resulting in a high latency and thus contradicting the previously mentioned requirements for voice telephony ?]*". Subsequently, this is again contradicted by the last sentence in paragraph [0050] stipulating that "*no* interleaving or coding" would be applied to said third latency path, further corroborated by the calculation in the following paragraph [0051] clearly assuming ***no*** interleaver memory and ***no*** encoding for the third path.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 238 of 739

The second sentence of paragraph [0050] should thus be deleted for clarification.

10. The Applicant should remove the parentheses around the expression "BER" in Claims 9, 12, 27, 36 and 45 as this term does not represent a reference sign in the sense of Rule 6.2(b) PCT (see also the PCT-Guidelines 5.11).

VIII. Certain observations on the international application

The following objections are raised with respect to Article 6 PCT:

1. Independent Claim 28 (and its dependent Claims 29-36) repeat - word by word - the subject-matter already defined in Claim 1 (and its dependent Claims 2-9), thus contravening the requirement of Article 6 PCT that the claims shall be concise.

   The generic terms "method" and "protocol" used in Claims 1 and 28 respectively belong to the same category "activity" as defined in the Guidelines 5.12 and can be used interchangeably. In fact, a protocol does not consist of anything more than a number of technical method steps.

   The claims need to be recast to include only the minimum necessary number of independent claims in any one category (see Rule 6.1(a) PCT and the PCT-Guidelines, A5.42). In the present case it is considered appropriate to use only one independent claim in the "activity" (method) category.

   Claim 28 and its dependent Claims 29-36 should thus be deleted.

2. Independent Claim 37 refers to "information that ***when executed allows*** sharing of resources in a transceiver, comprising information that allocates ...".

   In its present wording, the claimed information is construed to be ***suitable***, when executed, to share resources. The sharing of resources is thus not limiting the scope of the claim and the claimed information thus does not produce any technical effect whatsoever in terms of technical method steps being performed as a result of the

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 239 of 739

information (or program code) being executed.

It is also unclear, where or on which physical entity the information (or program code) is being executed on. Indeed, the claimed information can only bring about a technical effect in conjunction with a physical device on which it is run or executed. Otherwise, it merely represents program code per se.

The same objections apply to dependent Claims 38-45.

Claim 37 should thus be clarified to read: "An information storage medium comprising information which, when executed on a computer, performs the method as defined in any one of Claims 1 to 9." Claims 39-45 should be deleted.

3. The category of *method* Claims 2-4 is unclear as their additional features solely relate to constituent *means* of the latency paths. It is indeed unclear, which steps of the claimed *method* are effectively to be construed from the claimed (de)interleavers.

   The same objection applies to Claims 29-31 and 38-40.

4. The abbreviation "INP" as presented in Claims 9, 12, 27, 36 and 45 is not clear from the wording of the claim alone and should be replaced by "impulse noise protection" in the light of the description (see page 11, mid-paragraph [0041]).

5. Claim 7 refers to "allocating a shared processing module to a plurality of coding and/or decoding modules". It is unclear, whether or not and if so, to what extent, these modules are part of the transceiver referred to in Claim 1.

   The same lack of clarity arises in Claims 18, 25, 34 and 43.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 240 of 739

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

To:
SHERIDAN ROSS P.C.
Attn. Jason H. Vick
1560 Broadway
Suite 1200
Denver, CO 80202-5141
ETATS-UNIS D'AMERIQUE

RECEIVED
FEB 18 2008
SHERIDAN ROSS PC

INVITATION TO PAY ADDITIONAL FEES

(PCT Article 17(3)(a) and Rule 40.1)

Date of mailing *(day/month/year)* 06/02/2008	
Applicant's or agent's file reference 5550-57PCT	**PAYMENT DUE** within **ONE MONTH** from the above date of mailing
International application No. PCT/US2007/066522	International filing date *(day/month/year)* 12/04/2007
Applicant AWARE, INC.	

1. This International Searching Authority

(i) considers that there are 3 *(number of)* inventions claimed in the international application covered by the claims indicated ~~below~~/on the extra sheet:

and it considers that the international application does not comply with the requirements of unity of invention (Rules 13.1, 13.2 and 13.3) for the reasons indicated ~~below~~/on the extra sheet:

(ii) [X] has carried out a partial international search (see Annex) [ ] will establish the international search report on those parts of the international application which relate to the invention first mentioned in claims Nos.:

see annex

(iii) will establish the international search report on the other parts of the international application only if, and to the extent to which, additional fees are paid

2. The applicant is hereby **invited,** within the time limit indicated above, to pay the amount indicated below:

EUR 1.615,00	x	2	=	EUR 3.230
Fee per additional invention		number of additional inventions		total amount of additional fees

Or, _____ x _____ = _____

The applicant is informed that, according to Rule 40.2(c), **the payment of any additional fee may be made under protest,** i.e., a reasoned statement to the effect that the international application complies with the requirement of unity of invention or that the amount of the required additional fee is excessive.

3. [ ] Claim(s) Nos. _____ have been found to be unsearchable under Article 17(2)(b) because of defects under Article 17(2)(a) and therefore have not been included with any invention.

Name and mailing address of the International Searching Authority	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Carina Bergström

Form PCT/ISA/206 (July 1992)

Annex to Form PCT/ISA/206
COMMUNICATION RELATING TO THE RESULTS OF THE PARTIAL INTERNATIONAL SEARCH

International Application No
PCT/US2007/066522

1. The present communication is an Annex to the invitation to pay additional fees (Form PCT/ISA/206). It shows the results of the international search established on the parts of the international application which relate to the invention first mentioned in claims Nos.:
see 'Invitation to pay additional fees'
2. This communication is not the international search report which will be established according to Article 18 and Rule 43.

3. If the applicant does not pay any additional search fees, the information appearing in this communication will be considered as the result of the international search and will be included as such in the international search report.

4. If the applicant pays additional fees, the international search report will contain both the information appearing in this communication and the results of the international search on other parts of the international application for which such fees will have been paid.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 225 735 A (MATSUSHITA ELECTRIC IND CO LTD [JP]) 24 July 2002 (2002-07-24) paragraph [0009]	1-18, 28-35, 45-52, 58-65, 72-80, 85-92
X	EP 1 246 409 A (MITSUBISHI ELECTRIC CORP [JP]) 2 October 2002 (2002-10-02) claim 1	1-18, 28-35, 45-52, 58-65, 72-80, 85-92
A	SHOJI T ET AL: "WIRELESS ACCESS METHOD TO ENSURE EACH USER'S QOS IN UNPREDICTABLE AND VARIOUS QOS REQUIREMENTS" WIRELESS PERSONAL COMMUNICATIONS, SPRINGER, DORDRECHT, NL, vol. 22, no. 2, August 2002 (2002-08), pages 139-151, XP001122731 ISSN: 0929-6212 page 148, line 1	1-18, 28-35, 45-52, 58-65, 72-80, 85-92

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Form PCT/ISA/206 (Annex, first sheet) (July 1992; reprint January 2004)

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 242 of 739

INVITATION TO PAY ADDITIONAL FEES

International application No.
PCT/US2007/066522

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-18, 28-35, 45-52,58-65,72-80,85-92:

Method and apparatus for identifying at least one particular packet of the plurality of packets as a packet that should not be retransmitted.

---

2. claims: 19-27, 38-44, 53-57, 68-71, 81-84, 93-105

Method and apparatus for sharing a memory between a interleaving and /or deinterleaving memory and a packet retransmissions memory.

---

3. claims: 36-37, 66-67

Method and apparatus for identifying low latency packets and low error packets.

The following document is referred to in this communication; the numbering will be adhered to in the rest of the procedure:

D3: XP001122731

1.The application lacks unity within the meaning does not meet the requirements of unity of invention as defined in Rules 13.1 and 13.2 PCT, for the following reason the prior art document D3 is taken into account. Document D3 discloses (the references being the one in D3): a method of packet retransmissions comprising transmitting or receiving a plurality of packets.

With respect to the above mentioned prior art document the first group of claims (1-18, 28-35, 45-52,58-65,72-80,85-92) yield the special technical features of a method and apparatus for identifying at least one particular packet of the plurality of packets as a packet that should not be retransmitted , hence solving the objective problem of how to avoid that a packet is transmitted more than once when it is not necessary.

With respect to the above mentioned prior art document the second group of claims (19-27, 38-44, 53-57, 68-71, 81-84, 93-105) yields the special technical features of a method and apparatus for sharing a memory between a interleaving and /or deinterleaving memory and a packet retransmissions memory hence solving the objective problem how optimise the use of a memory.

With respect to the above mentioned prior art document the second group of claims (36-37, 66-67) yields the special technical features of a method and apparatus for identifying low latency packets and low error packets hence solving the objective problem how to identify different

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 243 of 739

packets classes.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 244 of 739

Patent Family Annex

Information on patent family members

International Application No
PCT/US2007/066522

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1225735 A	24-07-2002	AU 6944601 A	21-01-2002
		CN 1383655 A	04-12-2002
		WO 0205496 A1	17-01-2002
		JP 2002084338 A	22-03-2002
		US 2002154600 A1	24-10-2002
EP 1246409 A	02-10-2002	WO 0230067 A1	11-04-2002
		JP 3821778 B2	13-09-2006
		US 7114002 B1	26-09-2006

Important Information

General

- The claims cannot be changed at this point in the procedure, the transmitted report is not the international search report (see Art. 19 PCT).
- Any payment has to be made directly to this ISA, payments to other entities will not be accepted.
- In case of a total of more than 2 inventions found: when paying please specify exactly which claims should be searched.
- An extension of the set time limit cannot be granted.

Payment by cheque:

- The date to be considered as the date on which the payment is made is the date of receipt of the cheque at the EPO, provided that the cheque is met.
- Copies of cheques sent by fax or by post are not considered to be a valid payment.
- The fees shall be paid in euro, no equivalents in other currencies.

Payment or transfer to a bank account:

- The date to be considered as the date on which the payment is made is the date on which the amount of the payment or the transfer is actually entered in a bank account or Giro account held by the EPO.
- The fees shall be paid in euro, no equivalents in other currencies.

Payment by deposit account with the EPO:

- The date to be considered as the date on which the payment is made is the date that the authorisation to deduct fees from the deposit account is received at the EPO.

Note: If you don't have a deposit account with the EPO yourself you might want to consider using the account of an associate as a safe and quick way of paying.

Payment by credit card:

- Payments by credit card are not possible.

Payments under protest according to Rule 40 PCT:

- The protest will not be accepted without a payment of additional fees.
- The protest has to be accompanied by a technical reasoning.

New amounts for procedural fees as from 01/ 04/ 2006 (see OJ EPO 2006,8)!

- additional search fee: EUR 1615,00
- protest fee: EUR 1065,00

BNSDOCID: <XS 20070401000 [>

Important information

Rule 40 PCT has been amended as of 1 April 2005. For general information on the protest procedure at ISA/EP, please refer to OJ EPO 3/2005, pages 226/227.

1. As in the past the payment of any additional fee may be made under protest i.e. accompanied by a reasoned statement to the effect that the international application complies with the requirement of unity of invention or that the amount of the required additional fees is excessive according to amended Rule 40.2(c) PCT.

2. After due receipt of the payment of the additional search fee(s) under protest (i.e. within one month from the date of the invitation), the EPO will, prior to examination of the protest by the Board of Appeal, subject the invitation to pay additional fees to an internal review. The result of this review will be communicated to the applicant.

3. The fee for examination of the protest (Rule 40.2(e) PCT) is payable within one month from the date of the invitation to pay additional fees (Rule 40.1(iii) PCT). However, in order to allow the applicant to consider the result of the internal review, the applicant may pay the protest fee within one month from the date of notification of the result of the review.

4. Should the applicant wish to maintain his protest in light of the review he must pay the protest fee within one month from the date of notification of the result of the internal review, in which case the protest will be referred to the Board of Appeal. Should the Board of Appeal find that the protest was entirely justified, the protest fee shall be refunded.

5. In the event of the applicant already having paid the protest fee before notification of the result of the review, the protest will be referred to the Board of Appeal unless the result of the internal review was that the protest was entirely justified or the applicant indicates within one month from the date of notification of the result of the review that he does not wish to continue the protest. In both cases, the protest fee will be refunded.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 247 of 739

European Patent Organisation

Account details

Bank account

N° 3 338 800 00 (BLZ 700 800 00)
Dresdner Bank
Promenadeplatz 7
D-80273 München
SWIFT Code: DRESDEFF700
IBAN: DE20 7008 0000 0333 880000
BIC: DRESDEFF

Giro account

N° 300-800 (BLZ 700 100 80)
Deutsche Postbank AG
Bayerstr. 49
D-80138 München

Bitte beachten Sie, dass angeführte Nichtpatentliteratur (wie z. B. wissenschaftliche oder technische Dokumente) je nach geltendem Recht dem Urheberrechtsschutz und/oder anderen Schutzarten für schriftliche Werke unterliegen könnte. Die Vervielfältigung urheberrechtlich geschützter Texte, ihre Verwendung in anderen elektronischen oder gedruckten Publikationen und ihre Weitergabe an Dritte ist ohne ausdrückliche Zustimmung des Rechtsinhabers nicht gestattet.

Veuillez noter que les ouvrages de la littérature non-brevets qui sont cités, par exemple les documents scientifiques ou techniques, etc., peuvent être protégés par des droits d'auteur et/ou toute autre protection des écrits prévue par les législations applicables. Les textes ainsi protégés ne peuvent être reproduits ni utilisés dans d'autres publications électroniques ou imprimées, ni rediffusés sans l'autorisation expresse du titulaire du droit d'auteur.

Please be aware that cited works of non-patent literature such as scientific or technical documents or the like may be subject to copyright protection and/or any other protection of written works as appropriate based on applicable laws. Copyrighted texts may not be copied or used in other electronic or printed publications or re-distributed without the express permission of the copyright holder.

XS CPRTENFRDE

JHV | FFD

PATENT COOPERATION TREAT

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

To:
SHERIDAN ROSS P.C.
Attn. Jason H. Vick
1560 Broadway
Suite 1200
Denver, CO 80202-5141
ETATS-UNIS D'AMERIQUE

RECEIVED
APR 18 2008
SHERIDAN ROSS PC

Date of mailing *(day/month/year)* 14/04/2008	
Applicant's or agent's file reference 5550-57PCT	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. PCT/US2007/066522	International filing date *(day/month/year)* 12/04/2007
Applicant AWARE, INC.	

1. [x] The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

   Filing of amendments and statement under Article 19:
   The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

   When? The time limit for filing such amendments is normally two months from the date of transmittal of the International Search Report.

   Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Fascimile No.: (41-22) 338.82.70

   For more detailed instructions, see the notes on the accompanying sheet.

2. [ ] The applicant is hereby notified that no International search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. [ ] **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

   [ ] the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

   [ ] no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

   Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

   The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

   Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

   In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

   See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the International Searching Authority	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Carina Bergström

Form PCT/ISA/220 (October 2005) *(See notes on accompanying sheet)*

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the *PCT Applicant's Guide*, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions, respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report and the written opinion of the International Searching Authority, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims,description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only (see *PCT Applicant's Guide*, Volume I/A, Annexes B1 and B2).

The attention of the applicant is drawn to the fact that amendments to the claims under Article 19 are not allowed where the International Searching Authority has declared, under Article 17(2), that no international search report would be established (see *PCT Applicant's Guide*, Volume I/A, paragraph 296).

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When? Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How? Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 251 of 739

PATENT COOPERATION TREA

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
5550-57PCT		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US2007/066522	12/04/2007	12/04/2006
Applicant		
AWARE, INC.		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 6 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language,** the international search was carried out on the basis of:
      [X] the international application in the language in which it was filed
      [ ] a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
   b. [ ] This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).
   c. [ ] With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. [ ] **Certain claims were found unsearchable** (See Box No. II)

3. [ ] **Unity of invention is lacking** (see Box No III)

4. With regard to the **title,**
   [X] the text is approved as submitted by the applicant
   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**
   [X] the text is approved as submitted by the applicant
   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the **drawings,**
   a. the figure of the **drawings** to be published with the abstract is Figure No. 1
      [X] as suggested by the applicant
      [ ] as selected by this Authority, because the applicant failed to suggest a figure
      [ ] as selected by this Authority, because this figure better characterizes the invention
   b. [ ] none of the figures is to be published with the abstract

Form PCT/ISA/210 (first sheet) (April 2007)

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/066522

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04L12/56

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 225 735 A (MATSUSHITA ELECTRIC IND CO LTD [JP]) 24 July 2002 (2002-07-24) paragraph [0009]	1-18, 28-35, 45-52, 58-65, 72-80, 85-92
X	EP 1 246 409 A (MITSUBISHI ELECTRIC CORP [JP]) 2 October 2002 (2002-10-02) claim 1	1-18, 28-35, 45-52, 58-65, 72-80, 85-92

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
19 March 2008	14/04/2008

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Gregori, Stefano

Form PCT/ISA/210 (second sheet) (April 2005)

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 253 of 739

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SHOJI T ET AL: "WIRELESS ACCESS METHOD TO ENSURE EACH USER'S QOS IN UNPREDICTABLE AND VARIOUS QOS REQUIREMENTS" WIRELESS PERSONAL COMMUNICATIONS, SPRINGER, DORDRECHT, NL, vol. 22, no. 2, August 2002 (2002-08), pages 139-151, XP001122731 ISSN: 0929-6212 page 148, line 1	1-18, 28-35, 45-52, 58-65, 72-80, 85-92
X	US 2005/180323 A1 (BEIGHTOL DEAN D [US] ET AL) 18 August 2005 (2005-08-18) paragraph [0028] - paragraph [0034]	19-27, 38-44, 53-57, 68-71, 81-84, 93-105
X	US 2004/114536 A1 (AIDAN O'ROURKE) 17 June 2004 (2004-06-17) paragraph [0012] - paragraph [0014]	36,37, 66,67

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 254 of 739

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2007/066522

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search reportcovers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☒ No protest accompanied the payment of additional search fees.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 255 of 739

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-18, 28-35, 45-52,58-65,72-80,85-92:

   Method and apparatus for identifying at least one particular packet of the plurality of packets as a packet that should not be retransmitted.

   ---

2. claims: 19-27, 38-44, 53-57, 68-71, 81-84, 93-105

   Method and apparatus for sharing a memory between a interleaving and /or deinterleaving memory and a packet retransmissions memory.

   ---

3. claims: 36-37, 66-67

   Method and apparatus for identifying low latency packets and low error packets.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2007/066522

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1225735 A	24-07-2002	AU 6944601 A	21-01-2002
		CN 1383655 A	04-12-2002
		WO 0205496 A1	17-01-2002
		JP 2002084338 A	22-03-2002
		US 2002154600 A1	24-10-2002
EP 1246409 A	02-10-2002	WO 0230067 A1	11-04-2002
		JP 3821778 B2	13-09-2006
		US 7114002 B1	26-09-2006
US 2005180323 A1	18-08-2005	NONE	
US 2004114536 A1	17-06-2004	NONE	

Form PCT/ISA/210 (patent family annex) (April 2005)

...TENT COOPERATION TRE... Y

COPY GIVEN TO IDS DEPT
Date: 5/9/08 VDC
(orig. to JHV)

From the
INTERNATIONAL SEARCHING AUTHORITY

RECEIVED
APR 18 2008
SHERIDAN ROSS PC

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43*bis*.1)

	Date of mailing *(day/month/year)* see form PCT/ISA/210 (second sheet)
Applicant's or agent's file reference see form PCT/ISA/220	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2007/066522	12.04.2007	12.04.2006

International Patent Classification (IPC) or both national classification and IPC
INV. H04L12/56

Applicant
AWARE, INC.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notifed the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:	Date of completion of this opinion	Authorized Officer
European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	see form PCT/ISA/210	Gregori, Stefano Telephone No. +31 70 340-4127

Form (PCT/ISA/237) (Cover Sheet) (April 2005)

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

      ☐ a sequence listing

      ☐ table(s) related to the sequence listing

   b. format of material:

      ☐ on paper

      ☐ in electronic form

   c. time of filing/furnishing:

      ☐ contained in the international application as filed.

      ☐ filed together with the international application in electronic form.

      ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has, within the applicable time limit:

   ☒ paid additional fees

   ☐ paid additional fees under protest and, where applicable, the protest fee

   ☐ paid additional fees under protest but the applicable protest fee was not paid

   ☐ not paid additional fees

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

   ☐ complied with

   ☒ not complied with for the following reasons:

   see separate sheet

4. Consequently, this report has been established in respect of the following parts of the international application:

   ☒ all parts.

   ☐ the parts relating to claims Nos.

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	
	No:	Claims	1-105
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-105
Industrial applicability (IA)	Yes:	Claims	1-105
	No:	Claims	

2. Citations and explanations

see separate sheet

The following documents are referred to in this communication; the numbering will be adhered to in the rest of the procedure:

D1: EP-A-1 225 735 (MATSUSHITA ELECTRIC IND CO LTD [JP]) 24 July 2002 (2002-07-24).

D3: : SHOJI T ET AL: "WIRELESS ACCESS METHOD TO ENSURE EACH USER'S QOS IN UNPREDICTABLE AND VARIOUS QOS REQUIREMENTS" WIRELESS PERSONAL COMMUNICATIONS, SPRINGER, DORDRECHT, NL, vol. 22, no. 2, August 2002 (2002-08), pages 139-151, XP001122731 ISSN: 0929-6212.

D3: US 2005/180323 A1 (BEIGHTOL DEAN D [US] ET AL) 18 August 2005 (2005-08-18)
D4: US 2004/114536 A1 (AIDAN O'ROURKE) 17 June 2004 (2004-06-17)

Re Item IV.

1. The application lacks unity within the meaning does not meet the requirements of unity of invention as defined in Rules 13.1 and 13.2 PCT, for the following reason the prior art document D3 is taken into account. Document D3 discloses (the references being the one in D3):
a method of packet retransmissions comprising transmitting or receiving a plurality of packets.

With respect to the above mentioned prior art document the first group of claims (1-18, 28-35, 45-52,58-65,72-80,85-92) yield the special technical features of a method and apparatus for identifying at least one particular packet of the plurality of packets as a packet that should not be retransmitted , hence solving the objective problem of how to avoid that a packet is transmitted more than once when it is not necessary.

With respect to the above mentioned prior art document the second group of claims (19-27, 38-44, 53-57, 68-71, 81-84, 93-105) yields the special technical features of a method and apparatus for sharing a memory between a interleaving and /or

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 261 of 739

deinterleaving memory and a packet retransmissions memory hence solving the objective problem how optimise the use of a memory.

With respect to the above mentioned prior art document the second group of claims (36-37, 66-67) yields the special technical features of a method and apparatus for identifying low latency packets and low error packets hence solving the objective problem how to identify different packets classes.

This Authority considers that following separate inventions or groups of inventions are not so linked as to form a single general inventive concept:

1 Claims 1-18, 28-35, 45-52,58-65,72-80,85-92: Method and apparatus for identifying at least one particular packet of the plurality of packets as a packet that should not be retransmitted.

2 Claims 19-27, 38-44, 53-57, 68-71, 81-84, 93-105: Method and apparatus for sharing a memory between a interleaving and /or deinterleaving memory and a packet retransmissions memory.

3 Claims 36-37, 66-67: Method and apparatus for identifying low latency packets and low error packets.

In conclusion, the groups of claims are not linked by common or corresponding special technical features and define different inventions not linked by a single general inventive concept.

The application, hence does not meet the requirements of unity of invention as defined in Rules 13.1 and 13.2 PCT.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 262 of 739

2. Examination of the first invention: claims 1-18, 28-35, 45-52,58-65,72-80,85-92.

2.1 Claims 1, 28 they both describe a method, claims 9, 72, 85 they describe transceiver, claims 45 and 58 they define an apparatus for packet retransmissions. These groups of claims have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.

2.2 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1, 9, 28, 45, ,58, 72 and 85 is not new in the sense of Article 33(2) PCT.

2.3 Claim 1
Document D1 discloses (the references being the one in D1):
A method of packet retransmissions comprising:
transmitting or receiving a plurality of packets;
identifying at least one packet of the plurality of packets as a packet that should not be retransmitted (see paragraph 9).

2.4 Claims 28 describe the same method of claim 1
Claims 45 and 58 the apparatus corresponding to the method of claim 1.
Claims 9, 72 and 85 the transceiver corresponding to the method of claim 1.
Therefore independent claims 9, 28, 45, 58, 72 and 85 are also not new.

3. Examination of the second invention : Claims 19-27, 38-44, 53-57, 68-71, 81-84, 93-105.

3.1 Claims 19, 20, 38, 39, 99 and 103 they all describe a method, claims 23, 24, 42, 53, 54, 57, 68, 69, 81, 84, 95, 96 they describe an apparatus to menage a memory. These groups of claims have been drafted as separate independent claims, they

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 263 of 739

appear to relate effectively to the same subject-matter and to differ from each other only with regard to the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.

3.2 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 103 is not new in the sense of Article 33(2) PCT.

Document D3 discloses:
An method for packet communication comprising:
in a first mode of operation: transmitting or receiving a plurality of packets;
identifying at least one packet of the plurality of packets as a packet that should not be retransmitted see paragraph 28);
in a second mode of operation: transmitting or receiving a plurality of packets;
allocating a first portion of shared memory for retransmissions of packets and a second portion of the shared memory for one or more of interleaving, deinterleaving, coding, decoding and error correction (paragraph 31) ; and
in a third mode of operation: transmitting or receiving a plurality of packets;
identifying at least one packet of the plurality of packets as a retransmittable type packet; identifying at least one packet of the plurality of packets as a non retransmittable type packet; allocating a first portion of shared memory for retransmissions of the retransmittable-type packets and a second portion of the shared memory for one or more of interleaving, deinterleaving, coding, decoding and error correction (paragraph 33-34).

Claim 103 contains al the features of the other method claims 19, 20, 38, 39, 99 that are therefore also not new.
The same reasoning applies also for the apparatus claims 23, 24, 42, 53, 54, 57, 68, 69, 81, 84, 95, 96.

4. Examination of the third invention : Claims 36-37, 66-67

4.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 36, 37, 66 and 67 is not new in the sense of Article 33(2)

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 264 of 739

PCT.

Claim 36

Document D4 discloses:

A packet handing method comprising receiving a stream of packets;
identifying a first number of packets in the stream of packets as low latency packets;
identifying a second number of packets in the stream of packets as low error packets;
forwarding the low latency and low error packets to a transceiver; and storing the low error packets for correction (see paragraph 12 and 14).

Claim 66

The same reasoning applies to claim 66 the defines the corresponding apparatus of claim 33.

Claims 37 and 67

The additional features of claims 37 and 67 are already disclosed by D4 (see paragraph 12).

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 265 of 739

Possible steps after receipt of the international search report (ISR) and written opinion of the International Searching Authority (WO-ISA)

General information	For all international applications filed on or after 01/01/2004 the competent ISA will establish an ISR. It is accompanied by the WO-ISA. Unlike the former written opinion of the IPEA (Rule 66.2 PCT), the WO-ISA is not meant to be responded to, but to be taken into consideration for further procedural steps. This document explains about the possibilities.
Amending claims under Art. 19 PCT	Within 2 months after the date of mailing of the ISR and the WO-ISA the applicant may file amended claims under Art. 19 PCT directly with the International Bureau of WIPO. The PCT reform of 2004 did not change this procedure. For further information please see Rule 46 PCT as well as form PCT/ISA/220 and the corresponding Notes to form PCT/ISA/220.
Filing a demand for international preliminary examination	In principle, the WO-ISA will be considered as the written opinion of the IPEA. This should, in many cases, make it unnecessary to file a demand for international preliminary examination. If the applicant nevertheless wishes to file a demand this must be done before expiry of 3 months after the date of mailing of the ISR/WO-ISA or 22 months after priority date, whichever expires later (Rule 54bis PCT). Amendments under Art. 34 PCT can be filed with the IPEA as before, normally at the same time as filing the demand (Rule 66.1 (b) PCT). If a demand for international preliminary examination is filed and no comments/amendments have been received the WO-ISA will be transformed by the IPEA into an IPRP (International Preliminary Report on Patentability) which would merely reflect the content of the WO-ISA. The demand can still be withdrawn (Art. 37 PCT).
Filing informal comments	After receipt of the ISR/WO-ISA the applicant may file informal comments on the WO-ISA directly with the International Bureau of WIPO. These will be communicated to the designated Offices together with the IPRP (International Preliminary Report on Patentability) at 30 months from the priority date. Please also refer to the next box.
End of the international phase	At the end of the international phase the International Bureau of WIPO will transform the WO-ISA or, if a demand was filed, the written opinion of the IPEA into the IPRP, which will then be transmitted together with possible informal comments to the designated Offices. The IPRP replaces the former IPER (international preliminary examination report).
Relevant PCT Rules and more information	Rule 43 PCT, Rule 43bis PCT, Rule 44 PCT, Rule 44bis PCT, PCT Newsletter 12/2003, OJ 11/2003, OJ 12/2003

BNSDOCID: <XS_____20070401OCK_I_>

Bitte beachten Sie, dass angeführte Nichtpatentliteratur (wie z. B. wissenschaftliche oder technische Dokumente) je nach geltendem Recht dem Urheberrechtsschutz und/oder anderen Schutzarten für schriftliche Werke unterliegen könnte. Die Vervielfältigung urheberrechtlich geschützter Texte, ihre Verwendung in anderen elektronischen oder gedruckten Publikationen und ihre Weitergabe an Dritte ist ohne ausdrückliche Zustimmung des Rechtsinhabers nicht gestattet.

Veuillez noter que les ouvrages de la littérature non-brevets qui sont cités, par exemple les documents scientifiques ou techniques, etc., peuvent être protégés par des droits d'auteur et/ou toute autre protection des écrits prévue par les législations applicables. Les textes ainsi protégés ne peuvent être reproduits ni utilisés dans d'autres publications électroniques ou imprimées, ni rediffusés sans l'autorisation expresse du titulaire du droit d'auteur.

Please be aware that cited works of non-patent literature such as scientific or technical documents or the like may be subject to copyright protection and/or any other protection of written works as appropriate based on applicable laws. Copyrighted texts may not be copied or used in other electronic or printed publications or re-distributed without the express permission of the copyright holder.

XS CPRTENFRDE

BNSDOCID: <XS____2006100103CF_I_>

Electronic Acknowledgement Receipt

EFS ID:	17959383
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	20-JAN-2014
Filing Date:	
Time Stamp:	16:55:10
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		IDS_01.pdf	2398064 39064a5a30d3453777d58ff5a3784f344e740685	yes	14

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	4
	Information Disclosure Statement (IDS) Form (SB08)	5	14
Warnings:			
Information:			

2	Foreign Reference	EP1041756.pdf	1405051 71137eb7fe64961d64fd1bf6c7e5f45193f901e9	no	22
Warnings:					
Information:					
3	Foreign Reference	EP1225735A1.pdf	3319471 ab5e96001141a40a16fbef205e87ae59cad92e43	no	30
Warnings:					
Information:					
4	Foreign Reference	EP1246409A1.pdf	4522291 bfa232f471ba2a3d6ef7c8db6f2f3a099e58283e	no	38
Warnings:					
Information:					
5	Foreign Reference	EP1271833A1.pdf	1043074 b66d6b8ead4ab49f0dcd7244c8af86922a50f2e1	no	17
Warnings:					
Information:					
6	Foreign Reference	EP1367809B1.pdf	808974 5df520e82a70bfa4d15f473da70762735cb75640	no	15
Warnings:					
Information:					
7	Foreign Reference	GB2389493A.pdf	970749 17b7179bab10ac0e84488cbf906fbae564ca4718	no	28
Warnings:					
Information:					
8	Foreign Reference	JP06164648A.pdf	396242 079c8b66312eb8b7564d7a8b9ef53cc8d14edd5f	no	10
Warnings:					
Information:					

9	Foreign Reference	JP07254862.pdf	347817 cf4cfa8bf5e4641c9153685dc3769e38692231d5	no	24
Warnings:					
Information:					
10	Foreign Reference	JP09247048.pdf	504568 d9febe1eeac4adc31066d3f61c565fda37e5d5e2	no	22
Warnings:					
Information:					
11	Foreign Reference	JP11150764.pdf	921070 ae6bd1d377cb81813e441d068a73d9c3edbf7d6c	no	35
Warnings:					
Information:					
12	Foreign Reference	JP11355254.pdf	572262 e2a8d085d5c109ea100de80257385a0b58aeb945	no	24
Warnings:					
Information:					
13	Foreign Reference	JP2000341247A.pdf	2229002 4360a6aed454a41c64e2a63c1e042c8405784657	no	60
Warnings:					
Information:					
14	Foreign Reference	JP2002084338A.pdf	1064516 1dbac24ade6c9619fb59d4cc34686c82ab9695a2	no	19
Warnings:					
Information:					
15	Foreign Reference	JP2003008553.pdf	554798 0a6d4eded7aae3ae2b271f5cef95ed7c2841e535	no	10
Warnings:					
Information:					
16	Foreign Reference	JP2003509966A.pdf	304412 dc4e8dfc86689faed45926e123cb6adcd592355e	no	11
Warnings:					
Information:					
17	Foreign Reference	JP2003224615.pdf	3636306 7e78fb8675084ebfb6b34091e6feafad0a4848bf	no	123
Warnings:					
Information:					

18	Foreign Reference	JP2004007269.pdf	492043 f3907f3c822cee5b09e72b09c2c9df3273adb4ea	no	13
Warnings:					
Information:					
19	Foreign Reference	JP2004030506.pdf	1199044 77aa9cc9256e4d58d8d7d9b81ca7f3361d84725b	no	20
Warnings:					
Information:					
20	Foreign Reference	JP2004056221.pdf	1907236 f2a28cc1d526f8422e2d93e93436de651543818b	no	32
Warnings:					
Information:					
21	Foreign Reference	JP2004135013.pdf	1393998 08886e995d87bfbbb7d50e9a8e9370d76242fbb8	no	45
Warnings:					
Information:					
22	Foreign Reference	JP2005522963.pdf	1172060 263e8cd1c7ce7b39bd1aa8bbb3ec066e4d75fc5a	no	29
Warnings:					
Information:					
23	Foreign Reference	JP2005526422.pdf	1096094 d30508401eb865bf067944ae92cb20a6046265c3	no	27
Warnings:					
Information:					
24	Foreign Reference	KR1020000047827.pdf	403475 1eb2e08b737f63b1b98cf7937bb3bafabc9dcc14	no	7
Warnings:					
Information:					
25	Foreign Reference	WO0052834.pdf	1619380 25b6e57b041e6bb478a259d56aeb6cfb712b3279	no	40
Warnings:					
Information:					
26	Foreign Reference	WO0120865A1.pdf	1501442 74a77e54b205ec1c9f705e12915f0b393e593d53	no	40
Warnings:					
Information:					

27	Foreign Reference	WO03028296.pdf	1778511 b93ed8fba60257eab4f6844325b487dd088b4a54	no	50
Warnings:					
Information:					
28	Foreign Reference	WO03063060A2.pdf	2430819 c8ffb5b30275e9e56acafdcec39006c03345e36c	no	75
Warnings:					
Information:					
29	Foreign Reference	WO03090011.pdf	1840337 ef43f3626e7561a14e40892f5c58f0f471dc8a12	no	47
Warnings:					
Information:					
30	Foreign Reference	WO2006044227A1.pdf	1310271 c7b3442410420f8d83cd5d28ad5a10bbfd968faa	no	37
Warnings:					
Information:					
31	Non Patent Literature	Shoji_WIRELESS_ACCESS_METHOD_TO_ENSURE.pdf	1414514 e83281e015c9e4830594f9ec1232d0704b8e0314	no	14
Warnings:					
Information:					
32	Non Patent Literature	ITU-T_Recommendation_G992-5__05-2003.pdf	3754491 12d286f0ed80aef8c6897e43ec6a7ca902a6811d	no	92
Warnings:					
Information:					
33	Non Patent Literature	ITU-T_Recommendation_G992-3__01-2005.pdf	7371505 eda53373e7c854022481a11df6724b43946e015d	no	436
Warnings:					
Information:					
34	Non Patent Literature	ITU-T_Recommendation_G993-2__02-2006.pdf	14525041 c91a42eea242cefe1216e4c6604dfa1a1fa1f457	no	252
Warnings:					
Information:					
35	Non Patent Literature	Sunset_xDSL_Prequalification_of_ADSL_Circuits_with_ATU-C_Emulation.pdf	439680 e9560587c2f3d15c58addf78054630015d0fe2f3	no	4
Warnings:					
Information:					

36	Non Patent Literature	6936-54-PCT_ISR_2006-02-08.pdf	329244 ef0e0972ec0bef3a97b2e89fa5f7255d9b3ed644	no	4
Warnings:					
Information:					
37	Non Patent Literature	6936-54-PCT_Written_Opinion_2006-02-08.pdf	1112898 55de1f540eca900a1ffe703bb29937075411c091	no	10
Warnings:					
Information:					
38	Non Patent Literature	6936-54-PCT_IPRP_2007-04-26.pdf	1185333 e1911673caf9d732329e798e0daa1229b9cf29af	no	11
Warnings:					
Information:					
39	Non Patent Literature	6936-54-PAU_OA_2009-06-24.pdf	1621631 6e6bcea1107bdeecacfd28cca73d27af840590ac	no	30
Warnings:					
Information:					
40	Non Patent Literature	6936-54-PAU-DIV_OA_05-13-2013.pdf	274101 4b74bbfd9f645402b611c86b48c9f504a8125004	no	3
Warnings:					
Information:					
41	Non Patent Literature	6936-54-PCA_OA_09-14-2012.pdf	303677 ea9998f3093dc380decfd70626634bec4d0318a3	no	4
Warnings:					
Information:					
42	Non Patent Literature	6936-54-PCN_OA_2009-09-25.pdf	811648 107539c16c5da43ae8d1fe4d499847bfce058031	no	13
Warnings:					
Information:					
43	Non Patent Literature	6936-54-PCN_OA_2011-05-18.pdf	551044 41ddc4a282daa14135bd9e858832b28f0e6d7a6d	no	10
Warnings:					
Information:					
44	Non Patent Literature	6936-54-PCN_OA_03-28-2012.pdf	660784 b0c1187723e87cb0a883e72e25592ae303998f67	no	10
Warnings:					
Information:					

45	Non Patent Literature	6936-54-PCN_OA_09-05-2012.pdf	7192478 dbb3e3d34ee45f119801cca6ba48a439c7babb19	no	12
Warnings:					
Information:					
46	Non Patent Literature	6936-54-PEP_OA_3-06-2013.pdf	365049 e265ed0e4d700bee77eeadc0d7e30a33c9bfe05f	no	9
Warnings:					
Information:					
47	Non Patent Literature	6936-54-PIN_OA_03-18-2013.pdf	234879 aeedaa4a2cf108af46d66ae0cfbfb6ca4efc8cea	no	3
Warnings:					
Information:					
48	Non Patent Literature	6936-54-PKR_OA_2011-06-30.pdf	90930 145feb2de4bf7286b61462d2bbade07bc8385b90	no	2
Warnings:					
Information:					
49	Non Patent Literature	6936-54-PKR_NOA_03-29-2012.pdf	847775 e19d832f97e517db6e02ded58df1a186f9060b36	no	4
Warnings:					
Information:					
50	Non Patent Literature	6936-54-PKR-DIV_OA_2011-06-30.pdf	58522 537bde0b658956c6c973418c33a6cf394e85e735	no	2
Warnings:					
Information:					
51	Non Patent Literature	6936-54-PKR-DIV_NOA_03-29-2012.pdf	856807 b2175cb58e7fcd303526308cfb4ed963d12049d9	no	4
Warnings:					
Information:					
52	Non Patent Literature	6936-54-PJP_OA_2011-07-11.pdf	347976 fcdd6e51a1db64563c4bb402cad12e532b8ac975	no	10
Warnings:					
Information:					
53	Non Patent Literature	6936-54-PJP_NOA_2011-12-12.pdf	37951 be60a3f958cc53cfd783ccbb2a72b36fbfa30644	no	3
Warnings:					
Information:					

54	Non Patent Literature	6936-54-PJP-DIV_OA_2011-07-11.pdf	349283 697c5655ba1865ba8d37bc02f5821b4b1a3760ea	no	10
Warnings:					
Information:					
55	Non Patent Literature	6936-54-PJP-DIV_OA_2011-12-12.pdf	82852 7e0a2b3704b5049e9135153b0b40b5f5102203fb	no	4
Warnings:					
Information:					
56	Non Patent Literature	6936-54-PJP-DIV_NOA_03-26-2012.pdf	56733 0c14f634e73ff4a9abfffe61f83ff096bfd48fd6	no	3
Warnings:					
Information:					
57	Non Patent Literature	6936-57-PCT_Invitation_To_Pay_Fees_2008-02-06.pdf	816523 f14f579a893ef0a89b46a4ecb1970f85cf8546a6	no	9
Warnings:					
Information:					
58	Non Patent Literature	6936-57-PCT_ISR_2008-04-14.pdf	798210 965c4713760ff3c289bc3395daf8eca4809c38b5	no	8
Warnings:					
Information:					
59	Non Patent Literature	6936-57-PCT_Written_Opinion_2008-04-14.pdf	1023585 d5f28c5ce191c2aab31fceeb491cf1f4bba53a3e	no	10
Warnings:					
Information:					
		Total Files Size (in bytes):	90658521		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of: Marcos C. Tzannes	)	Group Art Unit:
Serial No.: 14/159,125	)	Confirmation No.: 3369
Filed: January 20, 2014	)	Examiner:
Atty. File No.: 6936-57-PUS-CON-3	)	
Entitled: "PACKET RETRANSMISSION AND MEMORY SHARING"	)	INFORMATION DISCLOSURE STATEMENT
	)	Electronically Submitted

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The references cited on attached Form PTO-1449 are being called to the attention of the Examiner.

☒ Copies of the cited non-patent and/or foreign references are enclosed herewith.

☐ Copies of the cited U.S. patents and/or patent applications are enclosed herewith.

☒ Copies of the cited U.S. patents/patent application publications are not enclosed in accordance with 37 C.F.R. § 1.98(a).

☐ Copies of the cited references are not enclosed, in accordance with 37 C.F.R. § 1.98(d), because the references were cited by or submitted to the U.S. Patent and Trademark Office in prior application Serial No. _____ filed _____, which is relied upon for an earlier filing date under 35 U.S.C. § 120.

☒ To the best of applicants' belief, the pertinence of the foreign-language references are believed to be summarized in the attached English translation/abstracts and/or in the figures, although applicants do not necessarily vouch for the accuracy of the translation.

☒ Examiner's attention is drawn to the following related applications:

- Serial No. 12/295,828 filed Oct. 2, 2008 U.S. Patent No. 8,335,956 (Attorney Ref. No. 6936-57-PUS)
- Serial No. 12/783,758 filed May 20, 2010 U.S. Patent No. 8,407,546 (Attorney Ref. No. 6936-57-PUS-CON)
- Serial No. 13/766,059 filed Feb. 13, 2013 U.S. Patent No. 8,645,784 (Attorney Ref. No. 6936-57-PUS-CON-2)

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 277 of 739

- Serial No. 12/760,728 filed April 15, 2010 U.S. Patent No. 8,595,577 (Attorney Ref. No. 6936-57-PUS-DIV)
- Serial No. 12/783,765 filed May 20, 2010 U.S. Patent No. 8,468,411 (Attorney Ref. No. 6936-57-PUS-DIV-CON)
- Serial No. 14/075,194 filed Nov. 8, 2013 (Attorney Ref. No. 6936-57-PUS-DIV-CON-2)
- Serial No. 11/246,163 filed Oct. 11, 2005 U.S. Patent No. 7,831,890 (Attorney Ref. No. 6936-54)
- Serial No. 12/761,586 filed April 16, 2010 U.S. Patent No. 7,844,882 (Attorney Ref. No. 6936-54-CON)
- Serial No. 12/853,020 filed Aug. 9, 2010 U.S. Patent No. 7,836,381 (Attorney Ref. No. 6936-54-CON-2)
- Serial No. 12/901,699 filed Oct. 11, 2010 U.S. Patent No. 8,276,048 (Attorney Ref. No. 6936-54-CON-3)
- Serial No. 13/567,261 filed Aug. 6, 2012 U.S. Patent No. 8,495,473 (Attorney Ref. No. 6936-54-CON-4)
- Serial No. 13/942,938 filed July 16, 2013 U.S. Patent No. 8,607,126 (Attorney Ref. No. 6936-54-CON-5)
- Serial No. 14/081,469 filed Nov. 15, 2013 (Attorney Ref. No. 6936-54-CON-6)

☐ Other:_____

Submission of the above information is not intended as an admission that any item is citable under the statutes or rules to support a rejection, that any item disclosed represents analogous art, or that those skilled in the art would refer to or recognize the pertinence of any reference without the benefit of hindsight, nor should an inference be drawn as to the pertinence of the references based on the order in which they are presented. Submission of this statement should not be taken as an indication that a search has been conducted, or that no better art exists.

It is respectfully requested that the cited information be expressly considered during the prosecution of this application and the references made of record therein.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 278 of 739

FEES

☒	**37 CFR 1.97(b)**: No fee is believed due in connection with this submission, because the information disclosure statement submitted herewith is satisfied by one of the following conditions ("X" indicates satisfaction): ☒ Within three months of the filing date of a national application other than a continued prosecution application under 37 CFR 1.53(d), or ☐ Within three months of the date of entry into the national stage of an international application as set forth in 37 CFR 1.491 or ☐ Before the mailing date of a first Office Action on the merits, or ☐ Before the mailing of a first Office action after the filing of a request for continued examination under 37 CFR 1.114. Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970.
☐	**37 CFR 1.97(c)**: The information disclosure statement transmitted herewith is being filed after all the above conditions (37 CFR 1.97(b)), but before the mailing date of one of the following conditions: (1) a final action under 37 C.F.R. 1.113 or (2) a notice of allowance under 37 C.F.R. 1.311, or (3) an action that otherwise closes prosecution in the application. This Information Disclosure Statement is accompanied by: ☐ A Certification (below) as specified by 37 C.F.R. 1.97(e). Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970. OR ☐ Please charge Deposit Account 19-1970 in the amount of $180.00 for the fee set forth in 37 C.F.R. 1.17(p) for submission of an information disclosure statement. Please credit any overpayment or charge any underpayment to Deposit Account 19-1970.
☐	**37 CFR 1.97(d)**: This Information Disclosure Statement is being submitted after the period specified in 37 CFR 1.97(c). ☐ This information Disclosure Statement includes a Certification (below) as specified by 37 C.F.R. 1.97(e) AND ☐ Applicants hereby requests consideration of the reference(s) disclosed herein. Please charge Deposit Account 19-1970 in the amount of $180.00 under 37 C.F.R. 1.17(p). Please credit any overpayment or charge any underpayment to Deposit Account 19-1970. Election to pay the fee should not be taken as an indication that applicant(s) cannot execute a certification.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 279 of 739

Certification (37 C.F.R. 1.97(e))
(Applicable only if checked)

☐ The undersigned certifies that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(1).

☐ A copy of the communication from the foreign patent office is enclosed.

OR

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned after making reasonable inquiry, no item of information contained in this Information Disclosure Statement was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(2).

Respectfully submitted,

SHERIDAN ROSS P.C.

By: _____
Jason H. Vick
Registration No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202-5141
(303) 863-9700

Date: 20 Jan 14

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 280 of 739

COPY GIVEN TO IDS DEPT
Date: 11/12/08 (YDC)
original to JHV

PCT

From the INTERNATIONAL BUREAU

NOTIFICATION CONCERNING
TRANSMITTAL OF COPY OF INTERNATIONAL
PRELIMINARY REPORT ON PATENTABILITY
(CHAPTER I OF THE PATENT COOPERATION
TREATY)
(PCT Rule 44bis.1(c))

To:

VICK, Jason, H.
Sheridan Ross Pc
Suite 1200
1560 Broadway
Denver, CO 80202
ETATS-UNIS D'AMERIQUE

RECEIVED
NOV 04 2008
SHERIDAN ROSS PC

Date of mailing *(day/month/year)*	
23 October 2008 (23.10.2008)	
Applicant's or agent's file reference	**IMPORTANT NOTICE**
5550-57PCT	

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2007/066522	12 April 2007 (12.04.2007)	12 April 2006 (12.04.2006)

Applicant
AWARE, INC. et al

The International Bureau transmits herewith a copy of the international preliminary report on patentability (Chapter I of the Patent Cooperation Treaty)

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Beate Giffo-Schmitt
Facsimile No. +41 22 338 82 70	e-mail: pt03.pct@wipo.int

Form PCT/IB/326 (January 2004)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference 5550-57PCT	**FOR FURTHER ACTION**	See item 4 below
International application No. PCT/US2007/066522	International filing date *(day/month/year)* 12 April 2007 (12.04.2007)	Priority date *(day/month/year)* 12 April 2006 (12.04.2006)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant AWARE, INC.		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 9 sheets, including this cover sheet.

   In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☒	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis* .2).

	Date of issuance of this report 14 October 2008 (14.10.2008)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Authorized officer Beate Giffo-Schmitt e-mail: pt03.pct@wipo.int

Form PCT/IB/373 (January 2004)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43*bis*.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2007/066522	12.04.2007	12.04.2006

International Patent Classification (IPC) or both national classification and IPC
INV. H04L12/56

Applicant
AWARE, INC.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notifed the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:	Date of completion of this opinion	Authorized Officer
European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	see form PCT/ISA/210	Gregori, Stefano Telephone No. +31 70 340-4127

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

      ☐ a sequence listing

      ☐ table(s) related to the sequence listing

   b. format of material:

      ☐ on paper

      ☐ in electronic form

   c. time of filing/furnishing:

      ☐ contained in the international application as filed.

      ☐ filed together with the international application in electronic form.

      ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has, within the applicable time limit:

   ☒ paid additional fees

   ☐ paid additional fees under protest and, where applicable, the protest fee

   ☐ paid additional fees under protest but the applicable protest fee was not paid

   ☐ not paid additional fees

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

   ☐ complied with

   ☒ not complied with for the following reasons:

   see separate sheet

4. Consequently, this report has been established in respect of the following parts of the international application:

   ☒ all parts.

   ☐ the parts relating to claims Nos.

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	
	No:	Claims	1-105
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-105
Industrial applicability (IA)	Yes:	Claims	1-105
	No:	Claims	

2. Citations and explanations

   see separate sheet

The following documents are referred to in this communication; the numbering will be adhered to in the rest of the procedure:

D1: EP-A-1 225 735 (MATSUSHITA ELECTRIC IND CO LTD [JP]) 24 July 2002 (2002-07-24).

D3: : SHOJI T ET AL: "WIRELESS ACCESS METHOD TO ENSURE EACH USER'S QOS IN UNPREDICTABLE AND VARIOUS QOS REQUIREMENTS" WIRELESS PERSONAL COMMUNICATIONS, SPRINGER, DORDRECHT, NL, vol. 22, no. 2, August 2002 (2002-08), pages 139-151, XP001122731 ISSN: 0929-6212.

D3: US 2005/180323 A1 (BEIGHTOL DEAN D [US] ET AL) 18 August 2005 (2005-08-18)
D4: US 2004/114536 A1 (AIDAN O'ROURKE) 17 June 2004 (2004-06-17)

Re Item IV.

1. The application lacks unity within the meaning does not meet the requirements of unity of invention as defined in Rules 13.1 and 13.2 PCT, for the following reason the prior art document D3 is taken into account. Document D3 discloses (the references being the one in D3):
a method of packet retransmissions comprising transmitting or receiving a plurality of packets.

With respect to the above mentioned prior art document the first group of claims (1-18, 28-35, 45-52,58-65,72-80,85-92) yield the special technical features of a method and apparatus for identifying at least one particular packet of the plurality of packets as a packet that should not be retransmitted , hence solving the objective problem of how to avoid that a packet is transmitted more than once when it is not necessary.

With respect to the above mentioned prior art document the second group of claims (19-27, 38-44, 53-57, 68-71, 81-84, 93-105) yields the special technical features of a method and apparatus for sharing a memory between a interleaving and /or

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 286 of 739

deinterleaving memory and a packet retransmissions memory hence solving the objective problem how optimise the use of a memory.

With respect to the above mentioned prior art document the second group of claims (36-37, 66-67) yields the special technical features of a method and apparatus for identifying low latency packets and low error packets hence solving the objective problem how to identify different packets classes.

This Authority considers that following separate inventions or groups of inventions are not so linked as to form a single general inventive concept:

1 Claims 1-18, 28-35, 45-52,58-65,72-80,85-92: Method and apparatus for identifying at least one particular packet of the plurality of packets as a packet that should not be retransmitted.

2 Claims 19-27, 38-44, 53-57, 68-71, 81-84, 93-105: Method and apparatus for sharing a memory between a interleaving and /or deinterleaving memory and a packet retransmissions memory.

3 Claims 36-37, 66-67: Method and apparatus for identifying low latency packets and low error packets.

In conclusion, the groups of claims are not linked by common or corresponding special technical features and define different inventions not linked by a single general inventive concept.

The application, hence does not meet the requirements of unity of invention as defined in Rules 13.1 and 13.2 PCT.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 287 of 739

2. Examination of the first invention: claims 1-18, 28-35, 45-52,58-65,72-80,85-92.

2.1 Claims 1, 28 they both describe a method, claims 9, 72, 85 they describe transceiver, claims 45 and 58 they define an apparatus for packet retransmissions. These groups of claims have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.

2.2 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1, 9, 28, 45, ,58, 72 and 85 is not new in the sense of Article 33(2) PCT..

2.3 Claim 1
Document D1 discloses (the references being the one in D1):
A method of packet retransmissions comprising:
transmitting or receiving a plurality of packets;
identifying at least one packet of the plurality of packets as a packet that should not be retransmitted (see paragraph 9).

2.4 Claims 28 describe the same method of claim 1
Claims 45 and 58 the apparatus corresponding to the method of claim 1.
Claims 9, 72 and 85 the transceiver corresponding to the method of claim 1.
Therefore independent claims 9, 28, 45, 58, 72 and 85 are also not new.

3. Examination of the second invention : Claims 19-27, 38-44, 53-57, 68-71, 81-84, 93-105.

3.1 Claims 19, 20, 38, 39, 99 and 103 they all describe a method, claims 23, 24, 42, 53, 54, 57, 68, 69, 81, 84, 95, 96 they describe an apparatus to menage a memory. These groups of claims have been drafted as separate independent claims, they

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 288 of 739

appear to relate effectively to the same subject-matter and to differ from each other only with regard to the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.

3.2 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 103 is not new in the sense of Article 33(2) PCT.

Document D3 discloses:
An method for packet communication comprising:
in a first mode of operation: transmitting or receiving a plurality of packets;
identifying at least one packet of the plurality of packets as a packet that should not be retransmitted see paragraph 28);
in a second mode of operation: transmitting or receiving a plurality of packets;
allocating a first portion of shared memory for retransmissions of packets and a second portion of the shared memory for one or more of interleaving, deinterleaving, coding, decoding and error correction (paragraph 31) ; and
in a third mode of operation: transmitting or receiving a plurality of packets;
identifying at least one packet of the plurality of packets as a retransmittable type packet; identifying at least one packet of the plurality of packets as a non retransmittable type packet; allocating a first portion of shared memory for retransmissions of the retransmittable-type packets and a second portion of the shared memory for one or more of interleaving, deinterleaving, coding, decoding and error correction (paragraph 33-34).

Claim 103 contains al the features of the other method claims 19, 20, 38, 39, 99 that are therefore also not new.
The same reasoning applies also for the apparatus claims 23, 24, 42, 53, 54, 57, 68, 69, 81, 84, 95, 96.

4. Examination of the third invention : Claims 36-37, 66-67

4.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 36, 37, 66 and 67 is not new in the sense of Article 33(2)

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 289 of 739

PCT.
Claim 36
Document D4 discloses:
A packet handing method comprising receiving a stream of packets;
identifying a first number of packets in the stream of packets as low latency packets;
identifying a second number of packets in the stream of packets as low error packets;
forwarding the low latency and low error packets to a transceiver; and storing the low error packets for correction (see paragraph 12 and 14).

Claim 66
The same reasoning applies to claim 66 the defines the corresponding apparatus of claim 33.

Claims 37 and 67
The additional features of claims 37 and 67 are already disclosed by D4 (see paragraph 12).

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 290 of 739

Electronic Acknowledgement Receipt

EFS ID:	17959536
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	20-JAN-2014
Filing Date:	
Time Stamp:	17:10:03
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	6936-57-PCT_IPRP_2008-10-23.pdf	949704 c80d5e6a62e94ee613905fb5de3123f8d6db9319	no	11

Warnings:	
Information:	

2	Non Patent Literature	6936-57-PAU_OA_2010-03-30.pdf	118586 f09c4a35f2933bf4cb6599411734b2e84f3988e7	no	2
Warnings:					
Information:					
3	Non Patent Literature	6936-57-PCN_OA_2011-03-16.pdf	504113 5424e26126c86430e34a1a93792b1f604121be6d	no	10
Warnings:					
Information:					
4	Non Patent Literature	6936-57-PCN_OA_03-07-2012.pdf	790537 72cf34d3071fbeb92aa164a6a97cb3f6242b4806	no	10
Warnings:					
Information:					
5	Non Patent Literature	6936-57-PCN_OA_12-12-2012.pdf	631557 21f96df594e8c13512b68630a267561674e9dcfd	no	12
Warnings:					
Information:					
6	Non Patent Literature	6936-57-PCO_OA_2010-11-05.pdf	631708 95c43ff202e11e402356a5582a89735ced343004	no	8
Warnings:					
Information:					
7	Non Patent Literature	6936-57-PEP_OA_2009-04-01.pdf	98674 a43b438ba9327246ea37c79843599efe849e807b	no	4
Warnings:					
Information:					
8	Non Patent Literature	6936-57-PEP_OA_2010-07-09.pdf	72035 61eb30665e34622210261620ad0d1080a91f2caf	no	3
Warnings:					
Information:					
9	Non Patent Literature	6936-57-PEP_OA_2010-12-21.pdf	160273 80a8078674bec8f36eeefc3fa36c39a2c5823367	no	4
Warnings:					
Information:					
10	Non Patent Literature	6936-57-PEP_OA_12-18-2012.pdf	165135 ebd26a5da6e7543dc52258e86c9102ba2773a3b2	no	4
Warnings:					
Information:					

11	Non Patent Literature	6936-57-PEP-DIV_OA_2010-03-17.pdf	124630 0d6ff1d9b93cbeeb3911516041401272 8e3c175f	no	5
Warnings:					
Information:					
12	Non Patent Literature	6936-57-PEP-DIV_OA_2010-11-03.pdf	34249 780ab56247a37481dbc5b4c61f1660143aefa3ac	no	1
Warnings:					
Information:					
13	Non Patent Literature	6936-57-PEP-DIV_OA_11-20-2013.pdf	1158682 f0248752e55966726f8f49cb02e7acd3a53e3bfc	no	4
Warnings:					
Information:					
14	Non Patent Literature	6936-57-PEP-DIV-2_OA_2010-03-03.pdf	126216 759bf799fe30ff9a761f784ec9d1b528f5299855	no	5
Warnings:					
Information:					
15	Non Patent Literature	6936-57-PEP-DIV-2_OA_2010-11-03.pdf	34217 c12f7d348b95e6a881961b3fb644a4316ec521b0	no	1
Warnings:					
Information:					
16	Non Patent Literature	6936-57-PEP-DIV-2_OA_2011-12-22.pdf	95779 b7a638eb4f8f3af97bbcdf9b81dadb58be29cb5f	no	4
Warnings:					
Information:					
17	Non Patent Literature	6936-57-PEP-DIV-2_Intent_to_Grant_12-18-2012.pdf	266303 cca997a1f383e74114c2e154e05c2e01bd3f29bf	no	6
Warnings:					
Information:					
18	Non Patent Literature	6936-57-PEP-DIV-2_Decision_to_Grant_05-31-2013.pdf	100861 b98914de8703017978c8297dd071cc3fc43b2c4c	no	2
Warnings:					
Information:					
19	Non Patent Literature	6936-57-PJP_OA_2011-04-04.pdf	235750 6dc4c7d5061d85422055e476c94641690e961753	no	6
Warnings:					
Information:					

20	Non Patent Literature	6936-57-PJP_OA_2011-10-31.pdf	125945 0ccdf28aac99537871817e45d634b160a1265ad3	no	4
Warnings:					
Information:					
21	Non Patent Literature	6936-57-PJP-DIV_OA_2011-04-18.pdf	161726 69ea9cdbb52aebaa16285fb7923880afc8d55627	no	5
Warnings:					
Information:					
22	Non Patent Literature	6936-57-PJP-DIV_OA_2011-08-29.pdf	175819 369dac2c643b1b6561161c2fb27080dda4946f60	no	4
Warnings:					
Information:					
23	Non Patent Literature	6936-57-PJP-DIV_OA_04-23-2012.pdf	41922 4fe1314fed0e7846fc0a1a1d6fc5be206fdd8853	no	1
Warnings:					
Information:					
24	Non Patent Literature	6936-57-PJP-DIV-2_OA_06-03-2013.pdf	107642 10df3bef0759dbbf0e8940a459c2d8bfbd6f5431	no	6
Warnings:					
Information:					
25	Non Patent Literature	6936-57-PKR_OA_08-29-2013.pdf	732391 c20e729fa8876521952255b2c4a383a2192aa571	no	5
Warnings:					
Information:					
26	Non Patent Literature	6936-57-PMX_OA_2010-04-22.pdf	415779 736d5407da39a52a2f12407e60776dc86ecea394	no	5
Warnings:					
Information:					
27	Non Patent Literature	6936-57-PMX_OA_2011-08-09.pdf	7993319 0b9ec99dc305d90edf4dfc6b26dc686ec7652c84	no	4
Warnings:					
Information:					
28	Non Patent Literature	6936-57-PMX_NOA_04-03-2012.pdf	96094 d9b4dee00d8af805e7197605e62a054b353118c8	no	2
Warnings:					
Information:					

29	Non Patent Literature	6936-57-PMX-DIV_OA_06-06-2013.pdf	383918 f3740449412a29c66be2b57b31a5b73d5888fec4	no	4
Warnings:					
Information:					
30	Non Patent Literature	6936-54_OA_2009-02-24.pdf	865943 fa3478cbc1d83ae33256f76ebdaef9f3f35b37b9	no	23
Warnings:					
Information:					
31	Non Patent Literature	6936-54_OA_2009-12-09.pdf	911747 c08cbaf7bd3931dc3967936521227986871 3637b	no	25
Warnings:					
Information:					
32	Non Patent Literature	6936-54_NOA_2010-09-07.pdf	326176 2b7654ff1fd839a5eced409f6c873bac6b75cf2b	no	8
Warnings:					
Information:					
33	Non Patent Literature	6936-54-CON_NOA_2010-10-06.pdf	319429 8cd4c3df8ff8190df5deaf485b076c114f102608	no	8
Warnings:					
Information:					
34	Non Patent Literature	6936-54-CON-2_NOA_2010-10-06.pdf	269129 a78e4dd2ccfcdc704f83f1492f3d5a8046291817	no	7
Warnings:					
Information:					
35	Non Patent Literature	6936-54-CON-3_OA_2012-01-06.pdf	405433 86f9eda9219bf0ea2b87c70a30ef945e1f21b0ef	no	13
Warnings:					
Information:					
36	Non Patent Literature	6936-54-CON-3_NOA_07-27-2012.pdf	474025 e0a2f88daff1a5c586c7ed8e9a8c3000ad690c1f	no	10
Warnings:					
Information:					
37	Non Patent Literature	6936-54-CON-4_OA_09-28-2012.pdf	1321469 f25fdada1a0b066ceb8a84d5510480842 1f91af9	no	27
Warnings:					
Information:					

38	Non Patent Literature	6936-54-CON-4_NOA_05-21-2013.pdf	635558 1f41068ced931323187ac7ef6385bbf73dcb7c6c	no	16
Warnings:					
Information:					
39	Non Patent Literature	6936-54-CON-5_OA_09-25-2013.pdf	311796 adadb50b243a8252da759b86fbf2687f3f2031c4	no	10
Warnings:					
Information:					
40	Non Patent Literature	6936-54-CON-5_NOA_10-08-2013.pdf	731556 3fd3bc36f6131ceb75b8cc1e76434a1ede72493a	no	17
Warnings:					
Information:					
41	Non Patent Literature	6936-57-PUS_OA_2012-01-05.pdf	504513 0f0b5ee21f015d8258d58f7f50aa47e1528cfa8c	no	14
Warnings:					
Information:					
42	Non Patent Literature	6936-57-PUS_NOA_08-17-2012.pdf	370125 afd89105502a9abbcb7ceff05616d8e626ee4552	no	7
Warnings:					
Information:					
43	Non Patent Literature	6936-57-PUS-CON_NOA_12-26-2012.pdf	405798 f511eccacab2e689a2fa49e9a9f6a6ffba2cb918	no	8
Warnings:					
Information:					
44	Non Patent Literature	6936-57-PUS-CON-2_OA_10-02-2013.pdf	467736 bf7f176450f3b18d7751931f680a1ad6bc223808	no	14
Warnings:					
Information:					
45	Non Patent Literature	6936-57-PUS-CON-2_NOA_11-25-2013.pdf	357820 7fe140b8632c24b1a41dc53738cb421bf8f429d2	no	7
Warnings:					
Information:					
46	Non Patent Literature	6936-57-PUS-DIV_OA_04-27-2012.pdf	1361537 5a4a357e95cb117e255a428b57d061c3d3a5f9ff	no	39
Warnings:					
Information:					

47	Non Patent Literature	6936-57-PUS-DIV_OA_01-02-2013.pdf	417006 d93b731aa8101c27d3cd0ef3279bc1b512ccb3cd	no	16
Warnings:					
Information:					
48	Non Patent Literature	6936-57-PUS-DIV_OA_06-20-2013.pdf	401312 731857c29c984b1ff7da5c78f86d865dcade1ada	no	13
Warnings:					
Information:					
49	Non Patent Literature	6936-57-PUS-DIV_OA_10-02-2013.pdf	350784 153fd1829beb2813eabecdbf7484cdaa623bc054	no	11
Warnings:					
Information:					
50	Non Patent Literature	6936-57-PUS-DIV_NOA_10-21-2013.pdf	354837 10f3ae0f4215f65fa67d2016fc9d92558b588d69	no	7
Warnings:					
Information:					
51	Non Patent Literature	6936-57-PUS-DIV-CON_OA_05-17-2012.pdf	1064507 79d45f50517bef66a3f8e825d7cec0c8f055b588	no	26
Warnings:					
Information:					
52	Non Patent Literature	6936-57-PUS-DIV-CON_OA_12-17-2012.pdf	376151 518e7a88a19d66c2caf751b47f036e90d59f350e	no	13
Warnings:					
Information:					
53	Non Patent Literature	6936-57-PUS-DIV-CON_NOA_05-09-2013.pdf	341908 13484d1132ba95c50b3c41ce33281e888af834ee	no	6
Warnings:					
Information:					
			Total Files Size (in bytes):	29879859	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/AIA/80 (07-12)
Approved for use through 11/30/2014. OMB 0651-0035
U.S. Patent and Trademark Office; U.S DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

■ Practitioners associated with Customer Number: 62574

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignments documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

■ The address associated with Customer Number: 62574

OR

☐

Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address: TQ DELTA, LLC
805 Las Cimas Parkway, Suite 240
Austin, Texas 78746

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be Filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of The practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record
The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	Mark Roche	Date	10/4/12
Name	Mark K. Roche	Telephone	512-609-1810
Title	Managing Director		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	17959560
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	20-JAN-2014
Filing Date:	
Time Stamp:	17:12:08
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Statement_Under_373c_w_POA.pdf	529716 4fc6441f924ccf1e246b72aef01f847a2e625dfe	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Assignee showing of ownership per 37 CFR 3.73.	1	2
	Power of Attorney	3	3
Warnings:			
Information:			
	Total Files Size (in bytes):	529716	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 14/159,125

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	280
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	600
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	720
TOTAL CLAIMS (37 CFR 1.16(i))	8 minus 20 =	*			OR	x 80 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*				x 420 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						400
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	2000

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
14/159,125	01/20/2014	2414	2000	6936-57-PUS-CON-3	8	1

CONFIRMATION NO. 3369

62574
Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

FILING RECEIPT

OC000000066409246

Date Mailed: 02/06/2014

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)
Marcos C. Tzannes, Alamo, CA;

Applicant(s)
TQ DELTA, LLC, Austin, TX

Assignment For Published Patent Application
TQ DELTA, LLC, Austin, TX

Power of Attorney: The patent practitioners associated with Customer Number 62574

Domestic Priority data as claimed by applicant
This application is a CON of 13/766,059 02/13/2013 PAT 8645784
which is a CON of 12/783,758 05/20/2010 PAT 8407546
which is a CON of 12/295,828 10/02/2008 PAT 8335956
which is a 371 of PCT/US2007/066522 04/12/2007
which claims benefit of 60/849,650 10/05/2006
and claims benefit of 60/792,236 04/12/2006

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

If Required, Foreign Filing License Granted: 02/03/2014
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/159,125**
Projected Publication Date: 05/15/2014

Non-Publication Request: No

Early Publication Request: No

Title

PACKET RETRANSMISSION AND MEMORY SHARING

Preliminary Class

370

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 305 of 739

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/159,125	01/20/2014	Marcos C. Tzannes	6936-57-PUS-CON-3

CONFIRMATION NO. 3369

62574
Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

POA ACCEPTANCE LETTER

OC000000066409290

Date Mailed: 02/06/2014

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/20/2014.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/bpham/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	
Sheet	1	of	1	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

UNPUBLISHED U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] (if known)	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	1	Examiner's Report for Canadian Patent Application No. 2,647,589, mailed December 16, 2013 (Attorney Ref. No.: 6936-57-PCA)
	2	Notice of Allowance for Japanese Patent Application No. 2012-042978, dispatched Feb. 17, 2014 (Attorney Ref. No.: 6936-57-PJP-DIV-2)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Electronic Acknowledgement Receipt

EFS ID:	18243039
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	19-FEB-2014
Filing Date:	20-JAN-2014
Time Stamp:	16:04:31
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		IDS_02.pdf	529996 b5df8b4827d67d43cc7bce67045521b1245dc5bf	yes	4

	Multipart Description/PDF files in .zip description				
	Document Description	**Start**	**End**		
	Transmittal Letter	1	3		
	Information Disclosure Statement (IDS) Form (SB08)	4	4		
Warnings:					
Information:					
2	Non Patent Literature	6936-57-PCA_OA_12-16-2013.pdf	140940 462e472021c351e2f8a7744957536eb7237ccdd6	no	3
Warnings:					
Information:					
3	Non Patent Literature	6936-57-PJP-DIV-2_NOA_02-17-2014.pdf	52537 aaecebbf1b8d8e59e21b58aa5dbfa52c96f4ab77	no	3
Warnings:					
Information:					
		Total Files Size (in bytes):	723473		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:	)	Group Art Unit: 2112
Marcos C. Tzannes	)	Confirmation No.: 3369
Serial No.: 14/159,125	)	Examiner:
Filed: January 20, 2014	)	
Atty. File No.: 6936-57-PUS-CON-3	)	SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT
Entitled: "PACKET RETRANSMISSION AND MEMORY SHARING"	)	Electronically Submitted

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The references cited on attached Form PTO-1449 are being called to the attention of the Examiner.

☒ Copies of the cited non-patent and/or foreign references are enclosed herewith.

☐ Copies of the cited U.S. patents and/or patent applications are enclosed herewith.

☐ Copies of the cited U.S. patents/unpublished patent applications/patent application publications are not enclosed in accordance with 37 C.F.R. § 1.98(a).

☐ Copies of the cited references are not enclosed, in accordance with 37 C.F.R. § 1.98(d), because the references were cited by or submitted to the U.S. Patent and Trademark Office in prior application Serial No. _____ filed _____, which is relied upon for an earlier filing date under 35 U.S.C. § 120.

☐ To the best of applicants' belief, the pertinence of the foreign-language references are believed to be summarized in the attached English translation/abstracts and/or in the figures, although applicants do not necessarily vouch for the accuracy of the translation.

☐ Examiner's attention is drawn to the following related applications:

- Serial No. _____ filed _____(Attorney Ref. No. _____)

☐ Other:_____

Submission of the above information is not intended as an admission that any item is citable under the statutes or rules to support a rejection, that any item disclosed represents analogous art, or that those skilled in the art would refer to or recognize the pertinence of any reference without the benefit of hindsight, nor should an inference be drawn as to the pertinence of the references based on the order in which they are presented.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 311 of 739

Submission of this statement should not be taken as an indication that a search has been conducted, or that no better art exists.

It is respectfully requested that the cited information be expressly considered during the prosecution of this application and the references made of record therein.

FEES

☒	**37 CFR 1.97(b)**: No fee is believed due in connection with this submission, because the information disclosure statement submitted herewith is satisfied by one of the following conditions ("X" indicates satisfaction): ☒ Within three months of the filing date of a national application other than a continued prosecution application under 37 CFR 1.53(d), or ☐ Within three months of the date of entry into the national stage of an international application as set forth in 37 CFR 1.491 or ☐ Before the mailing date of a first Office Action on the merits, or ☐ Before the mailing of a first Office action after the filing of a request for continued examination under 37 CFR 1.114. Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970.
☐	**37 CFR 1.97(c)**: The information disclosure statement transmitted herewith is being filed after all the above conditions (37 CFR 1.97(b)), but before the mailing date of one of the following conditions: (1) a final action under 37 C.F.R. 1.113 or (2) a notice of allowance under 37 C.F.R. 1.311, or (3) an action that otherwise closes prosecution in the application. This Information Disclosure Statement is accompanied by: ☐ A Certification (below) as specified by 37 C.F.R. 1.97(e). Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970. OR ☐ Please charge Deposit Account 19-1970 in the amount of $180.00 for the fee set forth in 37 C.F.R. 1.17(p) for submission of an information disclosure statement. Please credit any overpayment or charge any underpayment to Deposit Account 19-1970.
☐	**37 CFR 1.97(d)**: This Information Disclosure Statement is being submitted after the period specified in 37 CFR 1.97(c). ☐ This information Disclosure Statement includes a Certification (below) as specified by 37 C.F.R. 1.97(e) AND ☐ Applicants hereby requests consideration of the reference(s) disclosed herein. Please charge Deposit Account 19-1970 in the amount of $180.00 under 37 C.F.R. 1.17(p). Please credit any overpayment or charge any underpayment to Deposit Account 19-1970. Election to pay the fee should not be taken as an indication that applicant(s) cannot execute a certification.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 312 of 739

Certification (37 C.F.R. 1.97(e))
(Applicable only if checked)

☐ The undersigned certifies that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(1).

☐ A copy of the communication from the foreign patent office is enclosed.

OR

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned after making reasonable inquiry, no item of information contained in this Information Disclosure Statement was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(2).

Respectfully submitted,

SHERIDAN ROSS P.C.

By: _____
Jason H. Vick
Registration No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202-5141
(303) 863-9700

Date: 1 Feb 17

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 313 of 739

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of: Marcos C. Tzannes	)	Group Art Unit: 2112
Application No.: 14/159,125	)	Examiner:
Filed: January 20, 2014	)	Confirmation No.: 3369
Atty. File No.: 6936-57-PUS-CON-3	)	

For: PACKET RETRANSMISSION AND MEMORY SHARING

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

PRELIMINARY AMENDMENT

Dear Sir:

Prior to the initial review of the above-identified patent application by the Examiner, please enter the following Preliminary Amendment. Although Applicants do not believe that any fees are due based upon the filing of this Preliminary Amendment, please charge any such fees to Deposit Account 19-1970.

Please amend the above-identified patent application as follows:

Amendments to the Claims are shown in the listing of claims which begin on page 2 of this paper.

Remarks begin on page 5 of this paper.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 314 of 739

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1-105. (Cancelled)

106. (New) A method of packet retransmission, in a transceiver, comprising:

transmitting a first type of packet; and

transmitting a second type of packet,

wherein the first type of packet is stored in a retransmission buffer after transmission and the second type of packet is not stored in a retransmission buffer after transmission,

wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and

wherein the header field of the first type of packet comprises a sequence identifier (SID) that is incremented after the first type of packet is transmitted and the header field of the second type of packet does not comprise the SID of the first type of packet.

107. (New) The method of claim 106, wherein the transceiver is connected to a second transceiver using a wired or wireless channel and the transceivers are used to transport one or more of video and voice data.

108. (New) The method of claim 106, wherein the method is performed in a linecard that is operable to transport video.

109. (New) The method of claim 106, wherein the method is performed in a customer premises modem that is operable to transport video.

110. (New) The method of claim 106, wherein the transceiver includes at least one digital signal processor.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 315 of 739

111. (New) The method of claim 106, wherein the transceiver includes at least one ASIC (Application Specific Integrated Circuit).

112. (New) The method of claim 106, wherein the first type of packet comprises one or more PTM-TC codewords.

113. (New) The method of claim 106, wherein the first type of packet comprises one or more ATM cells.

114. (New) The method of claim 106, wherein the first type of packet comprises one or more Reed Solomon codewords.

115. (New) The method of claim 106, wherein the first type of packet is a low-PER packet and the second type of packet is a low-latency packet.

116. (New) A transceiver operable to transmit a first type of packet and to transmit a second type of packet, wherein the first type of packet is stored in a retransmission buffer after transmission and the second type of packet is not stored in a retransmission buffer after transmission, and wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and wherein the header field of the first type of packet comprises a sequence identifier (SID) that is incremented after the first type of packet is transmitted and the header field of the second type of packet does not comprise the SID of the first type of packet.

117. (New) The transceiver of claim 116, wherein the transceiver is connected to a second transceiver using a wired or wireless channel and the transceivers are used to transport one or more of video and voice data.

118. (New) The transceiver of claim 116, wherein the transceiver is located in a linecard that is operable to transport video.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 316 of 739

119. (New) The transceiver of claim 116, wherein the transceiver is located in a customer premises modem that is operable to transport video.

120. (New) The transceiver of claim 116, wherein the transceiver includes at least one digital signal processor.

121. (New) The transceiver of claim 116, wherein the transceiver includes at least one ASIC (Application Specific Integrated Circuit).

122. (New) The transceiver of claim 116, wherein the first type of packet comprises one or more PTM-TC codewords.

123. (New) The transceiver of claim 116, wherein the first type of packet comprises one or more ATM cells.

124. (New) The transceiver of claim 116, wherein the first type of packet comprises one or more Reed Solomon codewords.

125. (New) The transceiver of claim 116, wherein the first type of packet is a low-PER packet and the second type of packet is a low-latency packet.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 317 of 739

REMARKS/ARGUMENTS

By this amendment, claims 1-105 are canceled without prejudice or disclaimer and new claims 106-125 have been added.

Applicant requests examination on the merits.

Applicant believes that the pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

The Commissioner is hereby authorized to charge to Deposit Account No. 19-1970 any fees under 37 C.F.R. §§ 1.16 and 1.17 that may be required by this paper and to credit any overpayment to that Account. If any extension of time is required in connection with the filing of this paper and has not been separately requested, such extension is hereby Petitioned.

Respectfully submitted,

SHERIDAN ROSS P.C.

By: _____

Jason H. Vick
Registration No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202-5141
(303) 863-9700

Date: 10 MAR 14

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 318 of 739

Electronic Acknowledgement Receipt

EFS ID:	18420752
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	10-MAR-2014
Filing Date:	20-JAN-2014
Time Stamp:	15:59:51
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		AMEND_PRELIM_02.pdf	530619 0eda90837f86c438a634e8cc832ac208f7438652	yes	5

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Preliminary Amendment	1	1
	Claims	2	4
	Applicant Arguments/Remarks Made in an Amendment	5	5
Warnings:			
Information:			
	Total Files Size (in bytes):	530619	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/159,125	Filing Date 01/20/2014	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 03/10/2014

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	X $80 =	0
Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $420 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/ANGELONA JONES/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/159,125	01/20/2014	Marcos C. Tzannes	6936-57-PUS-CON-3

CONFIRMATION NO. 3369

62574
Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

PUBLICATION NOTICE

OC000000068453385

Title:PACKET RETRANSMISSION AND MEMORY SHARING

Publication No.US-2014-0133491-A1
Publication Date:05/15/2014

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, Osman M
Sheet	1	of	1	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

UNPUBLISHED U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] (if known)	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	1	Official Action (including translation) for Korean Patent Application No. 10-2014-7005299 mailed April 4, 2014 (Attorney Ref. No.: 6936-57-PKR-DIV)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, Osman M
Sheet	1	of	1	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

UNPUBLISHED U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] (if known)	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	1	Official Action (including translation) for Korean Patent Application No. 10-2014-7005299 mailed April 4, 2014 (Attorney Ref. No.: 6936-57-PKR-DIV)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Electronic Acknowledgement Receipt

EFS ID:	19278200
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	11-JUN-2014
Filing Date:	20-JAN-2014
Time Stamp:	17:26:41
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		IDS_03.pdf	531228 e7a5ce51c562659f683dd317ea89ac67a7e7b151	yes	4

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	3
	Information Disclosure Statement (IDS) Form (SB08)	4	4

Warnings:					
Information:					
2	Non Patent Literature	6936-57-PKR-DIV_OA_04-04-2014.pdf	162844 5680733e2ab6f10f5c4190ff9a86814fa3b52f6d	no	5
Warnings:					
Information:					
		Total Files Size (in bytes):	694072		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:	)	Group Art Unit: 2112
Marcos C. Tzannes	)	Confirmation No.: 3369
Serial No.: 14/159,125	)	Examiner: ALSHACK, Osman M.
Filed: January 20, 2014	)	
Atty. File No.: 6936-57-PUS-CON-3	)	SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT
Entitled: "PACKET RETRANSMISSION AND MEMORY SHARING"	)	Electronically Submitted

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The references cited on attached Form PTO-1449 are being called to the attention of the Examiner.

☒ Copies of the cited non-patent and/or foreign references are enclosed herewith.

☐ Copies of the cited U.S. patents and/or patent applications are enclosed herewith.

☐ Copies of the cited U.S. patents/unpublished patent applications/patent application publications are not enclosed in accordance with 37 C.F.R. § 1.98(a).

☐ Copies of the cited references are not enclosed, in accordance with 37 C.F.R. § 1.98(d), because the references were cited by or submitted to the U.S. Patent and Trademark Office in prior application Serial No. _____ filed _____, which is relied upon for an earlier filing date under 35 U.S.C. § 120.

☒ To the best of applicants' belief, the pertinence of the foreign-language references are believed to be summarized in the attached English translation/abstracts and/or in the figures, although applicants do not necessarily vouch for the accuracy of the translation.

☐ Examiner's attention is drawn to the following related applications:

- Serial No. _____ filed _____(Attorney Ref. No. _____)

☐ Other:_____

Submission of the above information is not intended as an admission that any item is citable under the statutes or rules to support a rejection, that any item disclosed represents analogous art, or that those skilled in the art would refer to or recognize the pertinence of any reference without the benefit of hindsight, nor should an inference be drawn as to the pertinence of the references based on the order in which they are presented.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 327 of 739

Submission of this statement should not be taken as an indication that a search has been conducted, or that no better art exists.

It is respectfully requested that the cited information be expressly considered during the prosecution of this application and the references made of record therein.

FEES

☒	**37 CFR 1.97(b)**: No fee is believed due in connection with this submission, because the information disclosure statement submitted herewith is satisfied by one of the following conditions ("X" indicates satisfaction): ☐ Within three months of the filing date of a national application other than a continued prosecution application under 37 CFR 1.53(d), or ☐ Within three months of the date of entry into the national stage of an international application as set forth in 37 CFR 1.491 or ☒ Before the mailing date of a first Office Action on the merits, or ☐ Before the mailing of a first Office action after the filing of a request for continued examination under 37 CFR 1.114. Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970.
☐	**37 CFR 1.97(c)**: The information disclosure statement transmitted herewith is being filed after all the above conditions (37 CFR 1.97(b)), but before the mailing date of one of the following conditions: (1) a final action under 37 C.F.R. 1.113 or (2) a notice of allowance under 37 C.F.R. 1.311, or (3) an action that otherwise closes prosecution in the application. This Information Disclosure Statement is accompanied by: ☐ A Certification (below) as specified by 37 C.F.R. 1.97(e). Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970. OR ☐ Please charge Deposit Account 19-1970 in the amount of $180.00 for the fee set forth in 37 C.F.R. 1.17(p) for submission of an information disclosure statement. Please credit any overpayment or charge any underpayment to Deposit Account 19-1970.
☐	**37 CFR 1.97(d)**: This Information Disclosure Statement is being submitted after the period specified in 37 CFR 1.97(c). ☐ This information Disclosure Statement includes a Certification (below) as specified by 37 C.F.R. 1.97(e) AND ☐ Applicants hereby requests consideration of the reference(s) disclosed herein. Please charge Deposit Account 19-1970 in the amount of $180.00 under 37 C.F.R. 1.17(p). Please credit any overpayment or charge any underpayment to Deposit Account 19-1970. Election to pay the fee should not be taken as an indication that applicant(s) cannot execute a certification.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 328 of 739

Certification (37 C.F.R. 1.97(e))
(Applicable only if checked)

☐ The undersigned certifies that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(1).

☐ A copy of the communication from the foreign patent office is enclosed.

OR

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned after making reasonable inquiry, no item of information contained in this Information Disclosure Statement was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(2).

Respectfully submitted,

SHERIDAN ROSS P.C.

By: _____
Jason H. Vick
Registration No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202-5141
(303) 863-9700

Date: 1/5/19

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 329 of 739

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, Osman M
Sheet	1	of	1	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

UNPUBLISHED U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] (if known)	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	1	Notice of Allowance for Canadian Patent Application No. 2,580,280, mailed Aug. 5, 2013 (Attorney's Ref. No.: 6936-54-PCA)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Electronic Acknowledgement Receipt

EFS ID:	19576274
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	14-JUL-2014
Filing Date:	20-JAN-2014
Time Stamp:	18:41:21
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		IDS_04.pdf	532653 cccefae46dfe93f7292bc2f1a75f5dbc5db16df8	yes	4

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	3
	Information Disclosure Statement (IDS) Form (SB08)	4	4

Warnings:					
Information:					
2	Non Patent Literature	6936-54-PCA_NOA_08-05-2013.pdf	1605168 55049c2da39ec4350188f99ffed5680278b89204	no	1
Warnings:					
Information:					
		Total Files Size (in bytes):	2137821		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:	Group Art Unit: 2112
Marcos C. Tzannes	Confirmation No.: 3369
Serial No.: 14/159,125	Examiner: ALSHACK, Osman M.
Filed: January 20, 2014	
Atty. File No.: 6936-57-PUS-CON-3	SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT
Entitled: "PACKET RETRANSMISSION AND MEMORY SHARING"	Electronically Submitted

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The references cited on attached Form PTO-1449 are being called to the attention of the Examiner.

☒ Copies of the cited non-patent and/or foreign references are enclosed herewith.

☐ Copies of the cited U.S. patents and/or patent applications are enclosed herewith.

☐ Copies of the cited U.S. patents/unpublished patent applications/patent application publications are not enclosed in accordance with 37 C.F.R. § 1.98(a).

☐ Copies of the cited references are not enclosed, in accordance with 37 C.F.R. § 1.98(d), because the references were cited by or submitted to the U.S. Patent and Trademark Office in prior application Serial No. _____ filed _____, which is relied upon for an earlier filing date under 35 U.S.C. § 120.

☐ To the best of applicants' belief, the pertinence of the foreign-language references are believed to be summarized in the attached English translation/abstracts and/or in the figures, although applicants do not necessarily vouch for the accuracy of the translation.

☐ Examiner's attention is drawn to the following related applications:

- Serial No. _____ filed _____(Attorney Ref. No. _____)

☐ Other:_____

Submission of the above information is not intended as an admission that any item is citable under the statutes or rules to support a rejection, that any item disclosed represents analogous art, or that those skilled in the art would refer to or recognize the pertinence of any reference without the benefit of hindsight, nor should an inference be drawn as to the pertinence of the references based on the order in which they are presented.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 333 of 739

Submission of this statement should not be taken as an indication that a search has been conducted, or that no better art exists.

It is respectfully requested that the cited information be expressly considered during the prosecution of this application and the references made of record therein.

FEES

☒	**37 CFR 1.97(b)**: No fee is believed due in connection with this submission, because the information disclosure statement submitted herewith is satisfied by one of the following conditions ("X" indicates satisfaction): ☐ Within three months of the filing date of a national application other than a continued prosecution application under 37 CFR 1.53(d), or ☐ Within three months of the date of entry into the national stage of an international application as set forth in 37 CFR 1.491 or ☒ Before the mailing date of a first Office Action on the merits, or ☐ Before the mailing of a first Office action after the filing of a request for continued examination under 37 CFR 1.114. Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970.
☐	**37 CFR 1.97(c)**: The information disclosure statement transmitted herewith is being filed after all the above conditions (37 CFR 1.97(b)), but before the mailing date of one of the following conditions: (1) a final action under 37 C.F.R. 1.113 or (2) a notice of allowance under 37 C.F.R. 1.311, or (3) an action that otherwise closes prosecution in the application. This Information Disclosure Statement is accompanied by: ☐ A Certification (below) as specified by 37 C.F.R. 1.97(e). Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970. OR ☐ Please charge Deposit Account 19-1970 in the amount of $180.00 for the fee set forth in 37 C.F.R. 1.17(p) for submission of an information disclosure statement. Please credit any overpayment or charge any underpayment to Deposit Account 19-1970.
☐	**37 CFR 1.97(d)**: This Information Disclosure Statement is being submitted after the period specified in 37 CFR 1.97(c). ☐ This information Disclosure Statement includes a Certification (below) as specified by 37 C.F.R. 1.97(e) AND ☐ Applicants hereby requests consideration of the reference(s) disclosed herein. Please charge Deposit Account 19-1970 in the amount of $180.00 under 37 C.F.R. 1.17(p). Please credit any overpayment or charge any underpayment to Deposit Account 19-1970. Election to pay the fee should not be taken as an indication that applicant(s) cannot execute a certification.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 334 of 739

Certification (37 C.F.R. 1.97(e))
(Applicable only if checked)

☐ The undersigned certifies that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(1).

☐ A copy of the communication from the foreign patent office is enclosed.

OR

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned after making reasonable inquiry, no item of information contained in this Information Disclosure Statement was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(2).

Respectfully submitted,

SHERIDAN ROSS P.C.

By: _____

Jason H. Vick
Registration No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202-5141
(303) 863-9700

Date: 14 Jan '19

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 335 of 739

PLUS Search Results for S/N 14159125, Searched Tue Jan 27 13:21:42 EST 2015

The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

8850089 76
4792753 76
4807224 76
4905225 76
4914653 76
4970714 76
5339313 76
5404353 76
5430738 76
5555266 76
5664091 76
5875292 76
5905720 76
6072726 76
6073180 76
6172983 76
6278718 76
6416471 76
6493318 76
6701370 76
6728878 76
6741554 76
6763030 76
6772375 76
6788704 76
7149192 76
7277390 76
7296204 76
7346701 76
7376426 76
7412338 76
7450599 76
7596091 76
7693070 76
7701846 76
7787368 76
7821933 76
7849208 76
7885264 76
7969901 76
8023417 76
8077601 76
7885264 76
7969901 76
8023417 76
8077601 76
8151155 76
8156407 76
8228917 76
8291034 76

PLUS Search Results for S/N 14159125, Searched Tue Jan 27 13:21:44 EST 2015

The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

4766591 99
5444856 99
5727149 99
RE36182 99
6005851 99
6021177 99
6185427 99
6278921 99
6438585 99
6477595 99
6556582 99
6701151 99
6765891 99
7058387 99
7068610 99
7099339 99
7103313 99
7116640 99
7221268 99
7260399 99
7293289 99
7328036 99
7356614 99
7395347 99
7403514 99
7593428 99
7609747 99
7639641 99
7686520 99
7734253 99
7839824 99
7945206 99
8013732 99
8024481 99
8040917 99
8045501 99
8060419 99
8060681 99
8077702 99
7945206 99
8013732 99
8024481 99
8040917 99
8045501 99
8060419 99
8060681 99
8077702 99
8149783 99
8160000 99
8228924 99

PLUS Search Results for S/N 14159125, Searched Tue Jan 27 14:26:49 EST 2015

The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

5844918 99
4799215 99
5875292 99
4412326 99
4551834 99
4617657 99
4888767 99
4989204 99
5222061 99
5235599 99
5267237 99
5444718 99
5610595 99
5740167 99
5754754 99
5828293 99
6161207 99
6181700 99
6219713 99
6219713 99
6453438 99
6483845 99
6587985 99
6684354 99
6732313 99
6785259 99
6891799 99
6914903 99
6918077 99
6987730 99
7088701 99
7099300 99
7124333 99
7263644 99
7356750 99
7386872 99
7397861 99
7400616 99
7447969 99
7477621 99
7484157 99
7486700 99
7535840 99
7583701 99
7633880 99
7689644 99
7701846 99
7710889 99
7769014 99
7823039 99

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, Osman M
Sheet	1	of	1	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	2009/0319854	12-24-2009	Qian et al.	

UNPUBLISHED U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] (if known)	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	2	Examiner's Report for Canadian Patent Application No. 2,869,452, mailed Dec. 15, 2014 (Attorney's Ref. No.: 6936-54-PCA-DIV)
	3	Notification of Reexamination (including translation) for Chinese Patent Application No. 200580032703.1, dispatched October 29, 2014 (Attorney Ref. No. 6936-54-PCN)
	4	Official Action for U.S. Patent Application No. 14/081,469 mailed December 17, 2014 (Attorney Ref. No.: 6936-54-CON-6)
	5	Official Action for U.S. Patent Application No. 14/075,194, mailed January 28, 2015 (Attorney Ref. No. 6936-57-PUS-DIV-CON-2)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Electronic Acknowledgement Receipt

EFS ID:	21347021
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	29-JAN-2015
Filing Date:	20-JAN-2014
Time Stamp:	16:02:47
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		IDS_05.pdf	338422 b159fa393fc5405992d8b7945fdb8b64f51f1368	yes	4

	Multipart Description/PDF files in .zip description				
	Document Description	**Start**	**End**		
	Transmittal Letter	1	3		
	Information Disclosure Statement (IDS) Form (SB08)	4	4		
Warnings:					
Information:					
2	Non Patent Literature	6936-54-PCA-DIV_OA_12-15-2014.pdf	405714 ba8a7b62a20ca94cbc1444cf9692a11fd3fdc749	no	4
Warnings:					
Information:					
3	Non Patent Literature	6936-54-PCN_OA_10-29-2014.pdf	4818235 19ef8fc2944c8180822c76ee48f68c17d3b184bd	no	19
Warnings:					
Information:					
4	Non Patent Literature	6936-54-CON-6_OA_12-17-2014.pdf	200657 e17b1e837e45ac641ea1f5cae7363bc68ed77ed2	no	7
Warnings:					
Information:					
5	Non Patent Literature	6936-57-PUS-DIV-CON-2_OA_01-28-2015.pdf	175959 6589b3c14cb2acfba49a04c05dc426d650c718f2	no	6
Warnings:					
Information:					
		Total Files Size (in bytes):	5938987		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:	)	Group Art Unit: 2112
Marcos C. Tzannes	)	Confirmation No.: 3369
Serial No.: 14/159,125	)	Examiner: ALSHACK, Osman M.
Filed: January 20, 2014	)	SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT
Atty. File No.: 6936-57-PUS-CON-3	)	
Entitled: "PACKET RETRANSMISSION AND MEMORY SHARING"	)	Electronically Submitted

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The references cited on attached Form PTO-1449 are being called to the attention of the Examiner.

☒ Copies of the cited non-patent and/or foreign references are enclosed herewith.

☐ Copies of the cited U.S. patents and/or patent applications are enclosed herewith.

☒ Copies of the cited U.S. patents/unpublished patent applications/patent application publications are not enclosed in accordance with 37 C.F.R. § 1.98(a).

☐ Copies of the cited references are not enclosed, in accordance with 37 C.F.R. § 1.98(d), because the references were cited by or submitted to the U.S. Patent and Trademark Office in prior application Serial No. _____ filed _____, which is relied upon for an earlier filing date under 35 U.S.C. § 120.

☒ To the best of applicants' belief, the pertinence of the foreign-language references are believed to be summarized in the attached English translation/abstracts and/or in the figures, although applicants do not necessarily vouch for the accuracy of the translation.

☐ Examiner's attention is drawn to the following related applications:

- Serial No. _____ filed _____(Attorney Ref. No. _____)

☐ Other:_____

Submission of the above information is not intended as an admission that any item is citable under the statutes or rules to support a rejection, that any item disclosed represents analogous art, or that those skilled in the art would refer to or recognize the pertinence of any reference without the benefit of hindsight, nor should an inference be drawn as to the pertinence of the references based on the order in which they are presented.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 343 of 739

Submission of this statement should not be taken as an indication that a search has been conducted, or that no better art exists.

It is respectfully requested that the cited information be expressly considered during the prosecution of this application and the references made of record therein.

FEES

☒	**37 CFR 1.97(b)**: No fee is believed due in connection with this submission, because the information disclosure statement submitted herewith is satisfied by one of the following conditions ("X" indicates satisfaction): ☐ Within three months of the filing date of a national application other than a continued prosecution application under 37 CFR 1.53(d), or ☐ Within three months of the date of entry into the national stage of an international application as set forth in 37 CFR 1.491 or ☒ Before the mailing date of a first Office Action on the merits, or ☐ Before the mailing of a first Office action after the filing of a request for continued examination under 37 CFR 1.114. Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970.
☐	**37 CFR 1.97(c)**: The information disclosure statement transmitted herewith is being filed after all the above conditions (37 CFR 1.97(b)), but before the mailing date of one of the following conditions: (1) a final action under 37 C.F.R. 1.113 or (2) a notice of allowance under 37 C.F.R. 1.311, or (3) an action that otherwise closes prosecution in the application. This Information Disclosure Statement is accompanied by: ☐ A Certification (below) as specified by 37 C.F.R. 1.97(e). Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970. OR ☐ Please charge Deposit Account 19-1970 in the amount of $180.00 for the fee set forth in 37 C.F.R. 1.17(p) for submission of an information disclosure statement. Please credit any overpayment or charge any underpayment to Deposit Account 19-1970.
☐	**37 CFR 1.97(d)**: This Information Disclosure Statement is being submitted after the period specified in 37 CFR 1.97(c). ☐ This information Disclosure Statement includes a Certification (below) as specified by 37 C.F.R. 1.97(e) AND ☐ Applicants hereby requests consideration of the reference(s) disclosed herein. Please charge Deposit Account 19-1970 in the amount of $180.00 under 37 C.F.R. 1.17(p). Please credit any overpayment or charge any underpayment to Deposit Account 19-1970. Election to pay the fee should not be taken as an indication that applicant(s) cannot execute a certification.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 344 of 739

Certification (37 C.F.R. 1.97(e))
(Applicable only if checked)

☐ The undersigned certifies that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(1).

☐ A copy of the communication from the foreign patent office is enclosed.

OR

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned after making reasonable inquiry, no item of information contained in this Information Disclosure Statement was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(2).

Respectfully submitted,

SHERIDAN ROSS P.C.

By: _____

Jason H. Vick
Registration No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202-5141
(303) 863-9700

Date: 29 Jan '15

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 345 of 739

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/159,125	01/20/2014	Marcos C. Tzannes	6936-57-PUS-CON-3	3369

62574 7590 02/06/2015

Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

EXAMINER	
ALSHACK, OSMAN M	

ART UNIT	PAPER NUMBER
2112	

NOTIFICATION DATE	DELIVERY MODE
02/06/2015	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jvick@sheridanross.com

Office Action Summary	Application No. 14/159,125	Applicant(s) TZANNES, MARCOS C.	
	Examiner OSMAN ALSHACK	Art Unit 2112	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03/10/2014*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *106-125* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *106-125* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *01/20/2014* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date *01/20/2014, 02/19/2014, 06/11/2014,and 07/14/2014*.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

1. The present application is being examined under the pre-AIA first to invent provisions.

Preliminary amendment

2. The preliminary amendment filed on 03/10/2014 cancels claims 1-105. Therefore, claims 106-125 are presented for examination.

Abstract

3. The abstract of the disclosure is acceptable for examination purposes.

Drawings

4. The drawings received on 01/20/2014 are acceptable for examination purposes.

Oath Declaration

5. The Oath complies with all the requirements set forth in MPEP 602 and therefore is accepted.

Information Disclosure Statement

6. Some of references listed in the information disclosure statement (IDS) submitted on have not been considered. English translation is required for not considered references.
The submission is in compliance with the provisions of 37 CFR 1.97. Form PTO- 1449 is signed and attached hereto for considered references.

Claim Rejections - 35 USC § 112

7. Claims 112, 113, 122, and 123 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

Regarding to claims 112 and 122, the claims recite "wherein the first type of packet comprises one or more **PTM-TC** codewords." Abbreviation **PTM-TC** not defined. Please clarify.

Regarding to claims 113 and 123, the claims recite "wherein the first type of packet comprises one or more **ATM** cells." Abbreviation **ATM** not defined. Please clarify. Appreciate correction required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained through the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in Graham v. John Deere CO., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 106-125 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Plamondon et al (U.S. PN: 2007/0206621)" herein after as Plamondon" in view of Yoshimura et al. (U.S. PN: 2002/0126675)" herein after as Yoshimura."

As per claim 106:

Plamondon substantially teaches or discloses a method of packet retransmission, in a transceiver, comprising (see abstract, and paragraph [0007]): transmitting a first type of packet; and transmitting a second type of packet (see paragraph [0007], and Fig 6, *steps 601 & 603*), wherein the first type of packet is stored in a retransmission buffer after transmission (see paragraph [0121], *herein, appliance 200*) and the second type of packet is not stored in a retransmission buffer after transmission (see paragraph [0122], *herein, appliance 200 is free to discard the saved packet data*), wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of

packet (see paragraphs [0144 & 0197]), and wherein the header field of the first type of packet comprises a sequence identifier (SID) that is incremented after the first type of packet is transmitted (see paragraph [0413], *herein, each time that a packet is retransmitted, the count is incremented by one*).

However, Plamondon does not explicitly teach the header field of the second type of packet does not comprise the SID of the first type of packet.

However, Yoshimura in analogous art teaches the header field of the second type of packet does not comprise the SID of the first type of packet (see paragraph [0090], and Fig 7, component S702), *herein, by not applying the retransmission control process to the real-time type packet that practically does not require the retransmission process*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the communication system of Plamondon with the teachings of Yoshimura by including the header field of the second type of packet does not comprise the SID of the first type of packet.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized the header field of the second type of packet does not comprise the SID of the first type of packet would have improved the retransmission packets performance.

As per claim 107:

Plamondon teaches that wherein the transceiver is connected to a second transceiver using a wired or wireless channel (see paragraph [0038], and Fig 2B, *component 104*) and the transceivers are used to transport one or more of video and voice data (see paragraph [0213]).

As per claim 108:

Plamondon teach that wherein the method is performed in a linecard that is operable to transport video (see paragraph [0068], *herein, standard telephone lines*).

As per claim 109:

Plamondon teach that wherein the method is performed in a customer premises modem that is operable to transport video (see paragraph [0072], *herein, mobile telephone*).

As per claim 110:

Plamondon teach that wherein the transceiver includes at least one digital signal processor (see paragraph [0064], *herein, a microprocessor unit*).

As per claim 111:

Plamondon teaches that wherein the transceiver includes at least one ASIC (Application Specific Integrated Circuit) (see paragraph [0096]).

As per claim 112:

Plamondon teaches that wherein the first type of packet comprises one or more PTM-TC codewords (see paragraph [0010], *herein, transport layer connection*).

As per claim 113:

Plamondon teaches that wherein the first type of packet comprises one or more ATM cells (see paragraph [0038], *herein, Asynchronous Transfer Mode*).

As per claim 114:

Plamondon teaches that wherein the first type of packet comprises one or more Reed Solomon codewords (see paragraph [0158], *herein, forward error correction techniques*).

As per claim 115:

Plamondon teaches that wherein the first type of packet is a low-PER packet and the second type of packet is a low-latency packet (see paragraph [0224]).

As per claim 116:

Plamondon substantially teaches or discloses a transceiver operable to transmit a first type of packet and to transmit a second type of packet (see paragraph [0007], and Fig 6, *steps 601 & 603*), wherein the first type of packet is stored in a retransmission buffer after transmission (see paragraph [0121], *herein, appliance 200*) and the second type of packet is not stored in a retransmission buffer after transmission (see paragraph [0122], *herein, appliance 200 is free to discard the saved packet data),* and wherein the first and second types of packet

comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet (see paragraphs [0144 & 0197]), and wherein the header field of the first type of packet comprises a sequence identifier (SID) that is incremented after the first type of packet is transmitted (see paragraph [0413], *herein, each time that a packet is retransmitted, the count is incremented by one*) and the header field of the second type of packet does not comprise the SID of the first type of packet (see paragraph [0149], *herein, Packets that are not retransmitted will not result in ambiguity*).

However, Plamondon does not explicitly teach the header field of the second type of packet does not comprise the SID of the first type of packet.

However, Yoshimura in analogous art teaches the header field of the second type of packet does not comprise the SID of the first type of packet (see paragraph [0090], and Fig 7, component S702), *herein, by not applying the retransmission control process to the real-time type packet that practically does not require the retransmission process*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the communication system of Plamondon with the teachings of Yoshimura by including the header field of the second type of packet does not comprise the SID of the first type of packet.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized the header field of the second type of packet does not comprise the SID of the first type of packet would have improved the retransmission packets performance.

As per claim 117:

Plamondon teaches that wherein the transceiver is connected to a second transceiver using a wired or wireless channel (see paragraph [0038], and Fig 2B, *component 104*) and the transceivers are used to transport one or more of video and voice data (see paragraph [0213]).

As per claim 118:

Plamondon teaches that wherein the transceiver is located in a linecard that is operable to transport video (see paragraph [0068], *herein, standard telephone lines*).

As per claim 119:

Plamondon teaches that wherein the transceiver is located in a customer premises modem that is operable to transport video (see paragraph [0072], *herein, mobile telephone*).

As per claim 120:

Plamondon teach that wherein the transceiver includes at least one digital signal processor (see paragraph [0064], *herein, a microprocessor unit*).

As per claim 121:

Plamondon teaches that wherein the transceiver includes at least one ASIC (Application Specific Integrated Circuit) (see paragraph [0096]).

As per claim 122:

Plamondon teaches that wherein the first type of packet comprises one or more PTM-TC codewords (see paragraph [0010], *herein, transport layer connection*).

As per claim 123:

Plamondon teaches that wherein the first type of packet comprises one or more ATM cells (see paragraph [0038], *herein, Asynchronous Transfer Mode*).

As per claim 124:

Plamondon teaches that wherein the first type of packet comprises one or more Reed Solomon codewords (see paragraph [0158], herein, forward error correction techniques).

As per claim 125:

Plamondon teaches that wherein the first type of packet is a low-PER packet and the second type of packet is a low-latency packet (see paragraph [0224]).

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to OSMAN ALSHACK whose telephone number is (571)272-2069. The examiner can normally be reached on MON-FRI 8:30 A 5:00 PM EST, also please fax interview request to (571) 273- 2069. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ALBERT DECADY can be reached on 5712723819.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/OSMAN ALSHACK/

Patent Examiner, Art Unit 2112

/ALBERT DECADY/

Supervisory Patent Examiner, Art Unit 2112

Notice of References Cited	Application/Control No. 14/159,125	Applicant(s)/Patent Under Reexamination TZANNES, MARCOS C.	
	Examiner OSMAN ALSHACK	Art Unit 2112	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,005,851 A	12-1999	Craddock et al.	370/329
*	B	US-2002/0126675 A1	09-2002	Yoshimura et al.	370/395.21
*	C	US-2002/0154600 A1	10-2002	Ido et al.	370/216
*	D	US-6,754,188 B1	06-2004	Garahi et al.	370/328
*	E	US-2004/0179494 A1	09-2004	Attar et al.	370/332
*	F	US-7,031,259 B1	04-2006	Guttman et al.	370/235
*	G	US-2007/0206621 A1	09-2007	Plamondon et al.	370/413
*	H	US-7,483,421 B2	01-2009	Compton, Matthew	370/389
*	I	US-7,826,438 B1	11-2010	Salhotra et al.	370/345
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, Osman M
Sheet	1	of	1	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

UNPUBLISHED U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] (if known)	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
/O.A./	1	Notice of Allowance for Canadian Patent Application No. 2,580,280, mailed Aug. 5, 2013 (Attorney's Ref. No.: 6936-54-PCA)

Examiner Signature	/Osman Alshack/	Date Considered	01/23/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	osman Alshack
Sheet	1	of	10	Attorney Docket Number	6936-57-PUS-CON-2

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/O.A./	1	5524116	06-04-1996	Kalmanek, Jr., et al.	
/O.A./	2	5663910	09-02-1997	Ko et al.	
/O.A./	3	5898698	04-27-1999	Bross	
/O.A./	4	5983382	11-09-1999	Pauls	
/O.A./	5	6098188	08-01-2000	Kalmanek, Jr., et al.	
/O.A./	6	6775320	08-10-2004	Tzannes et al.	
/O.A./	7	6778589	08-17-2004	Ishii	
/O.A./	8	6337877	01-08-2002	Cole et al.	
/O.A./	9	6496481	12-17-2002	Wu et al.	
/O.A./	10	6707822	03-16-2004	Fadavi-Ardekani et al.	
/O.A./	11	6778596	08-17-2004	Tzannes	
/O.A./	12	6826589	11-30-2004	Berrada	
/O.A./	13	7200792	04-03-2007	Kim et al.	
/O.A./	14	7164654	01-16-2007	Hunzinger et al.	
/O.A./	15	7174493	02-06-2007	Matsumoto et al.	
/O.A./	16	7519124	04-14-2009	Oksman et al.	
/O.A./	17	7600172	10-06-2009	Berens et al.	
/O.A./	18	7657818	02-02-2010	Cioffi et al.	
/O.A./	19	7764595	07-27-2010	Treigherman	
/O.A./	20	7782758	08-24-2010	Wydrowski et al.	
/O.A./	21	7831890	11-09-2010	Tzannes et al.	
/O.A./	22	7844882	11-30-2010	Tzannes et al.	
/O.A./	23	7836381	11-16-2010	Tzannes et al.	
/O.A./	24	8074138	12-06-2011	Chae et al.	
/O.A./	25	8149904	04-03-2012	Efland et al.	
/O.A./	26	8276048	09-25-2012	Tzannes et al.	
/O.A./	27	8335956	12-18-2012	Tzannes	
/O.A./	28	8407546	03-26-2013	Tzannes	
/O.A./	29	8468411	06-18-2013	Tzannes	
/O.A./	30	8495473	07-23-2013	Tzannes et al.	
/O.A./	31	8595577	11-26-2013	Tzannes	
/O.A./	32	8607126	12-10-2013	Tzannes et al.	
/O.A./	33	8645784	02-04-2014	Tzannes	
/O.A./	34	2001/0014962	08-16-2001	Obuchi et al.	

Examiner Signature	/Osman Alshack/	Date Considered	01/27/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	2	of	10	Attorney Docket Number	6936-57-PUS-CON-2

/O.A./	35	2002/0087710	07-04-2002	Aiken et al.	
/O.A./	36	2002/0126675	09-12-2002	Yoshimura et al.	
/O.A./	37	2002/0154600	10-24-2002	Ido et al.	
/O.A./	38	2003/0067877	04-10-2003	Sivakumar et al.	
/O.A./	39	2003/0076870	04-24-2003	Moon et al.	
/O.A./	40	2004/0114536	06-17-2004	O'Rourke	
/O.A./	41	2004/0148552	07-29-2004	Matsumoto et al.	
/O.A./	42	2004/0196786	10-07-2004	Laha et al.	
/O.A./	43	2004/0203455	10-14-2004	Bao et al.	
/O.A./	44	2005/0180323	08-18-2005	Beightol et al.	
/O.A./	45	2006/0092871	05-04-2006	Nishibayashi et al.	
/O.A./	46	2006/0236045	10-19-2006	Keyes Jr.	
/O.A./	47	2007/0198898	08-23-2007	Ysebaert et al.	
/O.A./	48	2007/0263528	11-15-2007	Mukherjee	
/O.A./	49	2008/0212582	09-04-2008	Zwart et al.	
/O.A./	50	2010/0061376	03-11-2010	Shimizu	

UNPUBLISHED U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-kind Code[2] (if known)	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/O.A./	51	14/075194	11-08-2013	Tzannes	
/O.A./	52	14/081469	11-15-2013	Tzannes et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
/O.A./	53	EP 1041756	10-04-2000	LUCENT TECHNOLOGIES INC.		(corresponds to JP 2000-341247)
/O.A./	54	EP 1225735	07-24-2002	Matsushita Electronic Inc Co Ltd		
/O.A./	55	EP 1246409	10-02-2002	MITSUBISHI ELECTRIC CORP		

Examiner Signature	/Osman Alshack/	Date Considered	01/27/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	3	of	10	Attorney Docket Number	6936-57-PUS-CON-2

/O.A./	56	EP 1271833	01-02-2003	MITSUBISHI DENKI KABUSHIKI KAISHA		
/O.A./	57	EP 1367809	01-25-2006	PANASONIC COMMUNICATIONS CO., LTD.		
/O.A./	58	GB 2389493	12-10-2003	NEC CORP		
/O.A./	59	JP 06-164648	06-10-1994	MITSUBISHI ELECTRIC CORP		(includes English abstract)
/O.A./	60	JP 07-254862	10-03-1995	SONY CORP.		(includes English abstract and partial mechanical translation)
/O.A./	61	JP Hei09-247048	09-19-1997	Y R P IDO TSUSHIN KIBAN KIJIYU		(includes machine translation)
/O.A./	62	JP Hei11-150764	06-02-1999	SHARP CORP		(includes an machine translation)
/O.A./	63	JP Hei11-355254A	12-24-1999	SONY CORP		(Includes machine translation of application)
/O.A./	64	JP 2000-341247	12-08-2000	LUCENT TECHNOLOGIES INC		(includes English abstract) (corresponds to EP 1 041 756 cited herein)
/O.A./	65	JP 2002-084338	03-22-2002	MATSUSHITA ELECTRIC IND CO LTD		(corresponds to US2002-0154600 cited herein)
/O.A./	66	JP 2003-008553	01-10-2003	MITSUBISHI ELECTRIC CORP		(corresponds to EP 1271833 cited herein)
/O.A./	67	JP 2003-509966	03-11-2003	AWARE INC.		(corresponds to WO01/20865 cited herein)

Examiner Signature	/Osman Alshack/	Date Considered	01/27/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	4	of	10	Attorney Docket Number	6936-57-PUS-CON-2

/O.A./	68	JP 2003-224615	08-08-2003	SAMSUNG ELECTRONICS CO LTD.		(corresponds to US 7,200,792 cited herein)
/O.A./	69	JP 2004-007269	01-08-2004	PANASONIC COMM CO LTD		(corresponds to EP 1367809 cited herein)
/O.A./	70	JP 2004-030506	01-29-2004	NEC CORP		(includes abstract and partial mechanical translation)
/O.A./	71	JP 2004-056221	02-19-2004	MATSUSHITA ELECTRIC IND CO LTD		(includes abstract and partial mechanical translation)
/O.A./	72	JP 2004-135013	04-30-2004	MATSUSHITA ELECTRIC IND CO LTD		(includes machine translation)
/O.A./	73	JP 2005-522963	07-28-2005	INTERDIGITAL TECHNOLOGY CORPORATION		(corresponds to WO 03/090011 cited herein)
/O.A./	74	JP 2005-526422	09-02-2005	EG TECHNOLOGY INC		(corresponds to WO 03/028296 cited herein)
/O.A./	75	KR 10-2000-0047827	07-25-2000	KONINCLIKE PHILIPS ELECTRONICS		(corresponds to US 6,826,589 cited herein)
/O.A./	76	WO 00/52834	09-08-2000	FUJITSU LIMITED		(corresponds to US2001/0014962 cited herein)
/O.A./	77	WO 01/20865	03-22-2001	AWARE INC.		
/O.A./	78	WO 03/028296	04-03-2003	EG TECHNOLOGY INC		
/O.A./	79	WO 03/063060	07-31-2003	Broadcom Corp.		
/O.A./	80	WO 03/090011	10-30-2003	INTERDIGITAL TECHNOLOGY CORPORATION		

Examiner Signature	/Osman Alshack/	Date Considered	01/27/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	5	of	10	Attorney Docket Number	6936-57-PUS-CON-2

	81	WO 2006/044227	04-27-2006	Aware Inc.		

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
/O.A./	82	Shoji, T. et al: "Wireless Access Method to Ensure Each Users QOS in Unpredictable and Various QOS Requirements Wireless Personal Communications," Springer, Dordrecht, NL, Vol. 22, No. 2, Aug. 2002, pp. 139-151
/O.A./	83	"ITU-T Recommendation G.992.5 - Series G: Transmission Systems and Media, Digital Systems and Networks", International Telecommunication Union, ADSL2, May 2003, 92 pages
/O.A./	84	"ITU-T Recommendation G.992.3," International Telecommunication Union, ADSL2, Jan. 2005, 436 pages
/O.A./	85	"VDSL2 ITU-T Recommendation G.993.2," International Telecommunication Union, Feb. 2006, 252 pages
/O.A./	86	"Sunset xDSL: Prequalification of ADSL Circuits with ATU-C Emulation," Sunrise Telecom Inc., Application Series, 2001, San Jose, USA, page 3, available at http://www.sunrisetelecom.com/technotes/APP-xDSL-8B.pdf
/O.A./	87	International Search Report for International (PCT) Patent Application No. PCT/US2005/036015, mailed Feb. 8, 2006 (Attorney Ref. No. 6936-54-PCT)
/O.A./	88	Written Opinion for International (PCT) Patent Application No. PCT/US2005/036015, mailed Feb. 8, 2006 (Attorney Ref. No. 6936-54-PCT)
/O.A./	89	International Preliminary Report on Patentability for International (PCT) Patent Application No. PCT/US2005/036015, mailed Apr. 26, 2007 (Attorney Ref. No. 6936-54-PCT)
/O.A./	90	Examiner's First Report for Australian Patent Application No. 2005296086, mailed Jun. 24, 2009 (Attorney's Ref. No. 6936-54-PAU)
/O.A./	91	Examiner's First Report for Australian Patent Application No. 2011201250 mailed May 13, 2013 (Attorney's Ref. No. 6936-54-PAU-DIV)
/O.A./	92	Examiner's Report for Canadian Patent Application No. 2,580,280, mailed Sept. 14, 2012 (Attorney's Ref. No.: 6936-54-PCA)
/O.A./	93	Notification of the First Office Action (including translation) for Chinese Patent Application No. 200580032703, mailed Sep. 25, 2009 (Attorney's Ref. No. 6936-54-PCN)

Examiner Signature	/Osman Alshack/	Date Considered	01/27/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	6	of	10	Attorney Docket Number	6936-57-PUS-CON-2

/O.A./	94	Official Action (including translation) for Chinese Patent Application No. 200580032703, dispatched May 18, 2011 (Attorney Ref. No. 6936-54-PCN)
/O.A./	95	Official Action (including translation) for Chinese Patent Application No. 200580032703.1, dispatched March 28, 2012 (Attorney Ref. No. 6936-54-PCN)
/O.A./	96	Decision of Refusal (including translation) for Chinese Patent Application No. 200580032703.1, dispatched September 5, 2012 (Attorney Ref. No. 6936-54-PCN)
/O.A./	97	Official Action for European Application No. 05807443.6, mailed March 6, 2013 (Attorney Ref. No.: 6936-54-PEP)
/O.A./	98	First Examination Report for Indian Patent Application No. 1208/KOLNP/2007, mailed March 18, 2013 (Attorney Ref. No.: 6936-54-PIN)
/O.A./	99	Official Action (translation only) for Korean Patent Application No. 10-2007-7008270, mailed Jun. 30, 2011 (Attorney Ref. No. 6936-54-PKR)
/O.A./	100	Notice of Allowance (including translation) for Korean Patent Application No. 10-2007-7008270, mailed March 29, 2012 (Attorney Ref. No.: 6936-54-PKR)
/O.A./	101	Official Action (translation only) for Korean Patent Application No. 10-2010-7022463, mailed Jun. 30, 2011 (Attorney Ref. No. 6936-54-PKR-DIV)
/O.A./	102	Notice of Allowance (including translation) for Korean Patent Application No. 10-2010-7022463, mailed March 29, 2012 (Attorney Ref. No.: 6936-54-PKR-DIV)
/O.A./	103	Official Action (including translation) for Japanese Patent Application No. 2007-535818, dispatched Jul. 11, 2011 (Attorney Ref. No. 6936-54-PJP)
	104	~~Notice of Allowance for Japanese Patent Application No. 2007-535818, dispatched Dec. 12, 2011 (Attorney Ref. No. 6936-54-PJP)~~ Not in English Language
/O.A./	105	Official Action (including translation) for Japanese Patent Application No. 2008-264540, dispatched Jul. 11, 2011 (Attorney Ref. No. 6936-54-PJP-DIV)
	106	~~Official Action (including translation) for Japanese Patent Application No. 2008-264540, dispatched Dec. 12, 2011 (Attorney Ref. No. 6936-54-PJP-DIV)~~ Not in English
/O.A./	107	Notice of Allowance for Japanese Patent Application No. 2008-264540, mailed March 26, 2012 (Attorney Ref. No.: 6936-54-PJP-DIV)
/O.A./	108	Invitation to Pay Additional Fees (including partial international search report) for International (PCT) Patent Application No. PCT/US2007/066522, mailed Feb. 6, 2008 (Attorney Ref. No. 6936-57-PCT)
/O.A./	109	International Search Report for International (PCT) Patent Application No. PCT/US2007/066522, mailed Apr. 14, 2008 (Attorney Ref. No. 6936-57-PCT)

Examiner Signature	/Osman Alshack/	Date Considered	01/27/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	7	of	10	Attorney Docket Number	6936-57-PUS-CON-2

/O.A./	110	Written Opinion for International (PCT) Patent Application No. PCT/US2007/066522, mailed Apr. 14, 2008 (Attorney Ref. No. 6936-57-PCT)
/O.A./	111	International Preliminary Report on Patentability for International (PCT) Patent Application No. PCT/US2007/066522, mailed Oct. 23, 2008 (Attorney Ref. No. 6936-57-PCT)
/O.A./	112	Examiner's First Report on Australian Patent Application No. 2007257055, mailed Mar. 30, 2010 (Attorney Ref. No. 6936-57-PAU)
/O.A./	113	Official Action (including translation) for Chinese Patent Application No. 200780012891.0, dispatched Mar. 16, 2011 (Attorney Ref. No. 6936-57-PCN)
/O.A./	114	Notification of the Second Office Action (including translation) for Chinese Patent Application No. 200780012891.0, dispatched March 7, 2012 (Attorney Ref. No.: 6936-57-PCN)
/O.A./	115	Notification of the Second Office Action (including translation) for Chinese Patent Application No. 200780012891.0, dispatched Dec. 12, 2012 (Attorney Ref. No.: 6936-57-PCN)
/O.A./	116	Official Action for Columbian Patent Application No. 08-109-377, dated Nov. 5, 2010 (Attorney Ref. No. 6936-57-PCO)
	117	~~Examination Report for European Patent Application No. 07811844.5, mailed Apr. 1, 2009 (Attorney Ref. No. 6936-57-PEP)~~ Not in English Language
/O.A./	118	Official Action for European Patent Application No. 07811844.5, dated Jul. 9, 2010 (Attorney Ref. No. 6936-57-PEP)
/O.A./	119	Official Action for European Patent Application No. 07811844.5, dated Dec. 21, 2010 (Attorney Ref. No. 6936-57-PEP)
/O.A./	120	Official Action for European Patent Application No. 07811844.5, dated Dec. 18, 2012 (Attorney Ref. No. 6936-57-PEP)
/O.A./	121	European Search Report and Opinion for European Patent Application No. 10000017.3, dated Mar. 17, 2010 (Attorney Ref. No. 6936-57-PEP-DIV)
/O.A./	122	Official Action for European Patent Application No. 10000017.3, dated Nov. 3, 2010 (Attorney Ref. No. 6936-57-PEP-DIV)
/O.A./	123	Official Action for European Patent Application No. 10000017.3, dated Nov. 20, 2013 (Attorney Ref. No. 6936-57-PEP-DIV)
/O.A./	124	European Search Report and Opinion for European Patent Application No. 10000016.5, dated Mar. 3, 2010 (Attorney Ref. No. 6936-57-PEP-DIV-2)
/O.A./	125	Official Action for European Patent Application No. 10000016.5, dated Nov. 3, 2010 (Attorney Ref. No. 6936-57-PEP-DIV-2)

Examiner Signature	/Osman Alshack/	Date Considered	01/27/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	8	of	10	Attorney Docket Number	6936-57-PUS-CON-2

/O.A./	126	Official Action for European Patent Application No. 10000016.5, dated Dec. 22, 2011 (Attorney Ref. No. 6936-57-PEP-DIV-2)
/O.A./	127	Communication Under Rule 71(3) EPC - Intention to Grant for European Patent Application No. 10000016.5, dated Dec. 18, 2012 (Attorney Ref. No. 6936-57-PEP-DIV-2)
/O.A./	128	Decision to Grant a European Patent Pursuant to Article 97(1) EPC for European Patent Application No. 10000016.5, dated May 31, 2013 (Attorney Ref. No. 6936-57-PEP-DIV-2)
/O.A./	129	Official Action for Japanese Patent Application No. 2009-505623, dispatched Apr. 4, 2011 (Attorney Ref. No. 6936-57-PJP)
/O.A./	130	Official Action (including translation) for Japanese Patent Application No. 2009-505623, dispatched Oct. 31, 2011 (Attorney Ref. No. 6936-57-PJP)
/O.A./	131	Official Action for Japanese Patent Application No. 2010-017356, dispatched Apr. 18, 2011 (Attorney Ref. No. 6936-57-PJP-DIV)
/O.A./	132	Official Action (including translation) for Japanese Patent Application No. 2010-017356, dispatched Aug. 29, 2011 (Attorney Ref. No. 6936-57-PJP-DIV)
	133	~~Decision of Final Rejection for Japanese Patent Application No. 2010-017356, dispatched April 23, 2013 (Attorney Ref. No.: 6936-57-PJP-DIV).~~ Not in Einglish language
/O.A./	134	Official Action for Japanese Patent Application No. 2012-042978, dispatched June 3, 2013 (Attorney Ref. No.: 6936-57-PJP-DIV-2)
/O.A./	135	Official Action for Korean Patent Application No. 10-2008-7024792, mailed Aug. 29, 2013 (Attorney Ref. No.: 6936-57-PKR)
/O.A./	136	Official Action (including translation) for Mexican Patent Application No. MX/a/2008/012505, dated Apr. 22, 2010 (Attorney Ref. No. 6936-57-PMX)
/O.A./	137	Official Action (including translation) for Mexican Patent Application No. MX/a/2008/012505, dated Aug. 9, 2011 (Attorney Ref. No. 6936-57-PMX)
/O.A./	138	Official Notification of Intent to Grant (including translation) for Mexican Patent Application No. MX/a/2008/012505, mailed April 3, 2012 (Attorney Ref. No.: 6936-57-PMX)
/O.A./	139	Official Action (including translation) for Mexican Patent Application No. MX/a/2011/005751, dated June 6, 2013 (Attorney Ref. No. 6936-57-PMX-DIV)
/O.A./	140	Official Action for U.S. Patent Application No. 11/246,163, mailed Feb. 24, 2009 (Attorney Ref. No. 6936-54)
/O.A./	141	Official Action for U.S. Patent Application No. 11/246,163, mailed Dec. 9, 2009 (Attorney Ref. No. 6936-54)

Examiner Signature	/Osman Alshack/	Date Considered	01/27/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	9	of	10	Attorney Docket Number	6936-57-PUS-CON-2

/O.A./	142	Notice of Allowability for U.S. Patent Application No. 11/246,163, mailed Sep. 7, 2010 (Attorney Ref. No. 6936-54)
/O.A./	143	Notice of Allowability for U.S. Patent Application No. 12/761,586, mailed Oct. 6, 2010 (Attorney Ref. No. 6936-54-CON)
/O.A./	144	Notice of Allowability for U.S. Patent Application No. 12/853,020, mailed Oct. 6, 2010 (Attorney Ref. No. 6936-54-CON-2)
/O.A./	145	Official Action for U.S. Patent Application No. 12/901,699, mailed Jan. 6, 2012 (Attorney Ref. No. 6936-54-CON-3)
/O.A./	146	Notice of Allowance for U.S. Patent Application No. 12/901,699, mailed July 27, 2012 (Attorney Ref. No. 6936-54-CON-3)
/O.A./	147	Official Action for U.S. Patent Application No. 13/567,261, mailed Sept. 28, 2012 (Attorney Ref. No.: 6936-54-CON-4)
/O.A./	148	Notice of Allowance for U.S. Patent Application No. 13/567,261, mailed May 21, 2013 (Attorney Ref. No.: 6936-54-CON-4)
/O.A./	149	Official Action for U.S. Patent Application No. 13/942,938, mailed Sept. 25, 2013 (Attorney Ref. No.: 6936-54-CON-5)
/O.A./	150	Notice of Allowance for U.S. Patent Application No. 13/942,938, mailed Oct. 8, 2013 (Attorney Ref. No.: 6936-54-CON-5)
/O.A./	151	Official Action for U.S. Patent Application No. 12/295,828, mailed Jan. 5, 2012 (Attorney Ref. No. 6936-57-PUS)
/O.A./	152	Notice of Allowance for U.S. Patent Application No. 12/295,828, mailed August 17, 2012 (Attorney Ref. No.: 6936-57-PUS)
/O.A./	153	Notice of Allowance for U.S. Patent Application No. 12/783,758, mailed December 26, 2012 (Attorney Ref. No.: 6936-57-PUS-CON)
/O.A./	154	Official Action for U.S. Patent Application No. 13/766,059, mailed Oct. 2, 2013 (Attorney Ref. No.: 6936-57-PUS-CON-2)
/O.A./	155	Notice of Allowance for U.S. Patent Application No. 13/766,059, mailed Nov. 25, 2013 (Attorney Ref. No.: 6936-57-PUS-CON-2)
/O.A./	156	Official Action for U.S. Patent Application No. 12/760,728, mailed April 27, 2012 (Attorney Ref. No.: 6936-57-PUS-DIV)
/O.A./	157	Official Action for U.S. Patent Application No. 12/760,728, mailed Jan. 2, 2013 (Attorney Ref. No.: 6936-57-PUS-DIV)

Examiner Signature	/Osman Alshack/	Date Considered	01/27/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	
				Examiner Name	
Sheet	10	of	10	Attorney Docket Number	6936-57-PUS-CON-2

/O.A./	158	Official Action for U.S. Patent Application No. 12/760,728, mailed June 20, 2013 (Attorney Ref. No.: 6936-57-PUS-DIV)
/O.A./	159	Official Action for U.S. Patent Application No. 12/760,728, mailed Oct. 2, 2013 (Attorney Ref. No.: 6936-57-PUS-DIV)
/O.A./	160	Notice of Allowance for U.S. Patent Application No. 12/760,728, mailed Oct. 21, 2013 (Attorney Ref. No.: 6936-57-PUS-DIV)
/O.A./	161	Official Action for U.S. Patent Application No. 12/783,765, mailed May 17, 2012 (Attorney Ref. No. 6936-57-PUS-DIV-CON)
/O.A./	162	Official Action for U.S. Patent Application No. 12/783,765, mailed December 17, 2012 (Attorney Ref. No. 6936-57-PUS-DIV-CON)
/O.A./	163	Notice of Allowance for U.S. Patent Application No. 12/783,765, mailed May 9, 2013 (Attorney Ref. No. 6936-57-PUS-DIV-CON)

Examiner Signature	/Osman Alshack/	Date Considered	01/27/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015								
	1	-								
	2	-								
	3	-								
	4	-								
	5	-								
	6	-								
	7	-								
	8	-								
	9	-								
	10	-								
	11	-								
	12	-								
	13	-								
	14	-								
	15	-								
	16	-								
	17	-								
	18	-								
	19	-								
	20	-								
	21	-								
	22	-								
	23	-								
	24	-								
	25	-								
	26	-								
	27	-								
	28	-								
	29	-								
	30	-								
	31	-								
	32	-								
	33	-								
	34	-								
	35	-								
	36	-								

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015								
	37	-								
	38	-								
	39	-								
	40	-								
	41	-								
	42	-								
	43	-								
	44	-								
	45	-								
	46	-								
	47	-								
	48	-								
	49	-								
	50	-								
	51	-								
	52	-								
	53	-								
	54	-								
	55	-								
	56	-								
	57	-								
	58	-								
	59	-								
	60	-								
	61	-								
	62	-								
	63	-								
	64	-								
	65	-								
	66	-								
	67	-								
	68	-								
	69	-								
	70	-								
	71	-								
	72	-								

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 371 of 739

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015								
	73	-								
	74	-								
	75	-								
	76	-								
	77	-								
	78	-								
	79	-								
	80	-								
	81	-								
	82	-								
	83	-								
	84	-								
	85	-								
	86	-								
	87	-								
	88	-								
	89	-								
	90	-								
	91	-								
	92	-								
	93	-								
	94	-								
	95	-								
	96	-								
	97	-								
	98	-								
	99	-								
	100	-								
	101	-								
	102	-								
	103	-								
	104	-								
	105	-								
	106	✓								
	107	✓								
	108	✓								

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 372 of 739

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	**Art Unit**
	OSMAN ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015								
	109	✓								
	110	✓								
	111	✓								
	112	✓								
	113	✓								
	114	✓								
	115	✓								
	116	✓								
	117	✓								
	118	✓								
	119	✓								
	120	✓								
	121	✓								
	122	✓								
	123	✓								
	124	✓								
	125	✓								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

CPC- SEARCHED		
Symbol	Date	Examiner
H04L 1/1809, H04L 1/1812, H04L 1/1887, H04L 1/1819	01/23/2015	O.A
H04L 2001/0093, H04L 45/302, H04L 47/6215	01/23/2015	O.A

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
714	748, 749, 776	01/23/2015	O.A

SEARCH NOTES		
Search Notes	Date	Examiner
East Inventor search	01/23/2015	O.A
East text search	01/23/2015	O.A

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

/OSMAN ALSHACK/ Examiner, Art Unit 2112	

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	Osman Alshack
Sheet	1	of	1	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

UNPUBLISHED U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] (if known)	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
/O.A./	1	Examiner's Report for Canadian Patent Application No. 2,647,589, mailed December 16, 2013 (Attorney Ref. No.: 6936-57-PCA)
/O.A./	2	Notice of Allowance for Japanese Patent Application No. 2012-042978, dispatched Feb. 17, 2014 (Attorney Ref. No.: 6936-57-PJP-DIV-2)

Examiner Signature	/Osman Alshack/	Date Considered	01/23/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 3369

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
14/159,125	01/20/2014 RULE	714	2112	6936-57-PUS-CON-3

APPLICANTS

TQ DELTA, LLC, Austin, TX, Assignee (with 37 CFR 1.172 Interest);

INVENTORS

Marcos C. Tzannes, Alamo, CA;

**** CONTINUING DATA ***************************

This application is a CON of 13/766,059 02/13/2013 PAT 8645784
which is a CON of 12/783,758 05/20/2010 PAT 8407546
which is a CON of 12/295,828 10/02/2008 PAT 8335956
which is a 371 of PCT/US2007/066522 04/12/2007
which claims benefit of 60/849,650 10/05/2006
and claims benefit of 60/792,236 04/12/2006

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

02/03/2014

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /OSMAN M ALSHACK/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		CA	5	8	1

ADDRESS

Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202
UNITED STATES

TITLE

PACKET RETRANSMISSION AND MEMORY SHARING

FILING FEE RECEIVED		
2000	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

BIB (Rev. 05/07).

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"14159125"	US-PGPUB; USPAT	OR	OFF	2015/01/21 11:11
S2	103	((Marcos) near2 (Tzannes)).INV.	USPAT; USOCR	OR	OFF	2015/01/21 11:14
S3	2	(retransmi$5 resend$3)near3((packet block group set package chunk)near3 type)with(first original primary second$3)same((per latency)near2 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:19
S4	3	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)with(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:23
S5	13	(transmi$5 transceiv$3 retransmi$5 resend$3)same((packet block group set package chunk)near3 type)same(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:24
S6	117	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:27
S7	0	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)same((per and latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:28
S8	3	S2 and S6	US-PGPUB; USPAT	OR	ON	2015/01/21 12:46
S9	3	S2 and (transmi$5 transceiv$3 retransmi$5 resend$3)same(packet block group set package chunk)same(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:54
S10	17	S2 and (transmi$5 transceiv$3 retransmi$5 resend$3)same(packet block group set package chunk)same(first original primary second$3)and((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:55

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 377 of 739

S11	32	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)and((per and latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:56
S12	17	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)same(identif$7 indicat$3 determin$3)and((per and latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:08
S13	13	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)with(buffer stor$3 memory)same(identif$7 indicat$3 determin$3)and((per and latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:11
S14	26	("2004/0179494").URPN.	USPAT	OR	OFF	2015/01/21 13:19
S15	1	S14 and(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)and((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:20
S16	4737	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)with(identif$7 indicat$3 determin$3)and((per error latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:38
S17	74538	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:39
S18	1496	(low-per low adj per)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:40
S19	32050	(low-latency low adj latency)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:40
S20	41	S18 and S19	US-PGPUB; USPAT	OR	ON	2015/01/21 13:40
S21	12	S17 and S20	US-PGPUB; USPAT	OR	ON	2015/01/21 13:41
S22	35	(transmi$5 transceiv$3 retransmi$5 resend$3)same(packet block group set package chunk)same(first original primary second$3)and(identif$7 indicat$3 determin$3)same((per and latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:47
S23	129	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)near3(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:50
S24	81	(transmi$5 transceiv$3 retransmi$5	US-PGPUB;	OR	ON	2015/01/21

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 378 of 739

		resend$3)with((packet block group set package chunk)near3 type)near(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	USPAT			13:51
S25	24	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near type)near(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:52
S26	39	(transmi$5 transceiv$3 retransmi$5 resend$3)near2((packet block group set package chunk frame)near2 type)near2(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:58
S27	1	("5524116").PN.	US-PGPUB; USPAT	OR	OFF	2015/01/21 14:27
S28	1	(14/075194).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 14:29
S29	1	(14/081469).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 14:31
S30	4	S2 and (transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near3 type)with(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 14:33
S31	20962	packet near2 identifier	US-PGPUB; USPAT	OR	ON	2015/01/21 14:49
S32	99	S31 with(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near3 type)with(first original primary second$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 14:51
S33	389	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near2 type)near2(identif$7 indicat$3 determin$3)with(buffer stor$3 memory)	US-PGPUB; USPAT	OR	ON	2015/01/21 14:57
S34	129524	(Quality near2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/01/21 15:00
S35	75	S33 and S34	US-PGPUB; USPAT	OR	ON	2015/01/21 15:00
S36	22753	(Quality near2 Service QOS)and((per error rat$3 latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 15:06
S37	1301	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near3 type)with(identif$7 indicat$3 determin$3)with(buffer stor$3 memory)	US-PGPUB; USPAT	OR	ON	2015/01/21 15:06
S38	65	S36 and S37	US-PGPUB; USPAT	OR	ON	2015/01/21 15:07

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 379 of 739

S39	84	(Quality near2 Service QOS)same(low high)near3(delay late$3)same((error data bit loss)near2 rate)same(identif$7 indicat$3 determin$3)and(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)near2(video voice data information bit$1)	US-PGPUB; USPAT	OR	ON	2015/01/21 16:20
S40	7	(Quality near2 Service QOS)same(low high)near3(delay late$3)same((error data bit loss)near2 rate)same(identif$7 indicat$3 determin$3 ID)same(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)near2(video voice data information bit$1)	US-PGPUB; USPAT	OR	ON	2015/01/21 16:31
S41	2	(10/696507).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 17:01
S42	2	(10/901940).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 17:03
S43	4	(Quality near2 Service QOS)with(identif$7 indicat$3 determin$3)with(packet block group set package chunk)near2(video voice data information bit$1)same(low high)near3(delay late$3)same((error data bit loss)near2 rate)	US-PGPUB; USPAT	OR	ON	2015/01/21 17:14
S44	201	(Quality near2 Service QOS)with(identif$7 indicat$3 determin$3)with(packet block group set package chunk)near2(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near2 rate)	US-PGPUB; USPAT	OR	ON	2015/01/21 17:16
S45	2524	714/748.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/21 17:31
S46	967	714/749.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/21 17:31
S47	1	S44 and S45	US-PGPUB; USPAT	OR	ON	2015/01/21 17:32
S48	0	S44 and S46	US-PGPUB; USPAT	OR	ON	2015/01/21 17:32
S49	16	("20010025239" | "20030133462" | "20040072541" | "20050141480" | "20060002465" | "20060095944" | "20060168133" | "20070009015" | "20070217339" | "20080101476" | "20080225983" | "20090034610" | "6856756" | "7292553" | "7706384" | "7782779").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2015/01/21 17:34
S50	25	(Customer with Premises)and(digital with signal with prosessor DSP)and(integrated with ciruit ASIC)and linecard	US-PGPUB; USPAT; USOCR	OR	ON	2015/01/21 17:59
S51	185383	packet$1 near2 $2transmi$5	US-PGPUB; USPAT	OR	ON	2015/01/22 09:06
S54	107	(Quality near2 Service QOS)same((packet block group set	US-PGPUB; USPAT	OR	ON	2015/01/22 09:09

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 380 of 739

		payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)				
S55	68	S51 and S54	US-PGPUB; USPAT	OR	ON	2015/01/22 09:09
S56	17	S51 same S54	US-PGPUB; USPAT	OR	ON	2015/01/22 09:09
S57	1	(Quality near2 Service QOS)same(first original primary)near3((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:24
S58	6	(Quality near2 Service QOS)and(first original primary)near3((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:27
S59	15	(Quality near2 Service QOS)and(first original primary)with((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:27
S62	19	(first original primary)near2((packet block group set payload frame)near2 type)near2(identif$7 indicat$3 determin$3)and(Quality near2 Service QOS)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:42
S63	1250	H04L1/1809.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:50
S64	2991	H04L1/1812.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:50
S65	2252	H04L1/1887.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:51
S66	1569	H04L1/1819.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:51
S67	2107	H04L2001/0093.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:51
S71	3061	H04L12/5601.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 10:02
S72	0	S54 and S63	US-PGPUB; USPAT	OR	ON	2015/01/22 10:03
S73	0	S54 and S64	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 381 of 739

S74	4	S54 and S65	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04
S75	0	S54 and S66	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04
S76	0	S54 and S67	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04
S77	1174	H04L45/302.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S78	1222	H04L47/6215.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S79	0	S54 and S77	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S80	1	S54 and S78	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S83	457	packet$1 near2 $2transmi$5 with(second$3 near2 packet)with(stor$3 retain$3)with(buffer memory)	US-PGPUB; USPAT	OR	OFF	2015/01/22 11:44
S84	80	packet$1 near2 $2transmi$5 with(second$3 near2 packet)near2(stor$3 retain$3)near2(buffer memory)	US-PGPUB; USPAT	OR	OFF	2015/01/22 11:45
S87	29	retransmi$5 same(second$3 with type with packet)same(stor$3 retain$3)same(buffer memory storage)	US-PGPUB; USPAT	OR	OFF	2015/01/22 11:47
S89	1	(Quality near2 Service QOS)with(identif$7 indicat$3 determin$3)with((packet block group set)near type)near(second$3)and(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near2 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 13:40
S90	393	"5524116" "5663910" "5898698" "5983382" "6098188" "6775320" "6778589" "6337877" "6496481" "6707822" "6778596" "6826589" "7200792" "7164654" "7174493" "7519124" "7600172" "7657818" "7764595" "7782758" "7831890" "7844882" "7836381" "8074138" "8149904" "8276048" "8335956" "8407546" "8468411" "8495473" "8595577" "8607126" "8645784" 2001/0014962	US-PGPUB; USPAT	OR	ON	2015/01/22 17:51
S92	33	("5524116" | "5663910" | "5898698" | "5983382" | "6098188" | "6775320" | "6778589" | "6337877" | "6496481" | "6707822" | "6778596" | "6826589" | "7200792" | "7164654" | "7174493" | "7519124" | "7600172" | "7657818" | "7764595" | "7782758" | "7831890" | "7844882" | "7836381" | "8074138" | "8149904" | "8276048" | "8335956" | "8407546" | "8468411" | "8495473" | "8595577" | "8607126" | "8645784" | " 2001/0014962").PN.	US-PGPUB; USPAT	OR	ON	2015/01/22 17:55
S94	13	("20020087710" | " 20020126675 " | "20020154600 " | "20030067877 " | "200310076870" | " 20040114536 " |	US-PGPUB; USPAT	OR	ON	2015/01/22 18:01

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 382 of 739

		"2004/0148552" | " 20040196786 " | "20040203455" | " 20050180323" | " 20060092871 " | "200610236045 " | "20070198898" | " 20070263528 " | "20080212582 " | "20100061376").PN.				
S95	46	S92 or S94	US-PGPUB; USPAT	OR	ON	2015/01/22 18:03
S96	11	S93 and S95	US-PGPUB; USPAT	OR	ON	2015/01/22 18:04
S97	10	S95 and (Quality near2 Service QOS)and((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/22 18:06
S98	11	S95 and (Quality near2 Service QOS)and((packet block group set payload frame)near5 type)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/22 18:11
S99	27	(packet adj transfer adj mode adj transmission adj convergence PTM-TC PTMTC PTM adj TC)	US-PGPUB; USPAT	OR	ON	2015/01/22 19:13
S100	1614	714/776.ccls.	US-PGPUB; USPAT	OR	OFF	2015/01/23 10:24
S101	185383	packet$1 near2 $2transmi$5	US-PGPUB; USPAT	OR	ON	2015/01/23 10:25
S102	107	(Quality near2 Service QOS)same((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/23 10:25
S103	68	S101 and S102	US-PGPUB; USPAT	OR	ON	2015/01/23 10:25
S104	0	S100 and S102	US-PGPUB; USPAT	OR	ON	2015/01/23 10:26
S105	0	S100 and S103	US-PGPUB; USPAT	OR	ON	2015/01/23 10:26
S106	0	S100 and (Quality near2 Service QOS)and((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/23 10:26
S107	368	(packet block frame set group)near3(second$3 next another other)with(stor$3 retain$3 accumulat$3)with(buffer memory storage)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:33
S108	79	(packet block frame set group)near3(second$3 next another other)with(stor$3 retain$3 accumulat$3)with(buffer memory storage)near2(retransmi$5 re-	US-PGPUB; USPAT	OR	ON	2015/01/23 14:34

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 383 of 739

		transmi$5 resend$3 re-send$3)				
S109	1	(packet block frame set group)near3((second$3 next another other)near2 type)with(stor$3 retain$3 accumulat$3)with(buffer memory storage)near2(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:34
S110	232	(head$3 field portion sector)with(packet block frame set group)near3(second$3 next another other)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:39
S111	93	(head$3 field portion sector)near3(packet block frame set group)near3(second$3 next another other)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:50
S112	16	(head$3 field portion sector)with(packet block frame set group)near3((second$3 next another other)near2 type)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:52
S113	22	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 15:07
S114	44	(head$3 field portion sector)and(packet block frame set group payload stream)and(second$3 next another other type)and(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:10
S115	41	(head$3 field portion sector)and(packet block frame set group payload stream)and(second$3 next another other type)same(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:11
S116	40	(head$3 field portion sector)and(packet block frame set group payload stream)same(second$3 next another other type)same(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:11
S117	38	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:11
S118	33	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(identif$7	EPO; JPO	OR	ON	2015/01/23 15:11

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 384 of 739

		indicat$3 determin$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)				
S119	107	(head$3 field portion sector)and(packet block frame set group payload stream)and((second$3 next another other)near2 type)and(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	USOCR; FPRS; DERWENT; IBM_TDB	OR	ON	2015/01/23 15:15
S120	10	(head$3 field portion sector)same(packet block frame set group payload stream)same((second$3 next another other)near2 type)same(identif$7 indicat$3 determin$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	USOCR; FPRS; DERWENT; IBM_TDB	OR	ON	2015/01/23 15:15
S121	57	(head$3 field portion sector)same(packet block frame set group payload stream)same((second$3 next another other)near2 type)same(count$3 identif$7 indicat$3 determin$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:11
S122	27	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:33
S123	2718	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:33
S124	58403	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S125	23	S123 with S124	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S126	25	S123 same S124	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S127	198	S123 and S124	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S128	25	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)same(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$4)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:42
S129	27	(retransmi$5 re-transmi$5 resend$3 re-send$3)same(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3	US-PGPUB; USPAT	OR	ON	2015/01/26 12:43

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 385 of 739

		determin$3 control$4)				
S130	77	(retransmi$5 re-transmi$5 resend$3 re-send$3)same2(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other two)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$4)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:46
S131	98	(head$3 field portion sector)near2(packet block frame set group payload stream)near2((second$3 next another other)near2 type)near2(count$3 identif$7 indicat$3 determin$3 control$4)	US-PGPUB; USPAT	OR	ON	2015/01/26 13:22
S132	24	S124 and S131	US-PGPUB; USPAT	OR	ON	2015/01/26 13:24
S133	1	(head$3 field portion sector)near2(packet block frame set group payload stream)near2((second$3 next another other)near2 type)near2(count$3 identif$7 indicat$3 determin$3 control$4)	EPO; JPO	OR	ON	2015/01/26 13:32
S134	76	(head$3 field portion sector)and(packet block frame set group payload stream)and(second$3 next another other type)and(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:33
S135	74	(head$3 field portion sector)same(packet block frame set group payload stream)and(second$3 next another other type)and(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S136	68	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)and(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S137	61	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S138	52	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(count$3 identif$7 indicat$3 determin$3 control$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S139	44	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3	EPO; JPO	OR	ON	2015/01/26 13:34

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 386 of 739

		next another other)same(count$3 identif$7 indicat$3 determin$3 control$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)				
S140	28	(head$3 field portion sector)near2(packet block frame set group payload stream)near2(second$3 next another other)near2(count$3 identif$7 indicat$3 determin$3 control$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 13:39
S141	73	(head$3 field portion sector)near2(packet block frame set group payload stream)near2(second$3 next another other)near2(count$3 identif$7 indicat$3 determin$3 control$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:03
S142	17	(head$3 field portion sector)near2(packet block frame set group payload stream)near2(second$3 next another other)near2((count$3 identif$7 indicat$3 determin$3 control$4)near2 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:08
S143	42	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(head$3 field portion sector)with(packet block frame set group payload stream)with(second$3 next another other)with(count$3 identif$7 indicat$3 determin$3 control$4)with(exclude$3 or separate$3 or avoid$3 or discard$3 or remov$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:22
S144	20	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(head$3 field portion sector)with(packet block frame set group payload stream)with(second$3 next another other)with(count$3 identif$7 indicat$3 determin$3 control$4)with(exclud$3 or avoid$3 or discard$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:35
S145	11551	370/389.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/26 16:08
S146	2182	370/394.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/26 16:08
S147	23	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 16:10
S148	4	S145 and S147	US-PGPUB; USPAT	OR	ON	2015/01/26 16:10
S149	1	S146 and S147	US-PGPUB; USPAT	OR	ON	2015/01/26 16:10
S150	33	("5524116" | "5663910" | "5898698" | "5983382" | "6098188" | "6775320" | "6778589" | "6337877" | "6496481" |	US-PGPUB; USPAT	OR	ON	2015/01/26 18:15

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 387 of 739

		"6707822" | "6778596" | "6826589" | "7200792" | "7164654" | "7174493" | "7519124" | "7600172" | "7657818" | "7764595" | "7782758" | "7831890" | "7844882" | "7836381" | "8074138" | "8149904" | "8276048" | "8335956" | "8407546" | "8468411" | "8495473" | "8595577" | "8607126" | "8645784" | " 2001/0014962").PN.				
S151	13	("20020087710" | " 20020126675 " | "20020154600 " | "20030067877 " | "200310076870" | " 20040114536 " | "2004/0148552" | " 20040196786 " | "20040203455" | " 20050180323" | " 20060092871 " | "200610236045 " | "20070198898" | " 20070263528 " | "20080212582 " | "20100061376").PN.	US-PGPUB; USPAT	OR	ON	2015/01/26 18:15
S152	46	S150 or S151	US-PGPUB; USPAT	OR	ON	2015/01/26 18:15
S153	28	S152 and (retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/26 18:16
S154	33	("5524116" | "5663910" | "5898698" | "5983382" | "6098188" | "6775320" | "6778589" | "6337877" | "6496481" | "6707822" | "6778596" | "6826589" | "7200792" | "7164654" | "7174493" | "7519124" | "7600172" | "7657818" | "7764595" | "7782758" | "7831890" | "7844882" | "7836381" | "8074138" | "8149904" | "8276048" | "8335956" | "8407546" | "8468411" | "8495473" | "8595577" | "8607126" | "8645784" | " 2001/0014962").PN.	US-PGPUB; USPAT	OR	ON	2015/01/27 10:45
S155	13	("20020087710" | " 20020126675 " | "20020154600 " | "20030067877 " | "200310076870" | " 20040114536 " | "2004/0148552" | " 20040196786 " | "20040203455" | " 20050180323" | " 20060092871 " | "200610236045 " | "20070198898" | " 20070263528 " | "20080212582 " | "20100061376").PN.	US-PGPUB; USPAT	OR	ON	2015/01/27 10:45
S156	46	S154 or S155	US-PGPUB; USPAT	OR	ON	2015/01/27 10:45
S157	28	S156 and (count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)same(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/27 10:46
S158	23	S156 and (count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/27 10:47
S159	10	S156 and (count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)same(packet block frame set	US-PGPUB; USPAT	OR	ON	2015/01/27 10:59

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 388 of 739

		group payload stream)same (quality near2 service QoS)				
S160	46	("8850089" "4792753" "4807224" "4905225" "4914653" "4970714" "5339313" "5404353" "5430738" "5555266" "5664091" "5875292" "5905720" "6072726" "6073180" "6172983" "6278718" "6416471" "6493318" "6701370" "6728878" "6741554" "6763030" "6772375" "6788704" "7149192" "7277390" "7296204" "7346701" "7376426" "7412338" "7450599" "7596091" "7693070" "7701846" "7787368" "7821933" "7849208" "7885264" "7969901" "8023417" "8077601" "7885264" "7969901" "8023417" "8077601" "8151155" "8156407" "8228917" "8291034").pn.	US-PGPUB; USPAT	OR	ON	2015/01/27 14:01
S161	42	("4766591" "5444856" "5727149" RE36182 "6005851" "6021177" "6185427" "6278921" "6438585" "6477595" "6556582" "6701151" "6765891" "7058387" "7068610" "7099339" "7103313" "7116640" "7221268" "7260399" "7293289" "7328036" "7356614" "7395347" "7403514" "7593428" "7609747" "7639641" "7686520" "7734253" "7839824" "7945206" "8013732" "8024481" "8040917" "8045501" "8060419" "8060681" "8077702" "7945206" "8013732" "8024481" "8040917" "8045501" "8060419" "8060681" "8077702" "8149783" "8160000" "8228924").pn.	US-PGPUB; USPAT	OR	ON	2015/01/27 14:01
S162	8	S160 and (head$3 field portion sector)with(packet block frame set group payload stream)with(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:02
S163	0	S161 and (head$3 field portion sector)with(packet block frame set group payload stream)with(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:02
S164	2	S161 and (head$3 field portion sector)same(packet block frame set group payload stream)same(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:04

1/27/2015 2:06:12 PM
C:\Users\oalshack\Documents\EAST\Workspaces\14159125.wsp

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 389 of 739

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, Osman M
Sheet	1	of	1	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

UNPUBLISHED U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] (if known)	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
/O.A./	1	Official Action (including translation) for Korean Patent Application No. 10-2014-7005299 mailed April 4, 2014 (Attorney Ref. No.: 6936-57-PKR-DIV)

Examiner Signature	/Osman Alshack/	Date Considered	01/23/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/159,125	01/20/2014	Marcos C. Tzannes	6936-57-PUS-CON-3	3369

62574 7590 04/20/2015

Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

EXAMINER	
ALSHACK, OSMAN M	

ART UNIT	PAPER NUMBER
2112	

NOTIFICATION DATE	DELIVERY MODE
04/20/2015	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jvick@sheridanross.com

Applicant-Initiated Interview Summary	**Application No.**	**Applicant(s)**	
	14/159,125	TZANNES, MARCOS C.	
	Examiner	**Art Unit**	
	OSMAN ALSHACK	2112	

All participants (applicant, applicant's representative, PTO personnel):

(1) *OSMAN ALSHACK*.

(2) *Pierre Vital (SPE)*.

(3) *Samir Rizk (Primary Examiner)*.

(4) *Jason Vick (Reg. No.45,285)*.

Date of Interview: *04/08/2015*.

Type: ☐ Telephonic ☐ Video Conference
☒ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☒103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *106*.

Identification of prior art discussed: *Reference Plamnndon et al. (US. PN.2007/0206221) & Yoshimura et al.(US.PN. 2002/0126675)* .

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Applicant's attorney briefly explained the claimed invention, and discussed the reference Plamondon et al. (US. PN.2007/0206221). The applicant's attorney argued the reference Plamondon does not teach the two different type of packets. Examiner pointed out that paragraph [0008] of Plamondon teaches the two different packets. Also, the applicant's attorney argued the same reference does not teach the limitation of "wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet". Its appears that the reference does not teach this limitation. However, the Examiner will review the cited references, update the search, and reconsider upon filling of arguments and/or amendment.

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/OSMAN ALSHACK/ Examiner, Art Unit 2112	/ALBERT DECADY/ Supervisory Patent Examiner, Art Unit 2112

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of: Marcos C. Tzannes	)	Group Art Unit: 2112
Application No.: 14/159,125	)	Examiner: ALSHACK, Osman M.
Filed: January 20, 2014	)	Confirmation No.: 3369
Atty. File No.: 6936-57-PUS-CON-3	)	

For: PACKET RETRANSMISSION AND MEMORY SHARING

AMENDMENT AND RESPONSE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Madam:

Applicant submits this Amendment and Response to address the Office Action having a mailing date of February 6, 2015. Please credit any overpayment or charge any underpayment to Deposit Account No. 19-1970.

Please amend the above-identified patent application as follows:

Amendments to the Claims are shown in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 5 of this paper.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 394 of 739

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-105. (Cancelled)

106. (Currently Amended) A method of packet retransmission, in a transceiver, comprising:

transmitting, by the transceiver, a first type of packet; and

transmitting, by the transceiver, a second type of packet,

wherein the first type of packet is stored in a retransmission buffer after transmission and the second type of packet is not stored in a retransmission buffer after transmission,

wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and

wherein the header field of the first type of packet comprises a sequence identifier (SID) that is incremented after the first type of packet is transmitted and the header field of the second type of packet does not comprise the SID of the first type of packet.

107. (Previously Presented) The method of claim 106, wherein the transceiver is connected to a second transceiver using a wired or wireless channel and the transceivers are used to transport one or more of video and voice data.

108. (Previously Presented) The method of claim 106, wherein the method is performed in a linecard that is operable to transport video.

109. (Previously Presented) The method of claim 106, wherein the method is performed in a customer premises modem that is operable to transport video.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 395 of 739

110. (Previously Presented) The method of claim 106, wherein the transceiver includes at least one digital signal processor.

111. (Previously Presented) The method of claim 106, wherein the transceiver includes at least one ASIC (Application Specific Integrated Circuit).

112. (Currently Amended) The method of claim 106, wherein the first type of packet comprises one or more PTM-TC (Packet Transfer Mode - Transmission Convergence) codewords.

113. (Currently Amended) The method of claim 106, wherein the first type of packet comprises one or more ATM (Asynchronous Transfer Mode) cells.

114. (Previously Presented) The method of claim 106, wherein the first type of packet comprises one or more Reed Solomon codewords.

115. (Currently Amended) The method of claim 106, wherein the first type of packet is a low-PER (Packet Error Rate) packet and the second type of packet is a low-latency packet.

116. (Previously Presented) A transceiver operable to transmit a first type of packet and to transmit a second type of packet, wherein the first type of packet is stored in a retransmission buffer after transmission and the second type of packet is not stored in a retransmission buffer after transmission, and wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and wherein the header field of the first type of packet comprises a sequence identifier (SID) that is incremented after the first type of packet is transmitted and the header field of the second type of packet does not comprise the SID of the first type of packet.

117. (Previously Presented) The transceiver of claim 116, wherein the transceiver is connected to a second transceiver using a wired or wireless channel and the transceivers are used to transport one or more of video and voice data.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 396 of 739

118. (Previously Presented) The transceiver of claim 116, wherein the transceiver is located in a linecard that is operable to transport video.

119. (Previously Presented) The transceiver of claim 116, wherein the transceiver is located in a customer premises modem that is operable to transport video.

120. (Previously Presented) The transceiver of claim 116, wherein the transceiver includes at least one digital signal processor.

121. (Previously Presented) The transceiver of claim 116, wherein the transceiver includes at least one ASIC (Application Specific Integrated Circuit).

122. (Currently Amended) The transceiver of claim 116, wherein the first type of packet comprises one or more PTM-TC (Packet Transfer Mode - Transmission Convergence) codewords.

123. (Currently Amended) The transceiver of claim 116, wherein the first type of packet comprises one or more ATM (Asynchronous Transfer Mode) cells.

124. (Previously Presented) The transceiver of claim 116, wherein the first type of packet comprises one or more Reed Solomon codewords.

125. (Currently Amended) The transceiver of claim 116, wherein the first type of packet is a low-PER (Packet Error Rate) packet and the second type of packet is a low-latency packet.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 397 of 739

REMARKS

Applicant respectfully requests reconsideration of this application as amended.

Applicant would like to thank Ex. Alshack and his colleagues for the courtesies extended during the 8 April Interview. During the Interview, an overview of the claimed technology was provided and contrasted with the Plamondon and Yoshimura references. The Examiners agree the claims were distinguishable from the references and that an updated search would need to be performed.

By the above amendments, the rejection under 35 U.S.C. §112 has been addressed. Withdrawal of the rejection is respectfully requested.

Based on the agreement during the interview, Applicant respectfully submits the rejection of claims 106-125 under 35 U.S.C. §103 has been overcome. Withdrawal of the rejection is respectfully requested.

With all rejections having been overcome, Applicant respectfully submits the application is in condition for allowance.

A prompt notice of allowance is respectfully solicited.

Should the Examiner believe anything further is desirable in order to place the application in even better condition for allowance, the Examiner is encouraged to contact Applicants undersigned representative at the telephone number listed below.

The Commissioner is hereby authorized to charge to deposit account number 19-1970 any fees under 37 CFR § 1.16 and 1.17 that may be required by this paper and to credit any overpayment to that Account. If any extension of time is required in connection with the filing of this paper and has not been separately requested, such extension is hereby Petitioned.

Respectfully submitted,

SHERIDAN ROSS P.C.

Date: April 23, 2015

By: /Jason H. Vick/

Jason H. Vick, Reg. No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202
Telephone: 303-863-9700

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 398 of 739

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:	)	Group Art Unit: 2112
Marcos C. Tzannes	)	Confirmation No.: 3369
Serial No.: 14/159,125	)	Examiner: ALSHACK, Osman M.
Filed: January 20, 2014	)	SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT
Atty. File No.: 6936-57-PUS-CON-3	)	
Entitled: "PACKET RETRANSMISSION AND MEMORY SHARING"	)	Electronically Submitted

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The references cited on attached Form PTO-1449 are being called to the attention of the Examiner.

☒ Copies of the cited non-patent and/or foreign references are enclosed herewith.

☐ Copies of the cited U.S. patents and/or patent applications are enclosed herewith.

☒ Copies of the cited U.S. patents/unpublished patent applications/patent application publications are not enclosed in accordance with 37 C.F.R. § 1.98(a).

☐ Copies of the cited references are not enclosed, in accordance with 37 C.F.R. § 1.98(d), because the references were cited by or submitted to the U.S. Patent and Trademark Office in prior application Serial No. _____ filed _____, which is relied upon for an earlier filing date under 35 U.S.C. § 120.

☒ To the best of applicants' belief, the pertinence of the foreign-language references are believed to be summarized in the attached English translation/abstracts and/or in the figures, although applicants do not necessarily vouch for the accuracy of the translation.

☐ Examiner's attention is drawn to the following related applications:

- Serial No. _____ filed _____(Attorney Ref. No. _____)

☐ Other:_____

Submission of the above information is not intended as an admission that any item is citable under the statutes or rules to support a rejection, that any item disclosed represents analogous art, or that those skilled in the art would refer to or recognize the pertinence of any reference without the benefit of hindsight, nor should an inference be drawn as to the pertinence of the references based on the order in which they are presented.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 399 of 739

Submission of this statement should not be taken as an indication that a search has been conducted, or that no better art exists.

It is respectfully requested that the cited information be expressly considered during the prosecution of this application and the references made of record therein.

FEES

☐	**37 CFR 1.97(b)**: No fee is believed due in connection with this submission, because the information disclosure statement submitted herewith is satisfied by one of the following conditions ("X" indicates satisfaction): ☐ Within three months of the filing date of a national application other than a continued prosecution application under 37 CFR 1.53(d), or ☐ Within three months of the date of entry into the national stage of an international application as set forth in 37 CFR 1.491 or ☐ Before the mailing date of a first Office Action on the merits, or ☐ Before the mailing of a first Office action after the filing of a request for continued examination under 37 CFR 1.114. Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970.
☒	**37 CFR 1.97(c)**: The information disclosure statement transmitted herewith is being filed after all the above conditions (37 CFR 1.97(b)), but before the mailing date of one of the following conditions: (1) a final action under 37 C.F.R. 1.113 or (2) a notice of allowance under 37 C.F.R. 1.311, or (3) an action that otherwise closes prosecution in the application. This Information Disclosure Statement is accompanied by: ☐ A Certification (below) as specified by 37 C.F.R. 1.97(e). Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970. OR ☒ Please charge Deposit Account 19-1970 in the amount of $180.00 for the fee set forth in 37 C.F.R. 1.17(p) for submission of an information disclosure statement. Please credit any overpayment or charge any underpayment to Deposit Account 19-1970.
☐	**37 CFR 1.97(d)**: This Information Disclosure Statement is being submitted after the period specified in 37 CFR 1.97(c). ☐ This information Disclosure Statement includes a Certification (below) as specified by 37 C.F.R. 1.97(e) AND ☐ Applicants hereby requests consideration of the reference(s) disclosed herein. Please charge Deposit Account 19-1970 in the amount of $180.00 under 37 C.F.R. 1.17(p). Please credit any overpayment or charge any underpayment to Deposit Account 19-1970. Election to pay the fee should not be taken as an indication that applicant(s) cannot execute a certification.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 400 of 739

Certification (37 C.F.R. 1.97(e))
(Applicable only if checked)

☐ The undersigned certifies that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(1).

☐ A copy of the communication from the foreign patent office is enclosed.

OR

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned after making reasonable inquiry, no item of information contained in this Information Disclosure Statement was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(2).

Respectfully submitted,

SHERIDAN ROSS P.C.

By: /Jason H. Vick/
Jason H. Vick
Registration No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202-5141
(303) 863-9700

Date: April 23, 2015

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 401 of 739

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, Osman M
Sheet	1	of	2	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	2003/0009717	01-09-2003	Fukushima et al.	
	2	2005/0036497	02-17-2005	Kawakami	

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	3	EP 1006689	06/07/2000	Matsushita Electric Industries Co., Ltd.		
	4	EP 1361690	11/12/2003	MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.		
	5	EP 1507353	02/16/2005	NTT DoCoMo, Inc.		
	6	JP 2001-119437	04/27/2001	MATSUSHITA ELECTRIC IND CO LTD		(Believed to correspond to US 2003/0009717 cited herein)
	7	JP 2004-007823	01/08/2004	MATSUSHITA ELECTRIC IND CO LTD		(Believed to Correspond to EP 1361690 cited herein)
	8	JP 2005-064594	03/10/2005	NTT DOCOMO INC		(Believed to correspond to EP 1507353 cited herein)
	9	JP 2005-191735	07/14/2005	TOSHIBA CORP		(Includes English translation of Abstract)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, Osman M
Sheet	2	of	2	Attorney Docket Number	6936-57-PUS-CON-3

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	10	Notice of Allowance (Including Translation) for Japanese Patent Application No. 2007-535818, dispatched Dec. 12, 2011 (Attorney Ref. No. 6936-54-PJP)
	11	Official Action (including translation) for Japanese Patent Application No. 2008-264540, dispatched Dec. 12, 2011 (Attorney Ref. No. 6936-54-PJP-DIV)
	12	Examiner's Report for Canadian Patent Application No. 2,647,589, mailed February 26, 2015 (Attorney Ref. No.: 6936-57-PCA)
	13	Examination Report for European Patent Application No. 07811844.5, mailed Apr. 1, 2009 (Attorney Ref. No. 6936-57-PEP)
	14	Decision of Final Rejection (Including Translation) for Japanese Patent Application No. 2010-017356, dispatched April 23, 2012 (Attorney Ref. No.: 6936-57-PJP-DIV)
	15	Official Action for Japanese Patent Application No. 2013-246257 dispatched January 26, 2015 (Attorney Ref. No.: 6936-57-PJP-DIV-3)
	16	Official Action (including translation) for Korean Patent Application No. 10-2008-7024792 dated Feb. 23, 2015 (Attorney Ref. No. 6936-57-PKR)
	17	Official Action (including translation) for Korean Patent Application No. 10-2014-7005299 mailed Feb. 23, 2015 (Attorney Ref. No.: 6936-57-PKR-DIV)
	18	Notice of Allowance for U.S. Patent Application No. 14/081,469, mailed April 3, 2015 December 17, 2014 (Attorney Ref. No.: 6936-54-CON-6)
	19	Notice of Allowance for U.S. Patent Application No. 14/075,194, mailed April 8, 2015 (Attorney Ref. No. 6936-57-PUS-DIV-CON-2)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Electronic Patent Application Fee Transmittal

Application Number:	14159125
Filing Date:	20-Jan-2014
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Filer:	Jason Vick/Joanne Vos
Attorney Docket Number:	6936-57-PUS-CON-3

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt	
EFS ID:	22149661
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	23-APR-2015
Filing Date:	20-JAN-2014
Time Stamp:	15:07:20
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	13761
Deposit Account	191970
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		AMEND_01.pdf	81859 a5495c6655a65ca1af44d3039f0fe32731d3e851	yes	5

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Amendment/Req. Reconsideration-After Non-Final Reject	1	1
Claims	2	4
Applicant Arguments/Remarks Made in an Amendment	5	5

Warnings:

Information:

2		IDS_06.pdf	62002 587c1cace3598a5bb1bf6ca19c68e9ba149ce177	yes	5

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Transmittal Letter	1	3
Information Disclosure Statement (IDS) Form (SB08)	4	5

Warnings:

Information:

3	Foreign Reference	EP1006689.pdf	3906870 e55da5820255fd498060d7d43afe6fd431117d1c	no	67

Warnings:

Information:

4	Foreign Reference	EP1361690A2.pdf	581460 520d087c15bbb34b6656e3598ef945cb4e1d8b0b	no	16

Warnings:

Information:

5	Foreign Reference	EP1507353A2.pdf	722947 f12b3767e5f2a57620538778caace8fbdb39ce6b	no	15
Warnings:					
Information:					
6	Foreign Reference	JP2004007823A.pdf	451277 72a00db5074351825b21c4181831576c31d532ca	no	13
Warnings:					
Information:					
7	Foreign Reference	JP2005064594A.pdf	461459 e051082b2a4e971836d5bff43542db2efe9e7bcb	no	12
Warnings:					
Information:					
8	Foreign Reference	JP2005191735A.pdf	10401530 b6c01101cc78eb150b758ee19bdd3c80a7125799	no	18
Warnings:					
Information:					
9	Non Patent Literature	6936-54-PJP_NOA_2011-12-12.pdf	116940 ff4bff0d03e1ea4851286a788c073d72c39ef106	no	6
Warnings:					
Information:					
10	Non Patent Literature	6936-54-PJP-DIV_OA_2011-12-12.pdf	82852 7e0a2b3704b5049e9135153b0b40b5f5102203fb	no	4
Warnings:					
Information:					
11	Non Patent Literature	6936-57-PCA_OA_02-26-2015.pdf	992402 f0086d7002e50ebca0164e94dc3e7cdef5efa6ab	no	3
Warnings:					
Information:					
12	Non Patent Literature	6936-57-PEP_OA_2009-04-01.pdf	98674 a43b438ba9327246ea37c79843599efe849e807b	no	4
Warnings:					
Information:					
13	Non Patent Literature	6936-57-PJP-DIV-3_OA_01-26-2015.pdf	172689 5297eecee31085b6478b88c573ab7e93893dd692	no	4
Warnings:					
Information:					

14	Non Patent Literature	6936-57-PKR_OA_02-23-2015.pdf	188035 0ab88572941b0856af08006303163849678 6d3f2	no	5
Warnings:					
Information:					
15	Non Patent Literature	6936-57-PKR-DIV_OA_02-23-2015.pdf	171131 3aeb99bfdd5b5d1023568d8d8145754aa9 80cddf	no	5
Warnings:					
Information:					
16	Non Patent Literature	6936-54-CON-6_OA_12-17-2014.pdf	200657 e17b1e837e45ac641ea1f5cae7363bc68ed 77ed2	no	7
Warnings:					
Information:					
17	Non Patent Literature	6936-57-PUS-DIV-CON-2_NOA_04-08-2015.pdf	354156 a9a954ba5c9b7f6886ed15588871ed07c7e 0d63e	no	5
Warnings:					
Information:					
18	Foreign Reference	JP2001119437A.pdf	3177901 b314c24dba7cf259764594ce2ad4f6d04fdb 51bc	no	40
Warnings:					
Information:					
19	Non Patent Literature	6936-57-PJP-DIV_OA_04-23-2012.pdf	83249 d52582f04b77f3fb12a1cab6af9132614278 903d	no	2
Warnings:					
Information:					
20	Fee Worksheet (SB06)	fee-info.pdf	30774 a22822eaf58a57efa66da09e70f26c841af46 55d	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	22338864		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/159,125	Filing Date 01/20/2014	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	04/23/2015	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	X $80 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $420 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/DAVID SASFAI/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/159,125	01/20/2014	Marcos C. Tzannes	6936-57-PUS-CON-3	3369

62574 7590 06/16/2015

Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

EXAMINER	
ALSHACK, OSMAN M	

ART UNIT	PAPER NUMBER
2112	

NOTIFICATION DATE	DELIVERY MODE
06/16/2015	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jvick@sheridanross.com

Office Action Summary	Application No. 14/159,125	Applicant(s) TZANNES, MARCOS C.	
	Examiner OSMAN ALSHACK	Art Unit 2112	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04/23/2015*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *106-125* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *106-125* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date *01/29/2015 & 04/23/2015*.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

emaDETAILED ACTION

1. The present application is being examined under the pre-AIA first to invent provisions.

Status of Claims

2. Claims 106-125 are presented for examination.

Information Disclosure Statement

3. The references listed in the information disclosure statement (IDS) submitted on have been considered. The submission is in compliance with the provisions of 37 CFR 1.97. Form PTO- 1449 is signed and attached hereto.

Claim Rejections - 35 USC § 112

4. The rejection of claims 112, 113, 122, and 123 under 35 U.S.C. § 112, second paragraph, is withdrawn in view of applicant's amendments.

Response to Arguments

5. Applicant's argument filed on 04/23/2015 with respect claims 106-125 have been fully considered but they are not persuasive.

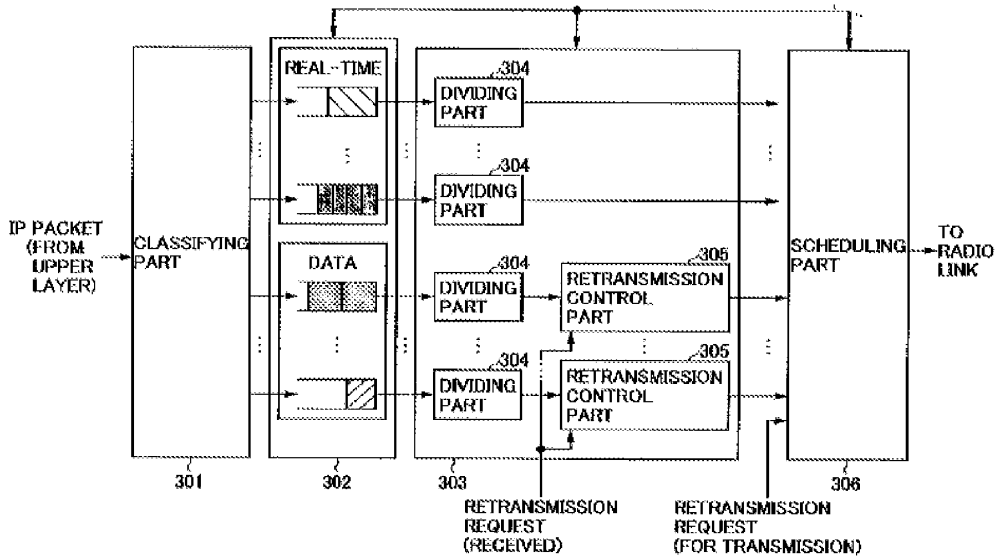
During the Interview on 04/08/2015, the applicant's attorney argued that the primary reference Plamondon et al. (U.S. PN: 2007/0206621) does not teach the limitation of "wherein the first and second types of packet comprise a header field that indicates whether a transmitted

packet is a first type of packet or a second type of packet." Examiner indicted that will review the applied reference and update the search upon filling of arguments and/or amendments.

After further review of the cited references, Examiners found that the secondary reference Yashimure et al. (U.S. PN: 2002/0126675) in paragraphs [0031, 0059, and 0062] teaches the limitation above. For example, according to one aspect of the present invention**, a packet transmission system transmits packets classified according to QoS requirement from a transmitting node to a receiving node**. **The transmitting node includes:** a dividing part provided for each QoS class for dividing a packet to be transmitted into a plurality of predetermined data units in each QoS class**; a transmitter-side retransmission control part for applying a transmitter-side retransmission control process in each QoS class to the data unit that belongs to one of QoS classes specified for data type packets and is one of the data units obtained from the dividing part**; and a scheduling part for selecting a data unit to be transmitted from a set of data units including a data unit that belongs to one of QoS classes not specified for data type packets and is obtained from the dividing part, and a data unit that belongs to one of the QoS classes specified for data type packets and is obtained from the transmitter-side retransmission control part, and transmitting the selected data unit… *See paragraph [0031].* **The classifying part 301 classifies the IP packets input from an upper layer into different IP datagram queues on the basis of the QoS requirement obtained from, for example, IP header information of the packets**. *See paragraph [0059].* The dividing part 304 then writes specification of the dividing process such as the number to divide into, a flag indicating front or tail of the packet, **or information about the packet length, into the header of each data unit. The dividing part 304 also writes a sequence number and identification for process line**

that indicates which dividing part generates this data unit (or identification for QoS class) into the header of each data unit. *See paragraph [0062].* Also see Fig 3, components 301 & 302, printed below for your convenience.

FIG.3



Patent Application Publication Sep. 12, 2002 Sheet 3 of 17 US 2002/0126675 A1

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained through the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in Graham v. John Deere CO., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 106-125 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Plamondon et al (U.S. PN: 2007/0206621)" herein after as Plamondon" in view of Yoshimura et al. (U.S. PN: 2002/0126675)" herein after as Yoshimura."

As per claim 106:

Plamondon substantially teaches or discloses a method of packet retransmission, in a transceiver, comprising (see abstract, and paragraph [0007]): transmitting, by the transceiver (see Fig 2B), a first type of packet (see paragraph [0007], and Fig 6, *step 601*); and transmitting, by the transceiver (see Fig 2B) a second type of packet (see paragraph [0007], and Fig 6, *step 603*), wherein the first type of packet is stored in a retransmission buffer after transmission (see paragraph [0121], *herein, appliance 200*) and the second type of packet is not stored in a retransmission buffer after transmission (see paragraph [0122], *herein, appliance 200 is free to discard the saved packet data*), and wherein the header field of the first type of packet comprises a sequence identifier (SID) that is incremented after the first type of packet is transmitted (see paragraph [0413], *herein, each time that a packet is retransmitted, the count is incremented by one*).

Plamondon does not explicitly teach wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and wherein the header field of the second type of packet does not comprise the SID of the first type of packet.

However, Yoshimura in analogous art teaches wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second

type of packet (see abstract, and paragraphs [0059 & 0062]), and wherein the header field of the second type of packet does not comprise the SID of the first type of packet (see paragraph [0090], and Fig 7, component S702), *herein, by not applying the retransmission control process to the real-time type packet that practically does not require the retransmission process*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the communication system of Plamondon with the teachings of Yoshimura by wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and wherein the header field of the second type of packet does not comprise the SID of the first type of packet.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and wherein the header field of the second type of packet does not comprise the SID of the first type of packet would have improved the retransmission packets performance.

As per claim 107:

Plamondon teaches that wherein the transceiver is connected to a second transceiver using a wired or wireless channel (see paragraph [0038], and Fig 2B, *component 104*) and the transceivers are used to transport one or more of video and voice data (see paragraph [0213]).

As per claim 108:

Plamondon teach that wherein the method is performed in a linecard that is operable to transport video (see paragraph [0068], *herein, standard telephone lines*).

As per claim 109:

Plamondon teach that wherein the method is performed in a customer premises modem that is operable to transport video (see paragraph [0072], *herein, mobile telephone*).

As per claim 110:

Plamondon teach that wherein the transceiver includes at least one digital signal processor (see paragraph [0064], *herein, a microprocessor unit*).

As per claim 111:

Plamondon teaches that wherein the transceiver includes at least one ASIC (Application Specific Integrated Circuit) (see paragraph [0096]).

As per claim 112:

Plamondon teaches that wherein the first type of packet comprises one or more PTM-TC (Packet Transfer Mode-Transmission convergence) codewords (see paragraph [0010], *herein, transport layer connection*).

As per claim 113:

Plamondon teaches that wherein the first type of packet comprises one or more ATM (Asynchronous Transfer Mode) cells (see paragraph [0038], *herein, Asynchronous Transfer Mode*).

As per claim 114:

Plamondon teaches that wherein the first type of packet comprises one or more Reed Solomon codewords (see paragraph [0158], *herein, forward error correction techniques*).

As per claim 115:

Plamondon teaches that wherein the first type of packet is a low-PER (packet Error Rate) packet and the second type of packet is a low-latency packet (see paragraph [0224]).

As per claim 116:

Plamondon substantially teaches or discloses a transceiver operable to transmit a first type of packet and to transmit a second type of packet (see paragraph [0007], and Fig 6, *steps 601 & 603*), wherein the first type of packet is stored in a retransmission buffer after transmission (see paragraph [0121], *herein, appliance 200*) and the second type of packet is not stored in a retransmission buffer after transmission (see paragraph [0122], *herein, appliance 200 is free to discard the saved packet data),*and wherein the header field of the first type of packet comprises a sequence identifier (SID) that is incremented after the first type of packet is transmitted (see paragraph [0413], *herein, each time that a packet is retransmitted, the count is incremented by one*) and the header field of the second type of packet does not comprise the SID

of the first type of packet (see paragraph [0149], *herein, Packets that are not retransmitted will not result in ambiguity*).

Plamondon does not explicitly teach wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and wherein the header field of the second type of packet does not comprise the SID of the first type of packet.

However, Yoshimura in analogous art teaches wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet (see abstract, and paragraphs [0059 & 0062]), and wherein the header field of the second type of packet does not comprise the SID of the first type of packet (see paragraph [0090], and Fig 7, component S702), *herein, by not applying the retransmission control process to the real-time type packet that practically does not require the retransmission process*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the communication system of Plamondon with the teachings of Yoshimura by wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and wherein the header field of the second type of packet does not comprise the SID of the first type of packet.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and wherein the header field of the second type of packet does not comprise the SID of the first type of packet would have improved the retransmission packets performance.

As per claim 117:

Plamondon teaches that wherein the transceiver is connected to a second transceiver using a wired or wireless channel (see paragraph [0038], and Fig 2B, *component 104*) and the transceivers are used to transport one or more of video and voice data (see paragraph [0213]).

As per claim 118:

Plamondon teaches that wherein the transceiver is located in a linecard that is operable to transport video (see paragraph [0068], *herein, standard telephone lines*).

As per claim 119:

Plamondon teaches that wherein the transceiver is located in a customer premises modem that is operable to transport video (see paragraph [0072], *herein, mobile telephone*).

As per claim 120:

Plamondon teach that wherein the transceiver includes at least one digital signal processor (see paragraph [0064], *herein, a microprocessor unit*).

As per claim 121:

Plamondon teaches that wherein the transceiver includes at least one ASIC (Application Specific Integrated Circuit) (see paragraph [0096]).

As per claim 122:

Plamondon teaches that wherein the first type of packet comprises one or more PTM-TC (Packet Transfer Mode-Transmission convergence) codewords (see paragraph [0010], *herein, transport layer connection*).

As per claim 123:

Plamondon teaches that wherein the first type of packet comprises one or more ATM (Asynchronous Transfer Mode) cells (see paragraph [0038], *herein, Asynchronous Transfer Mode*).

As per claim 124:

Plamondon teaches that wherein the first type of packet comprises one or more Reed Solomon codewords (see paragraph [0158], herein, forward error correction techniques).

As per claim 125:

Plamondon teaches that wherein the first type of packet is a low-PER (packet Error Rate) packet and the second type of packet is a low-latency packet (see paragraph [0224]).

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, ***THIS ACTION IS MADE FINAL***. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action. Any inquiry concerning this communication or earlier communications from the examiner should be directed to OSMAN ALSHACK whose telephone number is (571)272-2069.

The examiner can normally be reached on MON-FRI 8:30 AM - 5:00 PM EST, also please fax interview request to (571) 273- 2069. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ALBERT DECADY can be reached on 5712723819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/OSMAN ALSHACK/

Examiner, Art Unit 2112

/ALBERT DECADY/

Supervisory Patent Examiner, Art Unit 2112

Notice of References Cited	Application/Control No. 14/159,125	Applicant(s)/Patent Under Reexamination TZANNES, MARCOS C.	
	Examiner OSMAN ALSHACK	Art Unit 2112	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,005,851 A	12-1999	Craddock et al.	370/329
*	B	US-2002/0126675 A1	09-2002	Yoshimura et al.	370/395.21
*	C	US-2002/0154600 A1	10-2002	Ido et al.	370/216
*	D	US-6,754,188 B1	06-2004	Garahi et al.	370/328
*	E	US-2004/0109455 A1	06-2004	Jouppi et al.	370/395.52
*	F	US-2004/0179494 A1	09-2004	Attar et al.	370/332
*	G	US-2005/0068916 A1	03-2005	Jacobsen et al.	370/328
*	H	US-7,031,259 B1	04-2006	Guttman et al.	370/235
*	I	US-2007/0206621 A1	09-2007	Plamondon et al.	370/413
*	J	US-7,483,421 B2	01-2009	Compton, Matthew	370/389
*	K	US-7,826,438 B1	11-2010	Salhotra et al.	370/345
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, Osman M
Sheet	1	of	1	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	2009/0319854	12-24-2009	Qian et al.	

UNPUBLISHED U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] (if known)	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	2	Examiner's Report for Canadian Patent Application No. 2,869,452, mailed Dec. 15, 2014 (Attorney's Ref. No.: 6936-54-PCA-DIV)
	3	Notification of Reexamination (including translation) for Chinese Patent Application No. 200580032703.1, dispatched October 29, 2014 (Attorney Ref. No. 6936-54-PCN)
	4	Official Action for U.S. Patent Application No. 14/081,469 mailed December 17, 2014 (Attorney Ref. No.: 6936-54-CON-6)
	5	Official Action for U.S. Patent Application No. 14/075,194, mailed January 28, 2015 (Attorney Ref. No. 6936-57-PUS-DIV-CON-2)

Examiner Signature	/Osman Alshack/	Date Considered	06/04/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"14159125"	US-PGPUB; USPAT	OR	OFF	2015/01/21 11:11
S2	103	((Marcos) near2 (Tzannes)).INV.	USPAT; USOCR	OR	OFF	2015/01/21 11:14
S3	2	(retransmi$5 resend$3)near3((packet block group set package chunk)near3 type)with(first original primary second$3)same((per latency)near2 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:19
S4	3	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)with(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:23
S5	13	(transmi$5 transceiv$3 retransmi$5 resend$3)same((packet block group set package chunk)near3 type)same(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:24
S6	117	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:27
S7	0	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)same((per and latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:28
S8	3	S2 and S6	US-PGPUB; USPAT	OR	ON	2015/01/21 12:46
S9	3	S2 and (transmi$5 transceiv$3 retransmi$5 resend$3)same(packet block group set package chunk)same(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:54
S10	17	S2 and (transmi$5 transceiv$3 retransmi$5 resend$3)same(packet block group set package chunk)same(first original primary second$3)and((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:55

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 428 of 739

S11	32	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)and((per and latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:56
S12	17	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)same(identif$7 indicat$3 determin$3)and((per and latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:08
S13	13	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)with(buffer stor$3 memory)same(identif$7 indicat$3 determin$3)and((per and latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:11
S14	26	("2004/0179494").URPN.	USPAT	OR	OFF	2015/01/21 13:19
S15	1	S14 and(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)and((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:20
S16	4737	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)with(identif$7 indicat$3 determin$3)and((per error latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:38
S17	74538	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:39
S18	1496	(low-per low adj per)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:40
S19	32050	(low-latency low adj latency)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:40
S20	41	S18 and S19	US-PGPUB; USPAT	OR	ON	2015/01/21 13:40
S21	12	S17 and S20	US-PGPUB; USPAT	OR	ON	2015/01/21 13:41
S22	35	(transmi$5 transceiv$3 retransmi$5 resend$3)same(packet block group set package chunk)same(first original primary second$3)and(identif$7 indicat$3 determin$3)same((per and latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:47
S23	129	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)near3(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:50
S24	81	(transmi$5 transceiv$3 retransmi$5	US-PGPUB;	OR	ON	2015/01/21

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 429 of 739

		resend$3)with((packet block group set package chunk)near3 type)near(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	USPAT			13:51
S25	24	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near type)near(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:52
S26	39	(transmi$5 transceiv$3 retransmi$5 resend$3)near2((packet block group set package chunk frame)near2 type)near2(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:58
S27	1	("5524116").PN.	US-PGPUB; USPAT	OR	OFF	2015/01/21 14:27
S28	1	(14/075194).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 14:29
S29	1	(14/081469).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 14:31
S30	4	S2 and (transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near3 type)with(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 14:33
S31	20962	packet near2 identifier	US-PGPUB; USPAT	OR	ON	2015/01/21 14:49
S32	99	S31 with(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near3 type)with(first original primary second$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 14:51
S33	389	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near2 type)near2(identif$7 indicat$3 determin$3)with(buffer stor$3 memory)	US-PGPUB; USPAT	OR	ON	2015/01/21 14:57
S34	129524	(Quality near2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/01/21 15:00
S35	75	S33 and S34	US-PGPUB; USPAT	OR	ON	2015/01/21 15:00
S36	22753	(Quality near2 Service QOS)and((per error rat$3 latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 15:06
S37	1301	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near3 type)with(identif$7 indicat$3 determin$3)with(buffer stor$3 memory)	US-PGPUB; USPAT	OR	ON	2015/01/21 15:06
S38	65	S36 and S37	US-PGPUB; USPAT	OR	ON	2015/01/21 15:07

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 430 of 739

S39	84	(Quality near2 Service QOS)same(low high)near3(delay late$3)same((error data bit loss)near2 rate)same(identif$7 indicat$3 determin$3)and(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)near2(video voice data information bit$1)	US-PGPUB; USPAT	OR	ON	2015/01/21 16:20
S40	7	(Quality near2 Service QOS)same(low high)near3(delay late$3)same((error data bit loss)near2 rate)same(identif$7 indicat$3 determin$3 ID)same(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)near2(video voice data information bit$1)	US-PGPUB; USPAT	OR	ON	2015/01/21 16:31
S41	2	(10/696507).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 17:01
S42	2	(10/901940).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 17:03
S43	4	(Quality near2 Service QOS)with(identif$7 indicat$3 determin$3)with(packet block group set package chunk)near2(video voice data information bit$1)same(low high)near3(delay late$3)same((error data bit loss)near2 rate)	US-PGPUB; USPAT	OR	ON	2015/01/21 17:14
S44	201	(Quality near2 Service QOS)with(identif$7 indicat$3 determin$3)with(packet block group set package chunk)near2(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near2 rate)	US-PGPUB; USPAT	OR	ON	2015/01/21 17:16
S45	2524	714/748.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/21 17:31
S46	967	714/749.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/21 17:31
S47	1	S44 and S45	US-PGPUB; USPAT	OR	ON	2015/01/21 17:32
S48	0	S44 and S46	US-PGPUB; USPAT	OR	ON	2015/01/21 17:32
S49	16	("20010025239" | "20030133462" | "20040072541" | "20050141480" | "20060002465" | "20060095944" | "20060168133" | "20070009015" | "20070217339" | "20080101476" | "20080225983" | "20090034610" | "6856756" | "7292553" | "7706384" | "7782779").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2015/01/21 17:34
S50	25	(Customer with Premises)and(digital with signal with prosessor DSP)and (integrated with ciruit ASIC)and linecard	US-PGPUB; USPAT; USOCR	OR	ON	2015/01/21 17:59
S51	185383	packet$1 near2 $2transmi$5	US-PGPUB; USPAT	OR	ON	2015/01/22 09:06
S54	107	(Quality near2 Service QOS)same((packet block group set	US-PGPUB; USPAT	OR	ON	2015/01/22 09:09

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 431 of 739

		payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)				
S55	68	S51 and S54	US-PGPUB; USPAT	OR	ON	2015/01/22 09:09
S56	17	S51 same S54	US-PGPUB; USPAT	OR	ON	2015/01/22 09:09
S57	1	(Quality near2 Service QOS)same(first original primary)near3((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:24
S58	6	(Quality near2 Service QOS)and(first original primary)near3((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:27
S59	15	(Quality near2 Service QOS)and(first original primary)with((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:27
S62	19	(first original primary)near2((packet block group set payload frame)near2 type)near2(identif$7 indicat$3 determin$3)and(Quality near2 Service QOS)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:42
S63	1250	H04L1/1809.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:50
S64	2991	H04L1/1812.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:50
S65	2252	H04L1/1887.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:51
S66	1569	H04L1/1819.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:51
S67	2107	H04L2001/0093.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:51
S71	3061	H04L12/5601.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 10:02
S72	0	S54 and S63	US-PGPUB; USPAT	OR	ON	2015/01/22 10:03
S73	0	S54 and S64	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 432 of 739

S74	4	S54 and S65	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04
S75	0	S54 and S66	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04
S76	0	S54 and S67	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04
S77	1174	H04L45/302.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S78	1222	H04L47/6215.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S79	0	S54 and S77	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S80	1	S54 and S78	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S83	457	packet$1 near2 $2transmi$5 with(second$3 near2 packet)with(stor$3 retain$3)with(buffer memory)	US-PGPUB; USPAT	OR	OFF	2015/01/22 11:44
S84	80	packet$1 near2 $2transmi$5 with(second$3 near2 packet)near2(stor$3 retain$3)near2(buffer memory)	US-PGPUB; USPAT	OR	OFF	2015/01/22 11:45
S87	29	retransmi$5 same(second$3 with type with packet)same(stor$3 retain$3)same(buffer memory storage)	US-PGPUB; USPAT	OR	OFF	2015/01/22 11:47
S89	1	(Quality near2 Service QOS)with(identif$7 indicat$3 determin$3)with((packet block group set)near type)near(second$3)and(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near2 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 13:40
S90	393	"5524116" "5663910" "5898698" "5983382" "6098188" "6775320" "6778589" "6337877" "6496481" "6707822" "6778596" "6826589" "7200792" "7164654" "7174493" "7519124" "7600172" "7657818" "7764595" "7782758" "7831890" "7844882" "7836381" "8074138" "8149904" "8276048" "8335956" "8407546" "8468411" "8495473" "8595577" "8607126" "8645784" 2001/0014962	US-PGPUB; USPAT	OR	ON	2015/01/22 17:51
S92	33	("5524116" | "5663910" | "5898698" | "5983382" | "6098188" | "6775320" | "6778589" | "6337877" | "6496481" | "6707822" | "6778596" | "6826589" | "7200792" | "7164654" | "7174493" | "7519124" | "7600172" | "7657818" | "7764595" | "7782758" | "7831890" | "7844882" | "7836381" | "8074138" | "8149904" | "8276048" | "8335956" | "8407546" | "8468411" | "8495473" | "8595577" | "8607126" | "8645784" | " 2001/0014962").PN.	US-PGPUB; USPAT	OR	ON	2015/01/22 17:55
S94	13	("20020087710" | " 20020126675 " | "20020154600 " | "20030067877 " | "200310076870" | " 20040114536 " |	US-PGPUB; USPAT	OR	ON	2015/01/22 18:01

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 433 of 739

		"2004/0148552" | " 20040196786 " | "20040203455" | " 20050180323" | " 20060092871 " | "200610236045 " | "20070198898" | " 20070263528 " | "20080212582 " | "20100061376").PN.				
S95	46	S92 or S94	US-PGPUB; USPAT	OR	ON	2015/01/22 18:03
S96	11	S93 and S95	US-PGPUB; USPAT	OR	ON	2015/01/22 18:04
S97	10	S95 and (Quality near2 Service QOS)and((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/22 18:06
S98	11	S95 and (Quality near2 Service QOS)and((packet block group set payload frame)near5 type)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/22 18:11
S99	27	(packet adj transfer adj mode adj transmission adj convergence PTM-TC PTMTC PTM adj TC)	US-PGPUB; USPAT	OR	ON	2015/01/22 19:13
S100	1614	714/776.ccls.	US-PGPUB; USPAT	OR	OFF	2015/01/23 10:24
S101	185383	packet$1 near2 $2transmi$5	US-PGPUB; USPAT	OR	ON	2015/01/23 10:25
S102	107	(Quality near2 Service QOS)same((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/23 10:25
S103	68	S101 and S102	US-PGPUB; USPAT	OR	ON	2015/01/23 10:25
S104	0	S100 and S102	US-PGPUB; USPAT	OR	ON	2015/01/23 10:26
S105	0	S100 and S103	US-PGPUB; USPAT	OR	ON	2015/01/23 10:26
S106	0	S100 and (Quality near2 Service QOS)and((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/23 10:26
S107	368	(packet block frame set group)near3(second$3 next another other)with(stor$3 retain$3 accumulat$3)with(buffer memory storage)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:33
S108	79	(packet block frame set group)near3(second$3 next another other)with(stor$3 retain$3 accumulat$3)with(buffer memory storage)near2(retransmi$5 re-	US-PGPUB; USPAT	OR	ON	2015/01/23 14:34

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 434 of 739

		transmi$5 resend$3 re-send$3)				
S109	1	(packet block frame set group)near3((second$3 next another other)near2 type)with(stor$3 retain$3 accumulat$3)with(buffer memory storage)near2(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:34
S110	232	(head$3 field portion sector)with(packet block frame set group)near3(second$3 next another other)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:39
S111	93	(head$3 field portion sector)near3(packet block frame set group)near3(second$3 next another other)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:50
S112	16	(head$3 field portion sector)with(packet block frame set group)near3((second$3 next another other)near2 type)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:52
S113	22	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 15:07
S114	44	(head$3 field portion sector)and(packet block frame set group payload stream)and(second$3 next another other type)and(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:10
S115	41	(head$3 field portion sector)and(packet block frame set group payload stream)and(second$3 next another other type)same(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:11
S116	40	(head$3 field portion sector)and(packet block frame set group payload stream)same(second$3 next another other type)same(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:11
S117	38	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:11
S118	33	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(identif$7	EPO; JPO	OR	ON	2015/01/23 15:11

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 435 of 739

		indicat$3 determin$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)				
S119	107	(head$3 field portion sector)and(packet block frame set group payload stream)and((second$3 next another other)near2 type)and(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	USOCR; FPRS; DERWENT; IBM_TDB	OR	ON	2015/01/23 15:15
S120	10	(head$3 field portion sector)same(packet block frame set group payload stream)same((second$3 next another other)near2 type)same(identif$7 indicat$3 determin$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	USOCR; FPRS; DERWENT; IBM_TDB	OR	ON	2015/01/23 15:15
S121	57	(head$3 field portion sector)same(packet block frame set group payload stream)same((second$3 next another other)near2 type)same(count$3 identif$7 indicat$3 determin$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:11
S122	27	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:33
S123	2718	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:33
S124	58403	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S125	23	S123 with S124	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S126	25	S123 same S124	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S127	198	S123 and S124	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S128	25	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)same(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$4)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:42
S129	27	(retransmi$5 re-transmi$5 resend$3 re-send$3)same(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3	US-PGPUB; USPAT	OR	ON	2015/01/26 12:43

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 436 of 739

		determin$3 control$4)				
S130	77	(retransmi$5 re-transmi$5 resend$3 re-send$3)same2(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other two)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$4)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:46
S131	98	(head$3 field portion sector)near2(packet block frame set group payload stream)near2((second$3 next another other)near2 type)near2(count$3 identif$7 indicat$3 determin$3 control$4)	US-PGPUB; USPAT	OR	ON	2015/01/26 13:22
S132	24	S124 and S131	US-PGPUB; USPAT	OR	ON	2015/01/26 13:24
S133	1	(head$3 field portion sector)near2(packet block frame set group payload stream)near2((second$3 next another other)near2 type)near2(count$3 identif$7 indicat$3 determin$3 control$4)	EPO; JPO	OR	ON	2015/01/26 13:32
S134	76	(head$3 field portion sector)and(packet block frame set group payload stream)and(second$3 next another other type)and(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:33
S135	74	(head$3 field portion sector)same(packet block frame set group payload stream)and(second$3 next another other type)and(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S136	68	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)and(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S137	61	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S138	52	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(count$3 identif$7 indicat$3 determin$3 control$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S139	44	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3	EPO; JPO	OR	ON	2015/01/26 13:34

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 437 of 739

		next another other)same(count$3 identif$7 indicat$3 determin$3 control$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)				
S140	28	(head$3 field portion sector)near2(packet block frame set group payload stream)near2(second$3 next another other)near2(count$3 identif$7 indicat$3 determin$3 control$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 13:39
S141	73	(head$3 field portion sector)near2(packet block frame set group payload stream)near2(second$3 next another other)near2(count$3 identif$7 indicat$3 determin$3 control$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:03
S142	17	(head$3 field portion sector)near2(packet block frame set group payload stream)near2(second$3 next another other)near2((count$3 identif$7 indicat$3 determin$3 control$4)near2 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:08
S143	42	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(head$3 field portion sector)with(packet block frame set group payload stream)with(second$3 next another other)with(count$3 identif$7 indicat$3 determin$3 control$4)with(exclude$3 or separate$3 or avoid$3 or discard$3 or remov$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:22
S144	20	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(head$3 field portion sector)with(packet block frame set group payload stream)with(second$3 next another other)with(count$3 identif$7 indicat$3 determin$3 control$4)with(exclud$3 or avoid$3 or discard$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:35
S145	11551	370/389.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/26 16:08
S146	2182	370/394.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/26 16:08
S147	23	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 16:10
S148	4	S145 and S147	US-PGPUB; USPAT	OR	ON	2015/01/26 16:10
S149	1	S146 and S147	US-PGPUB; USPAT	OR	ON	2015/01/26 16:10
S150	33	("5524116" | "5663910" | "5898698" | "5983382" | "6098188" | "6775320" | "6778589" | "6337877" | "6496481" |	US-PGPUB; USPAT	OR	ON	2015/01/26 18:15

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 438 of 739

		"6707822" | "6778596" | "6826589" | "7200792" | "7164654" | "7174493" | "7519124" | "7600172" | "7657818" | "7764595" | "7782758" | "7831890" | "7844882" | "7836381" | "8074138" | "8149904" | "8276048" | "8335956" | "8407546" | "8468411" | "8495473" | "8595577" | "8607126" | "8645784" | "2001/0014962").PN.				
S151	13	("20020087710" | " 20020126675 " | "20020154600 " | "20030067877 " | "200310076870" | " 20040114536 " | "2004/0148552" | " 20040196786 " | "20040203455" | " 20050180323" | " 20060092871 " | "200610236045 " | "20070198898" | " 20070263528 " | "20080212582 " | "20100061376").PN.	US-PGPUB; USPAT	OR	ON	2015/01/26 18:15
S152	46	S150 or S151	US-PGPUB; USPAT	OR	ON	2015/01/26 18:15
S153	28	S152 and (retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/26 18:16
S154	33	("5524116" | "5663910" | "5898698" | "5983382" | "6098188" | "6775320" | "6778589" | "6337877" | "6496481" | "6707822" | "6778596" | "6826589" | "7200792" | "7164654" | "7174493" | "7519124" | "7600172" | "7657818" | "7764595" | "7782758" | "7831890" | "7844882" | "7836381" | "8074138" | "8149904" | "8276048" | "8335956" | "8407546" | "8468411" | "8495473" | "8595577" | "8607126" | "8645784" | "2001/0014962").PN.	US-PGPUB; USPAT	OR	ON	2015/01/27 10:45
S155	13	("20020087710" | " 20020126675 " | "20020154600 " | "20030067877 " | "200310076870" | " 20040114536 " | "2004/0148552" | " 20040196786 " | "20040203455" | " 20050180323" | " 20060092871 " | "200610236045 " | "20070198898" | " 20070263528 " | "20080212582 " | "20100061376").PN.	US-PGPUB; USPAT	OR	ON	2015/01/27 10:45
S156	46	S154 or S155	US-PGPUB; USPAT	OR	ON	2015/01/27 10:45
S157	28	S156 and (count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)same(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/27 10:46
S158	23	S156 and (count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/27 10:47
S159	10	S156 and (count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)same(packet block frame set	US-PGPUB; USPAT	OR	ON	2015/01/27 10:59

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 439 of 739

		group payload stream)same (quality near2 service QoS)				
S160	46	("8850089" "4792753" "4807224" "4905225" "4914653" "4970714" "5339313" "5404353" "5430738" "5555266" "5664091" "5875292" "5905720" "6072726" "6073180" "6172983" "6278718" "6416471" "6493318" "6701370" "6728878" "6741554" "6763030" "6772375" "6788704" "7149192" "7277390" "7296204" "7346701" "7376426" "7412338" "7450599" "7596091" "7693070" "7701846" "7787368" "7821933" "7849208" "7885264" "7969901" "8023417" "8077601" "7885264" "7969901" "8023417" "8077601" "8151155" "8156407" "8228917" "8291034").pn.	US-PGPUB; USPAT	OR	ON	2015/01/27 14:01
S161	42	("4766591" "5444856" "5727149" RE36182 "6005851" "6021177" "6185427" "6278921" "6438585" "6477595" "6556582" "6701151" "6765891" "7058387" "7068610" "7099339" "7103313" "7116640" "7221268" "7260399" "7293289" "7328036" "7356614" "7395347" "7403514" "7593428" "7609747" "7639641" "7686520" "7734253" "7839824" "7945206" "8013732" "8024481" "8040917" "8045501" "8060419" "8060681" "8077702" "7945206" "8013732" "8024481" "8040917" "8045501" "8060419" "8060681" "8077702" "8149783" "8160000" "8228924").pn.	US-PGPUB; USPAT	OR	ON	2015/01/27 14:01
S162	8	S160 and (head$3 field portion sector)with(packet block frame set group payload stream)with(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:02
S163	0	S161 and (head$3 field portion sector)with(packet block frame set group payload stream)with(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:02
S164	2	S161 and (head$3 field portion sector)same(packet block frame set group payload stream)same(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:04
S165	49	("5844918" "4799215" "5875292" "4412326" "4551834" "4617657" "4888767" "4989204" "5222061" "5235599" "5267237" "5444718" "5610595" "5740167" "5754754" "5828293" "6161207" "6181700" "6219713" "6219713" "6453438" "6483845" "6587985" "6684354"	US-PGPUB; USPAT	OR	ON	2015/01/27 14:48

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 440 of 739

		"6732313" "6785259" "6891799" "6914903" "6918077" "6987730" "7088701" "7099300" "7124333" "7263644" "7356750" "7386872" "7397861" "7400616" "7447969" "7477621" "7484157" "7486700" "7535840" "7583701" "7633880" "7689644" "7701846" "7710889" "7769014" "7823039").pn.				
S166	28	S165 and (head$3 field portion sector)same(packet block frame set group payload stream)same(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:48
S167	19	S165 and (head$3 field portion sector)with(packet block frame set group payload stream)with(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:49
S168	7	"18337261".FMID.	US-PGPUB; USPAT; FPRS	OR	OFF	2015/01/27 15:04
S169	145	(transmi$5 transceiv$3)with(two type different second$3)near(packet block group set package chunk)with((identif$7 indicat$3 determin$3)near header)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:08
S170	533	(transmi$5 transceiv$3)with(two type different second$3)with(packet block group set package chunk)with((identif$7 indicat$3 determin$3)near header)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:09
S171	135339	(Quality near2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:12
S172	1669	((packet adj error adj rate PER)near2 low$3)and((delay late$3)near2 low$3)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:14
S173	0	S170 and S172	US-PGPUB; USPAT	OR	ON	2015/06/03 19:14
S174	396	S171 and S172	US-PGPUB; USPAT	OR	ON	2015/06/03 19:14
S175	7346	(transmi$5 transceiv$3)same(two type different second$3)same(packet block group set package chunk frame)same((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:17
S176	8	S174 and S175	US-PGPUB; USPAT	OR	ON	2015/06/03 19:17
S177	478	(transmi$5 send$3)near2(two type different second$3)near2(packet block group set package chunk frame)same((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:15
S178	28	(transmi$5 send$3)near2(two type different second$3)near2(packet block group set package chunk frame)near2((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:15

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 441 of 739

S179	12	("20020154600" | "6754188" | "7483421" | "6005851" | "20040179494" | "20070206621" | "7031259" | "20050036497" | "20020126675" | "20090319854" | "20030009717" | "7826438").PN.	US-PGPUB; USPAT	OR	OFF	2015/06/04 11:16
S180	0	S177 and S179	US-PGPUB; USPAT	OR	ON	2015/06/04 11:17
S181	3	S179 and (transmi$5 send$3)same(two type different second$3)same(packet block group set package chunk frame)same((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:17
S182	63	(Quality near2 Service QOS)same((packet adj error adj rate PER)near2 low$3)and((delay late$3)near2 low$3)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:38
S183	1507	(transmi$5 send$3)with(two type different second$3)with(packet block group set package chunk frame)with((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:38
S184	1	S182 and S183	US-PGPUB; USPAT	OR	ON	2015/06/04 11:39
S185	43	S183 same(Quality near2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:39
S186	24	(transmi$5 send$3)with(two type different second$3)with(packet block group set package chunk frame)with(Quality near2 Service QOS)with((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:00
S187	44	(Quality near2 Service QOS)same((packet adj2 error adj2 rate PER)near2 low$3)same((delay late$3)near2 low$3)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:18
S188	26	((Quality near2 Service QOS)near2 level)same((packet adj2 error adj2 rate PER)near low$3)same((delay late$3)near low$3)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:35
S189	44	((Quality near2 Service QOS)near2 level)and((packet adj2 error adj2 rate PER)near low$3)and((delay late$3)near low$3)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:36
S190	6709	(transmi$5 send$3)with(packet block group set package chunk frame)with((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:36
S191	2	S189 and S190	US-PGPUB; USPAT	OR	ON	2015/06/04 12:37

6/4/2015 3:15:38 PM
C:\Users\oalshack\Documents\EAST\Workspaces\14159125.wsp

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 442 of 739

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, Osman M
Sheet	1	of	2	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	2003/0009717	01-09-2003	Fukushima et al.	
	2	2005/0036497	02-17-2005	Kawakami	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	3	EP 1006689	06/07/2000	Matsushita Electric Industries Co., Ltd.		
	4	EP 1361690	11/12/2003	MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.		
	5	EP 1507353	02/16/2005	NTT DoCoMo, Inc.		
	6	JP 2001-119437	04/27/2001	MATSUSHITA ELECTRIC IND CO LTD		(Believed to correspond to US 2003/0009717 cited herein)
	7	JP 2004-007823	01/08/2004	MATSUSHITA ELECTRIC IND CO LTD		(Believed to Correspond to EP 1361690 cited herein)
	8	JP 2005-064594	03/10/2005	NTT DOCOMO INC		(Believed to correspond to EP 1507353 cited herein)
	9	JP 2005-191735	07/14/2005	TOSHIBA CORP		(Includes English translation of Abstract)

Examiner Signature	/Osman Alshack/	Date Considered	06/04/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, Osman M
Sheet	2	of	2	Attorney Docket Number	6936-57-PUS-CON-3

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	10	Notice of Allowance (Including Translation) for Japanese Patent Application No. 2007-535818, dispatched Dec. 12, 2011 (Attorney Ref. No. 6936-54-PJP)
	11	Official Action (including translation) for Japanese Patent Application No. 2008-264540, dispatched Dec. 12, 2011 (Attorney Ref. No. 6936-54-PJP-DIV)
	12	Examiner's Report for Canadian Patent Application No. 2,647,589, mailed February 26, 2015 (Attorney Ref. No.: 6936-57-PCA)
	13	Examination Report for European Patent Application No. 07811844.5, mailed Apr. 1, 2009 (Attorney Ref. No. 6936-57-PEP)
	14	Decision of Final Rejection (Including Translation) for Japanese Patent Application No. 2010-017356, dispatched April 23, 2012 (Attorney Ref. No.: 6936-57-PJP-DIV)
	15	Official Action for Japanese Patent Application No. 2013-246257 dispatched January 26, 2015 (Attorney Ref. No.: 6936-57-PJP-DIV-3)
	16	Official Action (including translation) for Korean Patent Application No. 10-2008-7024792 dated Feb. 23, 2015 (Attorney Ref. No. 6936-57-PKR)
	17	Official Action (including translation) for Korean Patent Application No. 10-2014-7005299 mailed Feb. 23, 2015 (Attorney Ref. No.: 6936-57-PKR-DIV)
	18	Notice of Allowance for U.S. Patent Application No. 14/081,469, mailed April 3, 2015 December 17, 2014 (Attorney Ref. No.: 6936-54-CON-6)
	19	Notice of Allowance for U.S. Patent Application No. 14/075,194, mailed April 8, 2015 (Attorney Ref. No. 6936-57-PUS-DIV-CON-2)

Examiner Signature	/Osman Alshack/	Date Considered	06/04/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015	06/04/2015							
	1	-	-							
	2	-	-							
	3	-	-							
	4	-	-							
	5	-	-							
	6	-	-							
	7	-	-							
	8	-	-							
	9	-	-							
	10	-	-							
	11	-	-							
	12	-	-							
	13	-	-							
	14	-	-							
	15	-	-							
	16	-	-							
	17	-	-							
	18	-	-							
	19	-	-							
	20	-	-							
	21	-	-							
	22	-	-							
	23	-	-							
	24	-	-							
	25	-	-							
	26	-	-							
	27	-	-							
	28	-	-							
	29	-	-							
	30	-	-							
	31	-	-							
	32	-	-							
	33	-	-							
	34	-	-							
	35	-	-							
	36	-	-							

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 445 of 739

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015	06/04/2015							
	37	-	-							
	38	-	-							
	39	-	-							
	40	-	-							
	41	-	-							
	42	-	-							
	43	-	-							
	44	-	-							
	45	-	-							
	46	-	-							
	47	-	-							
	48	-	-							
	49	-	-							
	50	-	-							
	51	-	-							
	52	-	-							
	53	-	-							
	54	-	-							
	55	-	-							
	56	-	-							
	57	-	-							
	58	-	-							
	59	-	-							
	60	-	-							
	61	-	-							
	62	-	-							
	63	-	-							
	64	-	-							
	65	-	-							
	66	-	-							
	67	-	-							
	68	-	-							
	69	-	-							
	70	-	-							
	71	-	-							
	72	-	-							

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 446 of 739

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015	06/04/2015							
	73	-	-							
	74	-	-							
	75	-	-							
	76	-	-							
	77	-	-							
	78	-	-							
	79	-	-							
	80	-	-							
	81	-	-							
	82	-	-							
	83	-	-							
	84	-	-							
	85	-	-							
	86	-	-							
	87	-	-							
	88	-	-							
	89	-	-							
	90	-	-							
	91	-	-							
	92	-	-							
	93	-	-							
	94	-	-							
	95	-	-							
	96	-	-							
	97	-	-							
	98	-	-							
	99	-	-							
	100	-	-							
	101	-	-							
	102	-	-							
	103	-	-							
	104	-	-							
	105	-	-							
	106	✓	✓							
	107	✓	✓							
	108	✓	✓							

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 447 of 739

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015	06/04/2015							
	109	✓	✓							
	110	✓	✓							
	111	✓	✓							
	112	✓	✓							
	113	✓	✓							
	114	✓	✓							
	115	✓	✓							
	116	✓	✓							
	117	✓	✓							
	118	✓	✓							
	119	✓	✓							
	120	✓	✓							
	121	✓	✓							
	122	✓	✓							
	123	✓	✓							
	124	✓	✓							
	125	✓	✓							

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 448 of 739

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

CPC- SEARCHED		
Symbol	Date	Examiner
H04L 1/1809, H04L 1/1812, H04L 1/1887, H04L 1/1819	01/23/2015	O.A
H04L 2001/0093, H04L 45/302, H04L 47/6215	01/23/2015	O.A

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
714	748, 749, 776	01/23/2015	O.A

SEARCH NOTES		
Search Notes	Date	Examiner
East Inventor search	01/23/2015	O.A
East text search	01/23/2015	O.A
East text search updated	06/04/2015	O.A

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

/OSMAN ALSHACK/ Examiner, Art Unit 2112	

Substitute for form 1449A/PTO				***Complete if Known***	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	1	of	1	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	7042891	05-09-2006	Oberman et al.	

UNPUBLISHED U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	2	14/730874	06-04-2015	Tzannes et al.	
	3	14/742334	06-17-2015	Tzannes	

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	4	Official Action for U.S. Patent Application No. 14/730,874 mailed June 30, 2015 (Attorney Ref. No.: 6936-54-CON-7)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Electronic Patent Application Fee Transmittal

Application Number:	14159125
Filing Date:	20-Jan-2014
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Filer:	Jason Vick/Joanne Vos
Attorney Docket Number:	6936-57-PUS-CON-3

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt	
EFS ID:	22910770
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	14-JUL-2015
Filing Date:	20-JAN-2014
Time Stamp:	13:29:50
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	11417
Deposit Account	191970
Authorized User	VICK, JASON H.
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		IDS_07_Foreign_Certified.pdf	200836 7039dd1d7c70eac112e08da95763a247e557b70e	yes	4
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	3	
	Information Disclosure Statement (IDS) Form (SB08)		4	4	
Warnings:					
Information:					
2	Non Patent Literature	6936-54-PCA-DIV_NOA_04-20-2015.pdf	1610341 75c173af91e6e440a3d88ad359372e6fc8e74e06	no	1
Warnings:					
Information:					
3	Non Patent Literature	6936-54-PCN_OA_04-14-2015.pdf	14609026 86a21abad482c57ae1c7c9ee80090884a05775dc	no	30
Warnings:					
Information:					
4		IDS_08_USCertified.pdf	200731 fe56135bcfff7bb53d2464d0eab41da246aac6dc	yes	4
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	3	
	Information Disclosure Statement (IDS) Form (SB08)		4	4	
Warnings:					
Information:					
5	Non Patent Literature	6936-54-CON-7_OA_06-30-2015.pdf	194057 e9e6590ce8e800ca11d87178bdc34dd21c21e9c1	no	6
Warnings:					

Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	30775 18943b6791f1a1479f333e95ecf61871fa3bd3d9	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	16845766	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:	)	Group Art Unit: 2112
Marcos C. Tzannes	)	Confirmation No.: 3369
Serial No.: 14/159,125	)	Examiner: Alshack, Osman M
Filed: January 20, 2014	)	
Atty File No.: 6936-57-PUS-CON-3	)	SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT
Entitled: "PACKET RETRANSMISSION AND MEMORY SHARING"	)	Electronically Submitted

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Madam:

The references cited on attached Form PTO-1449 are being called to the attention of the Examiner.

☒ Copies of the cited non-patent and/or foreign references are enclosed herewith.

☐ Copies of the cited U.S. patents and/or patent applications are enclosed herewith.

☐ Copies of the cited U.S. patents/unpublished patent applications/patent application publications are not enclosed in accordance with 37 C.F.R. § 1.98(a).

☐ Copies of the cited references are not enclosed, in accordance with 37 C.F.R. § 1.98(d), because the references were cited by or submitted to the U.S. Patent and Trademark Office in prior application Serial No. _____ filed _____, which is relied upon for an earlier filing date under 35 U.S.C. § 120.

☒ To the best of applicants' belief, the pertinence of the foreign-language references are believed to be summarized in the attached English translation/abstracts and/or in the figures, although applicants do not necessarily vouch for the accuracy of the translation.

☐ Examiner's attention is drawn to the following related applications:

- Serial No. _____ filed _____ (Attorney Ref. No. _____)

☐ Other: _____

Submission of the above information is not intended as an admission that any item is citable under the statutes or rules to support a rejection, that any item disclosed represents

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 456 of 739

analogous art, or that those skilled in the art would refer to or recognize the pertinence of any reference without the benefit of hindsight, nor should an inference be drawn as to the pertinence of the references based on the order in which they are presented. Submission of this statement should not be taken as an indication that a search has been conducted, or that no better art exists.

It is respectfully requested that the cited information be expressly considered during the prosecution of this application and the references made of record therein.

FEES

☐	**37 CFR 1.97(b):** No fee is believed due in connection with this submission, because the information disclosure statement submitted herewith is satisfied by one of the following conditions ("X" indicates satisfaction): ☐ Within three months of the filing date of a national application other than a continued prosecution application under 37 CFR 1.53(d), or ☐ Within three months of the date of entry into the national stage of an international application as set forth in 37 CFR 1.491 or ☐ Before the mailing date of a first Office Action on the merits, or ☐ Before the mailing of a first Office action after the filing of a request for continued examination under 37 CFR 1.114. Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970.
☐	**37 CFR 1.97(c):** The information disclosure statement transmitted herewith is being filed after all the above conditions (37 CFR 1.97(b)), but before the mailing date of one of the following conditions: (1) a final action under 37 C.F.R. 1.113 or (2) a notice of allowance under 37 C.F.R. 1.311, or (3) an action that otherwise closes prosecution in the application. This Information Disclosure Statement is accompanied by: ☐ A Certification (below) as specified by 37 C.F.R. 1.97(e). Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970. OR ☐ Please charge Deposit Account 19-1970 in the amount of $180.00 for the fee set forth in 37 C.F.R. 1.17(p) for submission of an information disclosure statement. Please credit any overpayment or charge any underpayment to Deposit Account 19-1970.
☒	**37 CFR 1.97(d):** This Information Disclosure Statement is being submitted after the period specified in 37 CFR 1.97(c). ☒ This information Disclosure Statement includes a Certification (below) as specified by 37 C.F.R. 1.97(e) AND ☒ Applicants hereby requests consideration of the reference(s) disclosed herein. Please charge Deposit Account 19-1970 in the amount of $180.00 under 37 C.F.R. 1.17(p). Please credit any overpayment or charge any underpayment to Deposit Account 19-1970. Election to pay the fee should not be taken as an indication that applicant(s) cannot execute a certification.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 457 of 739

Certification (37 C.F.R. 1.97(e))
(Applicable only if checked)

☒ The undersigned certifies that:

☒ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(1).

☒ A copy of the communication from the foreign patent office is enclosed.

OR

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned after making reasonable inquiry, no item of information contained in this Information Disclosure Statement was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(2).

Respectfully submitted,

SHERIDAN ROSS P.C.

Date: July 14, 2015

By: /Jason H. Vick/
Jason H. Vick
Reg. No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202
Telephone: 303-863-9700

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 458 of 739

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	1	of	1	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

UNPUBLISHED U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	1	Notice of Allowance for Canadian Patent Application No. 2,869,452, mailed April 20, 2015 (Attorney's Ref. No.: 6936-54-PCA-DIV)
	2	Reexamination Decision (including translation) for Chinese Patent Application No. 200580032703.1, dispatched April 14, 2015 (Attorney Ref. No. 6936-54-PCN)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of: Marcos C. Tzannes Serial No.: 14/159,125 Filed: January 20, 2014 Atty File No.: 6936-57-PUS-CON-3 Entitled: "PACKET RETRANSMISSION AND MEMORY SHARING"	Group Art Unit: 2112 Confirmation No.: 3369 Examiner: Alshack, Osman M SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT Electronically Submitted

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Madam:

The references cited on attached Form PTO-1449 are being called to the attention of the Examiner.

☒ Copies of the cited non-patent and/or foreign references are enclosed herewith.

☐ Copies of the cited U.S. patents and/or patent applications are enclosed herewith.

☒ Copies of the cited U.S. patents/unpublished patent applications/patent application publications are not enclosed in accordance with 37 C.F.R. § 1.98(a).

☐ Copies of the cited references are not enclosed, in accordance with 37 C.F.R. § 1.98(d), because the references were cited by or submitted to the U.S. Patent and Trademark Office in prior application Serial No. _____ filed _____, which is relied upon for an earlier filing date under 35 U.S.C. § 120.

☐ To the best of applicants' belief, the pertinence of the foreign-language references are believed to be summarized in the attached English translation/abstracts and/or in the figures, although applicants do not necessarily vouch for the accuracy of the translation.

☒ Examiner's attention is drawn to the following related applications:

- Serial No. 14/730,874 filed June 4, 2015 (Attorney Ref. No. 6936-54-CON-7)
- Serial No. 14/742,334 filed June 17, 2015 (Attorney Ref. No. 6936-57-PUS-DIV-CON-3)

☐ Other: _____

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 460 of 739

Submission of the above information is not intended as an admission that any item is citable under the statutes or rules to support a rejection, that any item disclosed represents analogous art, or that those skilled in the art would refer to or recognize the pertinence of any reference without the benefit of hindsight, nor should an inference be drawn as to the pertinence of the references based on the order in which they are presented. Submission of this statement should not be taken as an indication that a search has been conducted, or that no better art exists.

It is respectfully requested that the cited information be expressly considered during the prosecution of this application and the references made of record therein.

FEES

☐	**37 CFR 1.97(b):** No fee is believed due in connection with this submission, because the information disclosure statement submitted herewith is satisfied by one of the following conditions ("X" indicates satisfaction): ☐ Within three months of the filing date of a national application other than a continued prosecution application under 37 CFR 1.53(d), or ☐ Within three months of the date of entry into the national stage of an international application as set forth in 37 CFR 1.491 or ☐ Before the mailing date of a first Office Action on the merits, or ☐ Before the mailing of a first Office action after the filing of a request for continued examination under 37 CFR 1.114. Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970.
☐	**37 CFR 1.97(c):** The information disclosure statement transmitted herewith is being filed after all the above conditions (37 CFR 1.97(b)), but before the mailing date of one of the following conditions: (1) a final action under 37 C.F.R. 1.113 or (2) a notice of allowance under 37 C.F.R. 1.311, or (3) an action that otherwise closes prosecution in the application. This Information Disclosure Statement is accompanied by: ☐ A Certification (below) as specified by 37 C.F.R. 1.97(e). Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970. OR ☐ Please charge Deposit Account 19-1970 in the amount of $180.00 for the fee set forth in 37 C.F.R. 1.17(p) for submission of an information disclosure statement. Please credit any overpayment or charge any underpayment to Deposit Account 19-1970.
☒	**37 CFR 1.97(d):** This Information Disclosure Statement is being submitted after the period specified in 37 CFR 1.97(c). ☒ This information Disclosure Statement includes a Certification (below) as specified by 37 C.F.R. 1.97(e) AND ☒ Applicants hereby requests consideration of the reference(s) disclosed herein. Please charge Deposit Account 19-1970 in the amount of $180.00 under 37 C.F.R. 1.17(p). Please credit any overpayment or charge any underpayment to Deposit Account 19-1970. Election to pay the fee should not be taken as an indication that applicant(s) cannot execute a certification.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 461 of 739

Certification (37 C.F.R. 1.97(e))
(Applicable only if checked)

☒ The undersigned certifies that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(1).

☐ A copy of the communication from the foreign patent office is enclosed.

OR

☒ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned after making reasonable inquiry, no item of information contained in this Information Disclosure Statement was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(2).

Respectfully submitted,

SHERIDAN ROSS P.C.

Date: July 14, 2015

By: /Jason H. Vick/
Jason H. Vick
Reg. No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202
Telephone: 303-863-9700

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 462 of 739

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, Osman M.
Sheet	1	of	1	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	1	Notice of Acceptance for Australian Patent Application No. 2015200618 mailed July 15, 2015 (Attorney's Ref. No. 6936-54-PAU-DIV-2)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Electronic Patent Application Fee Transmittal

Application Number:	14159125
Filing Date:	20-Jan-2014
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Filer:	Jason Vick/Joanne Vos
Attorney Docket Number:	6936-57-PUS-CON-3

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt	
EFS ID:	23667199
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	01-OCT-2015
Filing Date:	20-JAN-2014
Time Stamp:	16:07:11
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	2775
Deposit Account	191970
Authorized User	VICK, JASON H.
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		IDS_09.pdf	199621 30544f5fd7ef5df26cafbde38f691cf57047ddd7	yes	4
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	3	
	Information Disclosure Statement (IDS) Form (SB08)		4	4	
Warnings:					
Information:					
2	Non Patent Literature	6936-54-PAU-DIV-2_NOA_07-15-2015.pdf	118309 db38f0490b28c1f9bf8844ea5e5dfe8d9041b0bf	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30774 48e6b81e6f3748e9b6c5bccd8e0a3bff1ddef81a	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	348704		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:	)	Group Art Unit: 2112
Marcos C. Tzannes	)	Confirmation No.: 3369
Serial No.: 14/159,125	)	Examiner: Alschack, Osman M.
Filed: January 20, 2014	)	
Atty File No.: 6936-57-PUS-CON-3	)	SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT
Entitled: "PACKET RETRANSMISSION AND MEMORY SHARING"	)	Electronically Submitted

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Madam:

The references cited on attached Form PTO-1449 are being called to the attention of the Examiner.

☒ Copies of the cited non-patent and/or foreign references are enclosed herewith.

☐ Copies of the cited U.S. patents and/or patent applications are enclosed herewith.

☐ Copies of the cited U.S. patents/unpublished patent applications/patent application publications are not enclosed in accordance with 37 C.F.R. § 1.98(a).

☐ Copies of the cited references are not enclosed, in accordance with 37 C.F.R. § 1.98(d), because the references were cited by or submitted to the U.S. Patent and Trademark Office in prior application Serial No. _____ filed _____, which is relied upon for an earlier filing date under 35 U.S.C. § 120.

☐ To the best of applicants' belief, the pertinence of the foreign-language references are believed to be summarized in the attached English translation/abstracts and/or in the figures, although applicants do not necessarily vouch for the accuracy of the translation.

☐ Examiner's attention is drawn to the following related applications:

- Serial No. _____ filed _____ (Attorney Ref. No. _____)

☐ Other: _____

Submission of the above information is not intended as an admission that any item is citable under the statutes or rules to support a rejection, that any item disclosed represents

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 469 of 739

analogous art, or that those skilled in the art would refer to or recognize the pertinence of any reference without the benefit of hindsight, nor should an inference be drawn as to the pertinence of the references based on the order in which they are presented. Submission of this statement should not be taken as an indication that a search has been conducted, or that no better art exists.

It is respectfully requested that the cited information be expressly considered during the prosecution of this application and the references made of record therein.

FEES

☐	**37 CFR 1.97(b):** No fee is believed due in connection with this submission, because the information disclosure statement submitted herewith is satisfied by one of the following conditions ("X" indicates satisfaction): ☐ Within three months of the filing date of a national application other than a continued prosecution application under 37 CFR 1.53(d), or ☐ Within three months of the date of entry into the national stage of an international application as set forth in 37 CFR 1.491 or ☐ Before the mailing date of a first Office Action on the merits, or ☐ Before the mailing of a first Office action after the filing of a request for continued examination under 37 CFR 1.114. Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970.
☐	**37 CFR 1.97(c):** The information disclosure statement transmitted herewith is being filed after all the above conditions (37 CFR 1.97(b)), but before the mailing date of one of the following conditions: (1) a final action under 37 C.F.R. 1.113 or (2) a notice of allowance under 37 C.F.R. 1.311, or (3) an action that otherwise closes prosecution in the application. This Information Disclosure Statement is accompanied by: ☐ A Certification (below) as specified by 37 C.F.R. 1.97(e). Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970. OR ☐ Please charge Deposit Account 19-1970 in the amount of $180.00 for the fee set forth in 37 C.F.R. 1.17(p) for submission of an information disclosure statement. Please credit any overpayment or charge any underpayment to Deposit Account 19-1970.
☒	**37 CFR 1.97(d):** This Information Disclosure Statement is being submitted after the period specified in 37 CFR 1.97(c). ☒ This information Disclosure Statement includes a Certification (below) as specified by 37 C.F.R. 1.97(e) AND ☒ Applicants hereby requests consideration of the reference(s) disclosed herein. Please charge Deposit Account 19-1970 in the amount of $180.00 under 37 C.F.R. 1.17(p). Please credit any overpayment or charge any underpayment to Deposit Account 19-1970. Election to pay the fee should not be taken as an indication that applicant(s) cannot execute a certification.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 470 of 739

Certification (37 C.F.R. 1.97(e))
(Applicable only if checked)

☒ The undersigned certifies that:

☒ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(1).

☒ A copy of the communication from the foreign patent office is enclosed.

OR

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned after making reasonable inquiry, no item of information contained in this Information Disclosure Statement was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(2).

Respectfully submitted,

SHERIDAN ROSS P.C.

Date: October 1, 2015

By: /Jason H. Vick/
Jason H. Vick
Reg. No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202
Telephone: 303-863-9700

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 471 of 739

PTO/SB/30EFS (07-14)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	14/159,125	Filing Date	2014-01-20	Docket Number (if applicable)	6936-57-PUS-CON-3	Art Unit	2112
First Named Inventor	Marcos C. Tzannes			Examiner Name	ALSHACK, OSMAN M		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, to any international application that does not comply with the requirements of 35 U.S.C. 371, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV.

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 191970

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (07-14)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Jason H. Vick/	Date (YYYY-MM-DD)	2015-12-02
Name	Jason H. Vick	Registration Number	45285

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	14159125
Filing Date:	20-Jan-2014
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Filer:	Jason Vick/Joanne Vos
Attorney Docket Number:	6936-57-PUS-CON-3

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 3 months with $0 paid	1253	1	1400	1400
Miscellaneous:				
Request for Continued Examination	1801	1	1200	1200
		Total in USD ($)		**2600**

Electronic Acknowledgement Receipt	
EFS ID:	24246076
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	02-DEC-2015
Filing Date:	20-JAN-2014
Time Stamp:	18:19:23
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$2600
RAM confirmation Number	17469
Deposit Account	191970
Authorized User	VICK, JASON H.
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		AMEND_02_AF.pdf	177287 93277ae5a1e93bad3560a2f4c5b0d1b490649f57	yes	6

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment Submitted/Entered with Filing of CPA/RCE	1	1
	Claims	2	4
	Applicant Arguments/Remarks Made in an Amendment	5	5
	Extension of Time	6	6

Warnings:					
Information:					
2	Request for Continued Examination (RCE)	RCE_01.pdf	1349884 74563fab19ed419138b0b51d17143c82b158aca5	no	3
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	32916 f761590c9a453ef208f90e4ddaec9f5358a08cf4	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1560087		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of: Marcos C. Tzannes	Group Art Unit: 2112
Application No.: 14/159,125	Examiner: ALSHACK, Osman M.
Filed: January 20, 2014	Confirmation No.: 3369
Atty. File No.: 6936-57-PUS-CON-3	

For: PACKET RETRANSMISSION AND MEMORY SHARING

AMENDMENT AFTER FINAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Madam:

Applicant submits this Amendment After Final to address the Final Office Action having a mailing date of June 16, 2015. Please credit any overpayment or charge any underpayment to Deposit Account No. 19-1970.

Please amend the above-identified patent application as follows:

Amendments to the Claims are shown in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 5 of this paper.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 480 of 739

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-105. (Cancelled)

106. (Previously Presented) A method of packet retransmission, in a transceiver, comprising:

transmitting, by the transceiver, a first type of packet; and

transmitting, by the transceiver, a second type of packet,

wherein the first type of packet is stored in a retransmission buffer after transmission and the second type of packet is not stored in a retransmission buffer after transmission,

wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and

wherein the header field of the first type of packet comprises a sequence identifier (SID) that is incremented after the first type of packet is transmitted and the header field of the second type of packet does not comprise the SID of the first type of packet.

107. (Previously Presented) The method of claim 106, wherein the transceiver is connected to a second transceiver using a wired or wireless channel and the transceivers are used to transport one or more of video and voice data.

108. (Previously Presented) The method of claim 106, wherein the method is performed in a linecard that is operable to transport video.

109. (Previously Presented) The method of claim 106, wherein the method is performed in a customer premises modem that is operable to transport video.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 481 of 739

110. (Previously Presented) The method of claim 106, wherein the transceiver includes at least one digital signal processor.

111. (Previously Presented) The method of claim 106, wherein the transceiver includes at least one ASIC (Application Specific Integrated Circuit).

112. (Previously Presented) The method of claim 106, wherein the first type of packet comprises one or more PTM-TC (Packet Transfer Mode - Transmission Convergence) codewords.

113. (Previously Presented) The method of claim 106, wherein the first type of packet comprises one or more ATM (Asynchronous Transfer Mode) cells.

114. (Previously Presented) The method of claim 106, wherein the first type of packet comprises one or more Reed Solomon codewords.

115. (Previously Presented) The method of claim 106, wherein the first type of packet is a low-PER (Packet Error Rate) packet and the second type of packet is a low-latency packet.

116. (Previously Presented) A transceiver operable to transmit a first type of packet and to transmit a second type of packet, wherein the first type of packet is stored in a retransmission buffer after transmission and the second type of packet is not stored in a retransmission buffer after transmission, and wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and wherein the header field of the first type of packet comprises a sequence identifier (SID) that is incremented after the first type of packet is transmitted and the header field of the second type of packet does not comprise the SID of the first type of packet.

117. (Previously Presented) The transceiver of claim 116, wherein the transceiver is connected to a second transceiver using a wired or wireless channel and the transceivers are used to transport one or more of video and voice data.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 482 of 739

118. (Previously Presented) The transceiver of claim 116, wherein the transceiver is located in a linecard that is operable to transport video.

119. (Previously Presented) The transceiver of claim 116, wherein the transceiver is located in a customer premises modem that is operable to transport video.

120. (Previously Presented) The transceiver of claim 116, wherein the transceiver includes at least one digital signal processor.

121. (Previously Presented) The transceiver of claim 116, wherein the transceiver includes at least one ASIC (Application Specific Integrated Circuit).

122. (Previously Presented) The transceiver of claim 116, wherein the first type of packet comprises one or more PTM-TC (Packet Transfer Mode - Transmission Convergence) codewords.

123. (Previously Presented) The transceiver of claim 116, wherein the first type of packet comprises one or more ATM (Asynchronous Transfer Mode) cells.

124. (Previously Presented) The transceiver of claim 116, wherein the first type of packet comprises one or more Reed Solomon codewords.

125. (Previously Presented) The transceiver of claim 116, wherein the first type of packet is a low-PER (Packet Error Rate) packet and the second type of packet is a low-latency packet.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 483 of 739

REMARKS

Applicant respectfully requests reconsideration of this application as amended.

Applicant expressly thanks Ex. Alshack for the courtesies extended during the December 2, 2015 Telephone Interview. During the Interview, the last paragraph of claim 106 was discussed. Specifically it was pointed out that Yoshimura, in paragraph 90 is silent regarding a SID. The Examiner agreed and indicated an updated search would need to be performed upon Applicant's formal response being filed.

As such, Applicant respectfully submits all rejections are moot. Withdrawal of the various rejections under 35 U.S.C. §103 are respectfully requested.

With all rejections having been overcome, Applicant respectfully submits the application is in condition for allowance.

A prompt notice of allowance is respectfully solicited.

Should the Examiner believe anything further is desirable in order to place the application in even better condition for allowance, the Examiner is encouraged to contact Applicants undersigned representative at the telephone number listed below.

The Commissioner is hereby authorized to charge to deposit account number 19-1970 any fees under 37 CFR § 1.16 and 1.17 that may be required by this paper and to credit any overpayment to that Account. If any extension of time is required in connection with the filing of this paper and has not been separately requested, such extension is hereby Petitioned.

Respectfully submitted,

SHERIDAN ROSS P.C.

Date: December 2, 2015

By: /Jason H. Vick/

Jason H. Vick, Reg. No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202
Telephone: 303-863-9700

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 484 of 739

PTO/AIA/22 (03-13)
Approved for use through 7/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)	Docket Number (Optional) 6936-57-PUS-CON-3
Application Number 14/159,125	Filed January 20, 2014
For PACKET RETRANSMISSION AND MEMORY SHARING	
Art Unit 2112	Examiner ALSHACK, OSMAN M

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

		Fee	Small Entity Fee	Micro Entity Fee	
☐	One month (37 CFR 1.17(a)(1))	$200	$100	$50	$
☐	Two months (37 CFR 1.17(a)(2))	$600	$300	$150	$
☑	Three months (37 CFR 1.17(a)(3))	$1,400	$700	$350	$ 1,400
☐	Four months (37 CFR 1.17(a)(4))	$2,200	$1,100	$550	$
☐	Five months (37 CFR 1.17(a)(5))	$3,000	$1,500	$750	$

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☑ The Director has already been authorized to charge fees in this application to a Deposit Account.

☑ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 19-1970.

☑ Payment made via EFS-Web.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant.

☑ attorney or agent of record. Registration number 45285.

☐ attorney or agent acting under 37 CFR 1.34. Registration number _____.

/Jason H. Vick/ — Signature

December 2, 2015 — Date

Jason H. Vick — Typed or printed name

303-863-9700 — Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☑ * Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/159,125	Filing Date 01/20/2014	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT **12/02/2015**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	X $80 =	0
Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $420 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/TAMIE JARRETT/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/159,125	01/20/2014	Marcos C. Tzannes	6936-57-PUS-CON-3	3369

62574 7590 12/10/2015

Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

EXAMINER	
ALSHACK, OSMAN M	

ART UNIT	PAPER NUMBER
2112	

NOTIFICATION DATE	DELIVERY MODE
12/10/2015	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jvick@sheridanross.com

Applicant-Initiated Interview Summary	**Application No.**	**Applicant(s)**	
	14/159,125	TZANNES, MARCOS C.	
	Examiner	**Art Unit**	
	OSMAN ALSHACK	2112	

All participants (applicant, applicant's representative, PTO personnel):

(1) *OSMAN ALSHACK*. (3)_____.

(2) *Jason Vick (Reg. No. 45,285)*. (4)_____.

Date of Interview: *02 December 2015*.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☒103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *1*.

Identification of prior art discussed: *Reference Yoshimura et al. (U.S.PN: 2002/0126675* .

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Applicant's attorney briefly explained and discussed the claimed invention. Applicant's attorney argues that the cited paragraph [0090] of reference (U.S.PN: 2002/0126675 by Yoshimura et al.) fails to teach the limitation of " the header field of the second type of packet does not comprise the SID of the first type of packet." Examiner agrees that paragraph [0090] specifically does not explicitly teach the limitation. However, the Examiner will review the cited references, update the search, and reconsider upon filling of arguments and/or amendmen.

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/OSMAN ALSHACK/ Examiner, Art Unit 2112	/ALBERT DECADY/ Supervisory Patent Examiner, Art Unit 2112

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

Electronic Acknowledgement Receipt

EFS ID:	24340063
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	11-DEC-2015
Filing Date:	20-JAN-2014
Time Stamp:	16:30:17
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	PART_1_ADTRAN_0001.pdf	21615528 1cca2e0954cbbe4324f99bdb6066aec0b739743f	no	217

Warnings:	
Information:	

2	Non Patent Literature	PART_1_ADTRAN_0002.pdf	23477425 99f357af0875107f1589a9de59cb17b32c3cd271	no	451
Warnings:					
Information:					
3	Non Patent Literature	PART_1_ADTRAN_0003.pdf	16929691 55ccf0997a00b80ff45dce4c40c7d65efc590e0a	no	235
Warnings:					
Information:					
4	Non Patent Literature	PART_1_ADTRAN_0004.pdf	5990550 b6c138f148e842bad36cdacbca45e9c4b858e6c1	no	226
Warnings:					
Information:					
5	Non Patent Literature	PART_1_ADTRAN_0005.pdf	18541112 916b5fd1a43a367801e88d79ed55f7b2334629a5	no	392
Warnings:					
Information:					
6	Non Patent Literature	PART_1_ADTRAN_0006.pdf	18567586 f1a623cbb29de40581eb38d2b49c2e97e58778ab	no	375
Warnings:					
Information:					
7	Non Patent Literature	PART_1_ADTRAN_0007.pdf	14180780 98a1a98d0aa224b09a6fcd34149cd1376ab66d3f	no	245
Warnings:					
Information:					
8	Non Patent Literature	PART_1_ADTRAN_0008.pdf	15668112 efb4c9631b2e9ad6213f955d43003c9b8837cedd	no	348
Warnings:					
Information:					
			Total Files Size (in bytes):	134970784	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	1	of	6	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	4979174	12-18-1990	Cheng et al.	
	2	5063533	11-05-1991	Erhart et al.	
	3	5214501	05-25-1993	Cavallerano et al.	
	4	5287384	02-15-1994	Avery et al.	
	5	5351016	09-27-1994	Dent	
	6	5420640	05-30-1995	Munich et al.	
	7	5422913	06-06-1995	Wilkinson	
	8	5563915	10-08-1996	Stewart	
	9	5596604	01-21-1997	Cioffi et al.	
	10	5635864	06-03-1997	Jones	
	11	5675585	10-07-1997	Bonnot et al.	
	12	5737337	04-07-1998	Voith et al.	
	13	5745275	04-28-1998	Giles et al.	
	14	5751338	05-12-1998	Ludwig, jr.	
	15	5751741	05-12-1998	Voith et al.	
	16	5757416	05-26-1998	Birch et al.	
	17	5764649	06-09-1998	Tong	
	18	5764693	06-09-1998	Taylor et al.	
	19	5793759	08-11-1998	Rakib et al.	
	20	5835527	11-10-1998	Lomp	
	21	5867400	02-02-1999	El-Ghoroury et al.	
	22	5903612	05-11-1999	Van Der Puttent et al.	
	23	5905874	05-18-1999	Johnson	
	24	5912898	06-15-1999	Khoury	
	25	5917340	06-29-1999	Manohar et al.	
	26	5968200	10-19-1999	Amrany	
	27	5991857	11-23-1999	Koetje et al.	
	28	5995539	11-30-1999	Miller	
	29	6041057	03-21-2000	Stone	
	30	6081291	06-27-2000	Ludwig, Jr.	
	31	6151690	11-21-2000	Peeters	
	32	6226322	05-01-2001	Mukherjee	
	33	6308278	10-23-2001	Khouli et al.	
	34	6381728	04-30-2002	Kang	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	2	of	6	Attorney Docket Number	6936-57-PUS-CON-3

	35	6392572	05-21-2002	Shiu et al.	
	36	6421323	07-16-2002	Nelson et al.	
	37	6473418	10-29-2002	Laroia et al.	
	38	6484283	11-19-2002	Stephen et al.	
	39	6480976	11-12-2002	Pan et al.	
	40	6498806	12-24-2002	Davis	
	41	6542500	04-01-2003	Gerszberg et al.	
	42	6553534	04-22-2003	Young, III et al.	
	43	6578162	06-10-2003	Yung	
	44	6640239	10-28-2003	Gidwani	
	45	6657949	12-02-2003	Jones, IV et al.	
	46	6704848	03-09-2004	Song	
	47	6754290	06-22-2004	Halter	
	48	6738370	05-18-2004	Ostman	
	49	6865233	03-08-2005	Eriksson et al.	
	50	6885696	04-26-2005	Wingrove	
	51	6904537	06-07-2005	Gorman	
	52	6922444	07-26-2005	Cai et al.	
	53	6956872	10-18-2005	Djokovic et al.	
	54	6988234	01-17-2006	Han	
	55	7024592	04-04-2006	Voas et al.	
	56	7027782	04-11-2006	Moon et al.	
	57	7050552	05-23-2006	Comisky	
	58	7058085	06-06-2006	Earnshaw et al.	
	59	7103096	09-05-2006	Mitlin et al.	
	60	7200138	04-03-2007	Liu	
	61	7203206	04-10-2007	Amidan et al.	
	62	7187708	03-06-2007	Shiu et al.	
	63	7200169	04-03-2007	Suzuki et al.	
	64	7224702	05-29-2007	Lee	
	65	7266132	09-04-2007	Liu et al.	
	66	7269208	09-11-2007	Mazzoni et al.	
	67	7272768	09-18-2007	Chang et al.	
	68	7302379	11-27-2007	Cioffi et al.	
	69	7400688	07-15-2008	Garrett	
	70	7668101	02-23-2010	Raissinia et al.	
	71	7933295	04-26-2011	Thi et al.	
	72	8775890	07-08-2014	Yap et al.	
	73	2001/0039637	11-08-2001	Bengough	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	3	of	6	Attorney Docket Number	6936-57-PUS-CON-3

	74	2002/0015401	02-07-2002	Subramanian et al.	
	75	2003/0008821	01-09-2003	Detmar et al.	
	76	2003/0014709	01-16-2003	Miyoshi et al.	
	77	2003/0088821	05-08-2003	Yokokawa et al.	
	78	2003/0093750	05-15-2003	Cameron	
	79	2003/0131209	07-10-2003	Lee	
	80	2003/0179770	09-25-2003	Reznic et al.	
	81	2004/0120435	06-24-2004	Yang et al.	
	82	2005/0034046	02-10-2005	Berkmann et al.	
	83	2005/0079889	04-14-2005	Vaglica et al.	
	84	2005/0204251	09-15-2005	Moon et al.	
	85	2005/0254441	11-17-2005	Levi et al.	
	86	2005/0254508	11-17-2005	Aksu et al.	

UNPUBLISHED U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2 (if known)]	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	87	60/078,549	03-19-1998	Jacobsen et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	88	JP 2002-118527	04/19/2002	MATSUSHITA ELECTRIC IND CO LTD		(Includes English Translation of Abstract)
	89	KR 10-0295086 B1	04/24/2001	C&S TECHNOLOGY CO LTD		(Includes an English Translation of Abstract)
	90	WO 98/47238	10/22/1998	NORTHERN TELECOM LIMITED		
	91	WO 00/41395	07/13/2000	SARNOFF CORPORATION		

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	4	of	6	Attorney Docket Number	6936-57-PUS-CON-3

	92	WO 01/11833	02/15/2001	BERKELEY CONCEPT RESEARCH CORPORATION		

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	93	ARAMVITH, Supavadee et al. "Wireless Video Transport Using Conditional Retransmission and Low-Delay Interleaving" IEEE 2001 (4 pages)
	94	BAUER, Rainer et al. "Iterative Source/Channel-Decoding Using Reversible Variable Length Codes" Munich University of Technology, 2000 (10 pages)
	95	BUSINESS WIRE "New FatPipe T1 Speed Product Produces Speeds up to 4.5Mbps and Redundancy for a Fraction of the Cost of a Fractional T3!" Business Wire, Oct. 16, 1998 (2 pages)
	96	BUZZARD, Greg et al., "An Implementation of the Hamlyn Sender-Managed Interface Architecture" The Second Symposium on Operating Systems Design and Implementation (OSDI '96) Proceedings (Seattle, WA), 28-31 October 1996 (15 pages)
	97	CISCO SYSTEMS, INC. "Alternatives for High Bandwidth Connections Using Parallel T1/E1 Links" 1998 (8 pages)
	98	EBERLE, Wolfgang et al. "80-Mb/S QPSK and 72-Mb/s 64-QAM Flexible and Scalable Digital OFDM Transceiver ASICs for Wireless Local Area Networks in the 5-GHz Band" IEEE Journal of Solid-State Circuits, Vol. 36, No. 11, November 2001 (10 pages)
	99	GOODMAN, David et al. "Maximizing the Throughput to CDMA Data Communications" Polytechnic University, Brooklyn, NY (5 pages)
	100	"ITU-T Recommendation G.992.1, "Series G: Transmission Systems and Media, Digital Systems and Networks" June 1999 (256 pages)
	101	ITU-T Recommendation G.992.3, "Asymmetric Digital Subscriber Line Transceivers 2 (ADSL2) " International Telecommunication Union, April 2009, 404 pages
	102	ITU-T Recommendation G.992.3 Annex C, "Annex C: Specific Requirements for an ADSL System Operating in the Same Cable as ISDN as Defined in Appendix III of Recommendation ITU-T G.961" International Telecommunication Union, April 2009, 296 pages
	103	ITU-T Recommendation G.993.1 "Very High Speed Digital Subscriber Line Transceivers" June 2004 (228 pages)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	5	of	6	Attorney Docket Number	6936-57-PUS-CON-3

	104	ITU-T SG15/Q4 Contribution LB-031 "VDSL2 - Constraining the Interleaver Complexity" Texas Instruments, Inc. June 2004 (7 pages)
	105	JOHNS, David A., et al. "Integrated Circuits for Data Transmission Over Twisted-Pair Channels" IEEE Journal of Solid-State Circuits, Vol. 32, Nov. 3, March 1997 (9 pages)
	106	PETZOLD, Mark C. et al. "Multicarrier Spread Spectrum Performance in Fading Channels with Serial Concatenated Convolutional Coding" IEEE 1998 (4 pages)
	107	SKLOWER, K. et al. "The PPP Multilink Protocol (MP)" Network Working Group, November 1994 (15 pages)
	108	WOLMAN, Alec et al. "Latency Analysis of TCP on an ATM Network" University of Washington, Printed Sept. 19, 2014 (14 pages)
	109	YAMADA, Hitoshi et al. "QoS Control by Traffic Engineering in Content Delivery Networks" Fujitsu Science and Technology Journal, December 2003 (11 pages)
	110	Official Action for European Patent Application No. 10000017.3, dated October 20, 2015 (Attorney Ref. No. 6936-57-PEP-DIV)
	111	Official Action (Including Translation) for Japanese Patent Application No. 2013-246257 dispatched November 16, 2015 (Attorney Ref. No.: 6936-57-PJP-DIV-3)
	112	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed from Nov. 4, 2013 - Oct. 19, 2015 - Docket Nos., 1-122;** (3,844 pages)
	113	Defendant 2WIRE, INC.'s Preliminary Invalidity Contentions with Regard to Representative Asserted Claims for TQ DELTA, LLC v. 2WIRE, INC. - **Including Claim Charts for FAMILY 3 with Exhibits F-1 to F-9 and G-1 to G-25**; In the United States District Court for the District of Delaware; Civil Action No. 13-01835-RGA; filed September 24, 2015 (539 pages)
	114	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed from Nov. 4, 2013 - Nov. 30, 2015 - Docket Nos., 1-100;** (1722 pages)
	115	Defendant ZHONE TECHNOLOGIES, INC.'S Invalidity Contentions with Regard to Representative Asserted Claims for TQ DELTA, LLC v. ZHONE TECHNOLOGIES, INC. - **Including Claim Charts for FAMILY 3 with Exhibits 43-79**; In the United States District Court for the District of Delaware; Civil Action No. 13-01836-RGA; filed September 25, 2015 (961 pages)
	116	Defendant ZHONE TECHNOLOGIES, INC.'S Invalidity Contentions with Regard to Representative Asserted Claims for TQ DELTA, LLC v. ZHONE TECHNOLOGIES, INC. - **Including Claim Charts for FAMILY 9 with Exhibits 138-150**; In the United States District Court for the District of Delaware; Civil Action No. 13-01836-RGA; filed September 25, 2015 (246 pages)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	6	of	6	Attorney Docket Number	6936-57-PUS-CON-3

	117	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed from Dec. 9, 2013 - Nov. 30, 2015 - Docket Nos., 1-117;** (1996 pages)
	118	Defendant Zyxel's Initial Invalidity Contentions with Respect to Representative Asserted Claims for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS, INC. and ZYXEL COMMUNICATIONS CORPORATION - **Including Claim Charts for FAMILY 3 with Exhibits C1-C36;** In the United States District Court for the District of Delaware; Civil Action No. 13-02013-RGA; filed September 25, 2015 (729 pages)
	119	Defendant Zyxel's Initial Invalidity Contentions with Respect to Representative Asserted Claims for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS, INC. and ZYXEL COMMUNICATIONS CORPORATION - **Including Claim Charts for FAMILY 9 with Exhibits J2 - J13;** In the United States District Court for the District of Delaware; Civil Action No. 13-2013-RGA; filed September 25, 2015 (236 pages)
	120	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ADTRAN INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA; **Includes documents filed from July 17, 2014 - Oct. 19, 2015 - Docket Nos., 1-65;** (2,489 pages)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Electronic Acknowledgement Receipt

EFS ID:	24339921
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	11-DEC-2015
Filing Date:	20-JAN-2014
Time Stamp:	16:23:58
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		IDS_10.pdf	243402 e23813d88cb22897cb938e7f9fe69d67b41d4322	yes	9

	Multipart Description/PDF files in .zip description			
	Document Description	**Start**	**End**	
	Transmittal Letter	1	3	
	Information Disclosure Statement (IDS) Form (SB08)	4	9	
Warnings:				
Information:				

2	Foreign Reference	JP2002118527A.pdf	13373539 5ec088502fbd0bddcc0044a392127871b31d405a	no	15
Warnings:					
Information:					
3	Foreign Reference	KR100295086B1.pdf	2363211 3e9869dc12cec8a14d7c46bbfcf68b86e39a159b	no	19
Warnings:					
Information:					
4	Foreign Reference	WO9847238A2.pdf	4589652 e5e3cd58d27f9a38e66a66272bd1bea67f48a20a	no	37
Warnings:					
Information:					
5	Foreign Reference	WO0041395A1.pdf	5471159 6fc90131e4f47d8424f167bdd27f92ef39e3e350	no	36
Warnings:					
Information:					
6	Foreign Reference	WO0111833A1.pdf	3846597 a294e30ede29bcc3e12b9d7a48a85bba4cb2e61a	no	37
Warnings:					
Information:					
7	Non Patent Literature	Aramvith_Wireless_Video_Transport.pdf	777148 31911daa232c11de4cc51953301ebcd537220c09	no	4
Warnings:					
Information:					
8	Non Patent Literature	Bauer_Iterative_Source_Channel_Decoding.pdf	269530 52cb3c998a830d900567998cfeb358aa1860d428	no	10
Warnings:					
Information:					

9	Non Patent Literature	Business_wire_New_FatPipe_T1_Speed.pdf	99802 6f46603d1547277635f5e5ec4edc52dd8fa645f8	no	2
Warnings:					
Information:					
10	Non Patent Literature	Buzzard_An_Implementation_of_the_Hamlyn.pdf	447129 691bb05091c58207d5211cc8422dd9fa61abb705	no	15
Warnings:					
Information:					
11	Non Patent Literature	Cisco_Alterantives_for_High_bandwidth.pdf	390889 4ca06e4d54ded99e5506bb6ba34773089d36891d	no	8
Warnings:					
Information:					
12	Non Patent Literature	Eberle_80-MBS_QPSK_and_72-MBS.pdf	2310124 9ea8335703fec66d68177f5a550267b5f3368792	no	10
Warnings:					
Information:					
13	Non Patent Literature	Goodman_Maximizing_the_Throughput_of_CDMA.pdf	627485 b3c7ed132031aa0ddf557bcfab96e830d2eb98fd	no	5
Warnings:					
Information:					
14	Non Patent Literature	ITU-T_Recommendation_G992-1_06-1999.pdf	17720931 b8caa0929ae3f596cca27a947fe1d1a1fdcd431a	no	256
Warnings:					
Information:					
15	Non Patent Literature	ITU-T_Recommendation_G992-3_04-2009.pdf	3639718 7324997702779f7b3988aabb515a143ebeea11eb	no	404
Warnings:					
Information:					
16	Non Patent Literature	ITU-T_Recommendation_G992-3_Annex_C_04-2009.pdf	3400322 6157925768774 3d9a8e7158d2854304180c39e54	no	296
Warnings:					
Information:					
17	Non Patent Literature	ITU-T_Recommendation_G993-1_06-2004.pdf	4310354 3d924108bf398699d110af2f85695d4f0f01f5a1	no	228
Warnings:					
Information:					

18	Non Patent Literature	ITU_T_SG15_Q4_LB-031_June_2004.pdf	751718 edc810a36351e1034c245d6aa049af19be8544ac	no	7
Warnings:					
Information:					
19	Non Patent Literature	Johns_Integrated_Circuits_for_Data_Transmission.pdf	335155 40d0d9bb0a8ae9e10a574834812fc5fcd6fa500b	no	9
Warnings:					
Information:					
20	Non Patent Literature	Petzold_Multicarrier_Spread_Spectrum.pdf	946288 e2cc5ac5abbb9385f8de169009601da9f47d70e3	no	4
Warnings:					
Information:					
21	Non Patent Literature	Sklower_The_PPP_Multilink_Protocol.pdf	194178 c6824dbb098f87d53235007c958fab0ed80f6b67	no	15
Warnings:					
Information:					
22	Non Patent Literature	Wolman_Latency_Analysis_of_TCP.pdf	102428 301b7cc12043c3449d3ae6bc95c36fdcb77444e6	no	14
Warnings:					
Information:					
23	Non Patent Literature	Yamada_QoS_Control_by_Traffic_Engineering.pdf	579887 b28f71235711e0ea015f8a05a5718672c3bdde8c	no	11
Warnings:					
Information:					
24	Non Patent Literature	6936-57-PEP-DIV_OA_10-20-2015.pdf	239544 d56a594c04b47b406d9294d964efc4ec8bb6a888	no	4
Warnings:					
Information:					
25	Non Patent Literature	6936-57-PJP-DIV-3_OA_11-16-2015.pdf	167401 388e9ee8bf195f164191ddf4338afc6099d6a8c9	no	4
Warnings:					
Information:					
26	Non Patent Literature	PART_1_2WIRE_0001.pdf	25428487 a73dfbcb0ac45f0ca4bc5a1ee87f9be5508c01fa	no	168
Warnings:					
Information:					

27	Non Patent Literature	PART_1_2WIRE_0002.pdf	20301785 ee441ec0883e4c39656c2272a0e80fbab6bb0083	no	178
Warnings:					
Information:					
28	Non Patent Literature	PART_1_2WIRE_0003.pdf	23259056 e7cd5de48e549daefc723710ab37b350c3882f53	no	173
Warnings:					
Information:					
29	Non Patent Literature	PART_1_2WIRE_0004.pdf	22956104 c61d45215f4f05f3f08e7a7719d41dbcbfe6f031	no	183
Warnings:					
Information:					
30	Non Patent Literature	PART_1_2WIRE_0005.pdf	25491036 1b52835de4ae6e25b1351491715838 83bd63bc2e	no	236
Warnings:					
Information:					
31	Non Patent Literature	PART_1_2WIRE_0006.pdf	22191908 f4647582fe332a242bd3c913857f3b70f4ea870c	no	413
Warnings:					
Information:					
32	Non Patent Literature	PART_1_2WIRE_0007.pdf	23946035 7f8106e90a9b74c3b3cb395ecc020c598f3e5d5f	no	447
Warnings:					
Information:					
33	Non Patent Literature	PART_1_2WIRE_0008.pdf	15923494 4816d945ce7dd657173dfd78643c6eb71a77575a	no	414
Warnings:					
Information:					
34	Non Patent Literature	PART_1_2WIRE_0009.pdf	14901133 89356c385b2e83ed0578833a8a151f7591d0a794	no	263
Warnings:					
Information:					
35	Non Patent Literature	PART_1_2WIRE_0010.pdf	25854218 7b1f216b1876ccf66c9afa76bb9be6c2886d5ffa	no	236
Warnings:					
Information:					

36	Non Patent Literature	PART_1_2WIRE_0011.pdf	19723211 921d91d7e5b0fc7d1935860e4d0f89655e92fd49	no	426
Warnings:					
Information:					
37	Non Patent Literature	PART_1_2WIRE_0012.pdf	14901983 2be7dcf6f3da3e26d76280940035a0a7ee3b0714	no	476
Warnings:					
Information:					
38	Non Patent Literature	PART_1_2WIRE_0013.pdf	7478165 2e0b6541006e3ecdefb65f53af25274e78e736bd	no	231
Warnings:					
Information:					
39	Non Patent Literature	2Wire_Invalidity_Contentions_FAMILY_3_09-24-2015.pdf	5177022 d78c41fdbd3e96c2056c9993c6f0dfc00550f48b	no	539
Warnings:					
Information:					
40	Non Patent Literature	PART_1_ZHONE_0001.pdf	14504146 f8bca37a89bab101b9309647427afa71ad3babe0	no	226
Warnings:					
Information:					
41	Non Patent Literature	PART_1_ZHONE_0002.pdf	12441957 53a84134f9995be61d9d3e0685cbd8b872370451	no	227
Warnings:					
Information:					
42	Non Patent Literature	PART_1_ZHONE_0003.pdf	25843915 ab80dec470473d57a6b91344a6066c928bca1d45	no	431
Warnings:					
Information:					
43	Non Patent Literature	PART_1_ZHONE_0004.pdf	13183091 6165a23d9d6773806214057e3759eed75c16e669	no	432
Warnings:					
Information:					
44	Non Patent Literature	PART_1_ZHONE_0005.pdf	5755160 2a2296a59a471fc71d942657daab1fb713a425b3	no	197
Warnings:					
Information:					

45	Non Patent Literature	PART_1_ZHONE_0006.pdf	6553426 385458be68e3ef9d72fba62f75511b5f795e66a9	no	209
Warnings:					
Information:					
46	Non Patent Literature	ZHONE_Invalidity_Contentions_FAMILY_3_09-25-2015.pdf	8243124 fe9b9ccafb77cf28973dc9db158dd3c166e13b64	no	961
Warnings:					
Information:					
47	Non Patent Literature	ZHONE_Invalidity_Contentions_FAMILY_9_09-25-2015.pdf	2462985 499140a5e9faaccd46c351d41c1260026dd52976	no	246
Warnings:					
Information:					
48	Non Patent Literature	PART_1_ZYXEL_0001.pdf	11347003 3fc1a1816f3478cd75498cfbc3df50d47f233e51	no	220
Warnings:					
Information:					
49	Non Patent Literature	PART_1_ZYXEL_0002.pdf	13855927 4753b772899156bb70a9fbf5744c0ea1d6a2cd58	no	233
Warnings:					
Information:					
50	Non Patent Literature	PART_1_ZYXEL_0003.pdf	19227914 c53f3180bf3e0cbf51cf1081f229ebc80630c135	no	198
Warnings:					
Information:					
51	Non Patent Literature	PART_1_ZYXEL_0004.pdf	14072691 8b88338ca668e3ac29df024406fd6d12ca54f82b	no	237
Warnings:					
Information:					
52	Non Patent Literature	PART_1_ZYXEL_0005.pdf	17642079 ca8c0369e301d8651eff5262b6ba5e86e8e7b090	no	256
Warnings:					
Information:					
53	Non Patent Literature	PART_1_ZYXEL_0006.pdf	3083853 12d8b791fed10aaef71c89b122f96797350b7c80	no	232
Warnings:					
Information:					

54	Non Patent Literature	PART_1_ZYXEL_0007.pdf	12198773 e68163b894d526a079af36ea678191b5a30ef43f	no	232
Warnings:					
Information:					
55	Non Patent Literature	PART_1_ZYXEL_0008.pdf	12512620 f981366a9cb7f037d9745515 73b6c2a88a740151	no	388
Warnings:					
Information:					
56	Non Patent Literature	ZYXEL_Invalidity_Contentions_FAMILY_3_09-25-2015.pdf	4985935 591f41c79a8493400cfbb35b8ea6acaf01917884	no	729
Warnings:					
Information:					
57	Non Patent Literature	ZYXEL_Invalidity_Contentions_FAMILY_9_09-25-2015.pdf	2392253 e0bd3ae9d635c2fbbd4c0ef54b9b6f128c37cf81	no	236
Warnings:					
Information:					
		Total Files Size (in bytes):	535038080		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of: Marcos C. Tzannes Serial No.: 14/159,125 Filed: January 20, 2014 Atty File No.: 6936-57-PUS-CON-3 Entitled: "PACKET RETRANSMISSION AND MEMORY SHARING"	Group Art Unit: 2112 Confirmation No.: 3369 Examiner: Alshack, Osman M SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT Electronically Submitted

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Madam:

The references cited on attached Form PTO-1449 are being called to the attention of the Examiner.

☒ Copies of the cited non-patent and/or foreign references are enclosed herewith.

☐ Copies of the cited U.S. patents and/or patent applications are enclosed herewith.

☒ Copies of the cited U.S. patents/unpublished patent applications/patent application publications are not enclosed in accordance with 37 C.F.R. § 1.98(a).

☐ Copies of the cited references are not enclosed, in accordance with 37 C.F.R. § 1.98(d), because the references were cited by or submitted to the U.S. Patent and Trademark Office in prior application Serial No. _____ filed _____, which is relied upon for an earlier filing date under 35 U.S.C. § 120.

☒ To the best of applicants' belief, the pertinence of the foreign-language references are believed to be summarized in the attached English translation/abstracts and/or in the figures, although applicants do not necessarily vouch for the accuracy of the translation.

☐ Examiner's attention is drawn to the following related applications:

- Serial No. _____ filed _____ (Attorney Ref. No. _____)

☐ Other: _____

Submission of the above information is not intended as an admission that any item is citable under the statutes or rules to support a rejection, that any item disclosed represents

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 507 of 739

analogous art, or that those skilled in the art would refer to or recognize the pertinence of any reference without the benefit of hindsight, nor should an inference be drawn as to the pertinence of the references based on the order in which they are presented. Submission of this statement should not be taken as an indication that a search has been conducted, or that no better art exists.

It is respectfully requested that the cited information be expressly considered during the prosecution of this application and the references made of record therein.

FEES

☒	**37 CFR 1.97(b):** No fee is believed due in connection with this submission, because the information disclosure statement submitted herewith is satisfied by one of the following conditions ("X" indicates satisfaction): ☐ Within three months of the filing date of a national application other than a continued prosecution application under 37 CFR 1.53(d), or ☐ Within three months of the date of entry into the national stage of an international application as set forth in 37 CFR 1.491 or ☐ Before the mailing date of a first Office Action on the merits, or ☒ Before the mailing of a first Office action after the filing of a request for continued examination under 37 CFR 1.114. Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970.
☐	**37 CFR 1.97(c):** The information disclosure statement transmitted herewith is being filed after all the above conditions (37 CFR 1.97(b)), but before the mailing date of one of the following conditions: (1) a final action under 37 C.F.R. 1.113 or (2) a notice of allowance under 37 C.F.R. 1.311, or (3) an action that otherwise closes prosecution in the application. This Information Disclosure Statement is accompanied by: ☐ A Certification (below) as specified by 37 C.F.R. 1.97(e). Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970. OR ☐ Please charge Deposit Account 19-1970 in the amount of $180.00 for the fee set forth in 37 C.F.R. 1.17(p) for submission of an information disclosure statement. Please credit any overpayment or charge any underpayment to Deposit Account 19-1970.
☐	**37 CFR 1.97(d):** This Information Disclosure Statement is being submitted after the period specified in 37 CFR 1.97(c). ☐ This information Disclosure Statement includes a Certification (below) as specified by 37 C.F.R. 1.97(e) AND ☐ Applicants hereby requests consideration of the reference(s) disclosed herein. Please charge Deposit Account 19-1970 in the amount of $180.00 under 37 C.F.R. 1.17(p). Please credit any overpayment or charge any underpayment to Deposit Account 19-1970. Election to pay the fee should not be taken as an indication that applicant(s) cannot execute a certification.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 508 of 739

Certification (37 C.F.R. 1.97(e))
(Applicable only if checked)

☐ The undersigned certifies that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(1).

☐ A copy of the communication from the foreign patent office is enclosed.

OR

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned after making reasonable inquiry, no item of information contained in this Information Disclosure Statement was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(2).

Respectfully submitted,

SHERIDAN ROSS P.C.

Date: December 11, 2015

By: /Jason H. Vick/
Jason H. Vick
Reg. No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202
Telephone: 303-863-9700

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 509 of 739

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/159,125	01/20/2014	Marcos C. Tzannes	6936-57-PUS-CON-3	3369

62574 7590 12/31/2015

Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

EXAMINER	
ALSHACK, OSMAN M	

ART UNIT	PAPER NUMBER
2112	

NOTIFICATION DATE	DELIVERY MODE
12/31/2015	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jvick@sheridanross.com

Office Action Summary	Application No. 14/159,125	Applicant(s) TZANNES, MARCOS C.	
	Examiner OSMAN ALSHACK	Art Unit 2112	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12/02/2015*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *106-125* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *106-125* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date *07/14/2015, 10/01/2015, and 12/11/2015*.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

1. *The present application is being examined under the pre-AIA first to invent provisions.*

Status of Claims

2. Claims 106-125 are presented for examination. Claims 1-105 are cancelled.

Information Disclosure Statement

3. The references listed in the information disclosure statement (IDS) submitted on have been considered. The submission is in compliance with the provisions of 37 CFR 1.97. Form PTO- 1449 is signed and attached hereto.

Response to Arguments

4. Applicant's arguments filed on 12/02/2015 with respect claims 106-125 have been fully considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained through the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in Graham v. John Deere CO., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 106-125 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Plamondon et al (U.S. PN: 2007/0206621)" herein after as Plamondon" in view of Marco (U.S. PN: 6,266,337).

As per claim 106:

Plamondon substantially teaches or discloses a method of packet retransmission, in a transceiver, comprising (*see abstract, and paragraph [0007*]): transmitting, by the transceiver (*see Fig 2B*), a first type of packet (*see paragraph [0007], and Fig 6, step 601*); and transmitting, by the transceiver (*see Fig 2B*) a second type of packet (*see paragraph [0007], and Fig 6, step 603*), wherein the first type of packet is stored in a retransmission buffer after transmission (*see paragraph [0121], herein, appliance 200*) and the second type of packet is not stored in a retransmission buffer after transmission (*see paragraph [0122], herein, appliance 200 is free to discard the saved packet data*), and wherein the header field of the first type of packet comprises a sequence identifier (SID) that is incremented after the first type of packet is transmitted (*see paragraph [0413], herein, each time that a packet is retransmitted, the count is incremented by one*).

Plamondon does not explicitly teach wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and wherein the header field of the second type of packet does not comprise the SID of the first type of packet.

However, Marco in analogous art teaches wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet (*see column 5, lines 34-38, herein, a retransmit packet comparator 154 determines whether the incoming packet is of the type "retransmission" or "regular" (block 204) and sends an appropriate signal to a packet routing controller 156 and Fig 54, step 204*) and wherein the header field of the second type of packet does not comprise the SID of the first type of packet (*see column 5, lines 39-46, herein, if the packet is a regular packet, the packet routing controller 156 causes a copy of the packet data 158 to be stored in a data memory 160 (block 206). In addition, the packet routing controller 156 causes a CRC generator 162 to compute the checksum of the packet. This is done in a similar manner as described above using CRC-32 and excluding packet header fields such as the identifier and the time-to-live fields).*

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the communication system of Plamondon with the teachings of Marco by the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and wherein the header field of the second type of packet does not comprise the SID of the first type of packet.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and wherein the header field of the second type of packet does not comprise the SID of the first type of packet would have improved the retransmission packets performance.

As per claim 107:

Plamondon teaches that wherein the transceiver is connected to a second transceiver using a wired or wireless channel (*see paragraph [0038], and Fig 2B, component 104*) and the transceivers are used to transport one or more of video and voice data (*see paragraph [0213]*).

As per claim 108:

Plamondon teach that wherein the method is performed in a linecard that is operable to transport video (*see paragraph [0068], herein, standard telephone lines*).

As per claim 109:

Plamondon teach that wherein the method is performed in a customer premises modem that is operable to transport video (*see paragraph [0072], herein, mobile telephone*).

As per claim 110:

Plamondon teach that wherein the transceiver includes at least one digital signal processor (*see paragraph [0064], herein, a microprocessor unit*).

As per claim 111:

Plamondon teaches that wherein the transceiver includes at least one ASIC (Application Specific Integrated Circuit) (*see paragraph [0096]*).

As per claim 112:

Plamondon teaches that wherein the first type of packet comprises one or more PTM-TC (Packet Transfer Mode-Transmission convergence) codewords (*see paragraph [0010], herein, transport layer connection*).

As per claim 113:

Plamondon teaches that wherein the first type of packet comprises one or more ATM (Asynchronous Transfer Mode) cells (*see paragraph [0038], herein, Asynchronous Transfer Mode*).

As per claim 114:

Plamondon teaches that wherein the first type of packet comprises one or more Reed Solomon codewords (*see paragraph [0158], herein, forward error correction techniques*).

As per claim 115:

Plamondon teaches that wherein the first type of packet is a low-PER (packet Error Rate) packet and the second type of packet is a low-latency packet (*see paragraph [0224]*).

As per claim 116:

Plamondon substantially teaches or discloses a transceiver operable to transmit a first type of packet and to transmit a second type of packet (*see paragraph [0007], and Fig 6, steps 601 & 603*), wherein the first type of packet is stored in a retransmission buffer after transmission (*see paragraph [0121], herein, appliance 200*) and the second type of packet is not

stored in a retransmission buffer after transmission (*see paragraph [0122], herein, appliance 200 is free to discard the saved packet data),*and wherein the header field of the first type of packet comprises a sequence identifier (SID) that is incremented after the first type of packet is transmitted (*see paragraph [0413], herein, each time that a packet is retransmitted, the count is incremented by one*) and the header field of the second type of packet does not comprise the SID of the first type of packet (*see paragraph [0149], herein, Packets that are not retransmitted will not result in ambiguity*).

Plamondon does not explicitly teach wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and wherein the header field of the second type of packet does not comprise the SID of the first type of packet.

However, Marco in analogous art teaches wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet (*see column 5, lines 34-38, herein, a retransmit packet comparator 154 determines whether the incoming packet is of the type "retransmission" or "regular" (block 204) and sends an appropriate signal to a packet routing controller 156 and Fig 54, step 204*) and wherein the header field of the second type of packet does not comprise the SID of the first type of packet (*see column 5, lines 39-46, herein, if the packet is a regular packet, the packet routing controller 156 causes a copy of the packet data 158 to be stored in a data memory 160 (block 206). In addition, the packet routing controller 156 causes a CRC generator 162 to compute the checksum of the packet. This is done in a similar manner as described above using CRC-32 and excluding packet header fields such as the identifier and the time-to-live fields).*

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the communication system of Plamondon with the teachings of Marco by the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and wherein the header field of the second type of packet does not comprise the SID of the first type of packet.

This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and wherein the header field of the second type of packet does not comprise the SID of the first type of packet would have improved the retransmission packets performance.

As per claim 117:

Plamondon teaches that wherein the transceiver is connected to a second transceiver using a wired or wireless channel (*see paragraph [0038], and Fig 2B, component 104*) and the transceivers are used to transport one or more of video and voice data (*see paragraph [0213]*).

As per claim 118:

Plamondon teaches that wherein the transceiver is located in a linecard that is operable to transport video (*see paragraph [0068], herein, standard telephone lines*).

As per claim 119:

Plamondon teaches that wherein the transceiver is located in a customer premises modem that is operable to transport video (*see paragraph [0072], herein, mobile telephone*).

As per claim 120:

Plamondon teach that wherein the transceiver includes at least one digital signal processor (*see paragraph [0064], herein, a microprocessor unit*).

As per claim 121:

Plamondon teaches that wherein the transceiver includes at least one ASIC (Application Specific Integrated Circuit) (*see paragraph [0096]*).

As per claim 122:

Plamondon teaches that wherein the first type of packet comprises one or more PTM-TC (Packet Transfer Mode-Transmission convergence) codewords (*see paragraph [0010], herein, transport layer connection*).

As per claim 123:

Plamondon teaches that wherein the first type of packet comprises one or more ATM (Asynchronous Transfer Mode) cells (*see paragraph [0038], herein, Asynchronous Transfer Mode*).

As per claim 124:

Plamondon teaches that wherein the first type of packet comprises one or more Reed Solomon codewords (*see paragraph [0158], herein, forward error correction techniques*).

As per claim 125:

Plamondon teaches that wherein the first type of packet is a low-PER (packet Error Rate) packet and the second type of packet is a low-latency packet (*see paragraph [0224]*).

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to OSMAN ALSHACK whose telephone number is (571)272-2069. The examiner can normally be reached on MON-FRI 8:30 AM 5:00 PM EST, also please fax interview request to (571) 273- 2069. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ALBERT DECADY can be reached on 5712723819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/OSMAN ALSHACK/

Patent Examiner, Art Unit 2112.

/ESAW ABRAHAM/

Primary Examiner, Art Unit 2112

Notice of References Cited	Application/Control No. 14/159,125	Applicant(s)/Patent Under Reexamination TZANNES, MARCOS C.	
	Examiner OSMAN ALSHACK	Art Unit 2112	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-6,005,851 A	12-1999	Craddock; Arthur Julian Patterson	H04L29/06	370/329
*	B	US-6,266,337 B1	07-2001	Marco; Talmon	H04L1/1829	370/410
*	C	US-2002/0126675 A1	09-2002	Yoshimura, Takeshi	H04L47/10	370/395.21
*	D	US-2002/0154600 A1	10-2002	Ido, Daiji	H04L1/1809	370/216
*	E	US-2004/0109455 A1	06-2004	Jouppi, Jarkko	H04W28/24	370/395.52
*	F	US-6,754,188 B1	06-2004	Garahi; Masood	H04L45/306	370/328
*	G	US-2004/0179494 A1	09-2004	Attar, Rashid Ahmed	H04J9/00	370/332
*	H	US-2005/0068916 A1	03-2005	Jacobsen, Eric A.	H04L1/0001	370/328
*	I	US-7,031,259 B1	04-2006	Guttman; Ron	H04N7/17318	348/E5.006
*	J	US-2006/0089833 A1	04-2006	Su; Huan-Yu	G10L19/09	704/230
*	K	US-2007/0206621 A1	09-2007	Plamondon; Robert	H04L1/1887	370/413
*	L	US-7,483,421 B2	01-2009	Compton; Matthew	H04L45/00	370/352
*	M	US-7,826,438 B1	11-2010	Salhotra; Atul	H04L1/188	370/345

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

CPC- SEARCHED		
Symbol	Date	Examiner
H04L 1/1809, H04L 1/1812, H04L 1/1887, H04L 1/1819	01/23/2015	O.A
H04L 2001/0093, H04L 45/302, H04L 47/6215	01/23/2015	O.A

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
714	748, 749, 776	01/23/2015	O.A

SEARCH NOTES		
Search Notes	Date	Examiner
East Inventor search	01/23/2015	O.A
East text search	01/23/2015	O.A
East text search updated	06/04/2015	O.A
East text search updated	12/18/2015	O.A

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

/OSMAN ALSHACK/ Examiner, Art Unit 2112	

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	1	of	1	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2 (if known)]	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	7042891	05-09-2006	Oberman et al.	

UNPUBLISHED U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2 (if known)]	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	2	14/730874	06-04-2015	Tzannes et al.	
	3	14/742334	06-17-2015	Tzannes	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)

Examiner Initials*	Cite No.[1]	
	4	Official Action for U.S. Patent Application No. 14/730,874 mailed June 30, 2015 (Attorney Ref. No.: 6936-54-CON-7)

Examiner Signature	/Osman Alshack/	Date Considered	12/18/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	1	of	1	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

UNPUBLISHED U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	1	Notice of Allowance for Canadian Patent Application No. 2,869,452, mailed April 20, 2015 (Attorney's Ref. No.: 6936-54-PCA-DIV)
	2	Reexamination Decision (including translation) for Chinese Patent Application No. 200580032703.1, dispatched April 14, 2015 (Attorney Ref. No. 6936-54-PCN)

Examiner Signature	/Osman Alshack/	Date Considered	12/18/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, Osman M.
Sheet	1	of	1	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	1	Notice of Acceptance for Australian Patent Application No. 2015200618 mailed July 15, 2015 (Attorney's Ref. No. 6936-54-PAU-DIV-2)

Examiner Signature	/Osman Alshack/	Date Considered	12/18/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	1	of	6	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	4979174	12-18-1990	Cheng et al.	
	2	5063533	11-05-1991	Erhart et al.	
	3	5214501	05-25-1993	Cavallerano et al.	
	4	5287384	02-15-1994	Avery et al.	
	5	5351016	09-27-1994	Dent	
	6	5420640	05-30-1995	Munich et al.	
	7	5422913	06-06-1995	Wilkinson	
	8	5563915	10-08-1996	Stewart	
	9	5596604	01-21-1997	Cioffi et al.	
	10	5635864	06-03-1997	Jones	
	11	5675585	10-07-1997	Bonnot et al.	
	12	5737337	04-07-1998	Voith et al.	
	13	5745275	04-28-1998	Giles et al.	
	14	5751338	05-12-1998	Ludwig, jr.	
	15	5751741	05-12-1998	Voith et al.	
	16	5757416	05-26-1998	Birch et al.	
	17	5764649	06-09-1998	Tong	
	18	5764693	06-09-1998	Taylor et al.	
	19	5793759	08-11-1998	Rakib et al.	
	20	5835527	11-10-1998	Lomp	
	21	5867400	02-02-1999	El-Ghoroury et al.	
	22	5903612	05-11-1999	Van Der Puttent et al.	
	23	5905874	05-18-1999	Johnson	
	24	5912898	06-15-1999	Khoury	
	25	5917340	06-29-1999	Manohar et al.	
	26	5968200	10-19-1999	Amrany	
	27	5991857	11-23-1999	Koetje et al.	
	28	5995539	11-30-1999	Miller	
	29	6041057	03-21-2000	Stone	
	30	6081291	06-27-2000	Ludwig, Jr.	
	31	6151690	11-21-2000	Peeters	
	32	6226322	05-01-2001	Mukherjee	
	33	6308278	10-23-2001	Khouli et al.	
	34	6381728	04-30-2002	Kang	

Examiner Signature	/Osman Alshack/	Date Considered	12/18/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	2	of	6	Attorney Docket Number	6936-57-PUS-CON-3

	35	6392572	05-21-2002	Shiu et al.	
	36	6421323	07-16-2002	Nelson et al.	
	37	6473418	10-29-2002	Laroia et al.	
	38	6484283	11-19-2002	Stephen et al.	
	39	6480976	11-12-2002	Pan et al.	
	40	6498806	12-24-2002	Davis	
	41	6542500	04-01-2003	Gerszberg et al.	
	42	6553534	04-22-2003	Young, III et al.	
	43	6578162	06-10-2003	Yung	
	44	6640239	10-28-2003	Gidwani	
	45	6657949	12-02-2003	Jones, IV et al.	
	46	6704848	03-09-2004	Song	
	47	6754290	06-22-2004	Halter	
	48	6738370	05-18-2004	Ostman	
	49	6865233	03-08-2005	Eriksson et al.	
	50	6885696	04-26-2005	Wingrove	
	51	6904537	06-07-2005	Gorman	
	52	6922444	07-26-2005	Cai et al.	
	53	6956872	10-18-2005	Djokovic et al.	
	54	6988234	01-17-2006	Han	
	55	7024592	04-04-2006	Voas et al.	
	56	7027782	04-11-2006	Moon et al.	
	57	7050552	05-23-2006	Comisky	
	58	7058085	06-06-2006	Earnshaw et al.	
	59	7103096	09-05-2006	Mitlin et al.	
	60	7200138	04-03-2007	Liu	
	61	7203206	04-10-2007	Amidan et al.	
	62	7187708	03-06-2007	Shiu et al.	
	63	7200169	04-03-2007	Suzuki et al.	
	64	7224702	05-29-2007	Lee	
	65	7266132	09-04-2007	Liu et al.	
	66	7269208	09-11-2007	Mazzoni et al.	
	67	7272768	09-18-2007	Chang et al.	
	68	7302379	11-27-2007	Cioffi et al.	
	69	7400688	07-15-2008	Garrett	
	70	7668101	02-23-2010	Raissinia et al.	
	71	7933295	04-26-2011	Thi et al.	
	72	8775890	07-08-2014	Yap et al.	
	73	2001/0039637	11-08-2001	Bengough	

Examiner Signature	/Osman Alshack/	Date Considered	12/18/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	3	of	6	Attorney Docket Number	6936-57-PUS-CON-3

	74	2002/0015401	02-07-2002	Subramanian et al.	
	75	2003/0008821	01-09-2003	Detmar et al.	
	76	2003/0014709	01-16-2003	Miyoshi et al.	
	77	2003/0088821	05-08-2003	Yokokawa et al.	
	78	2003/0093750	05-15-2003	Cameron	
	79	2003/0131209	07-10-2003	Lee	
	80	2003/0179770	09-25-2003	Reznic et al.	
	81	2004/0120435	06-24-2004	Yang et al.	
	82	2005/0034046	02-10-2005	Berkmann et al.	
	83	2005/0079889	04-14-2005	Vaglica et al.	
	84	2005/0204251	09-15-2005	Moon et al.	
	85	2005/0254441	11-17-2005	Levi et al.	
	86	2005/0254508	11-17-2005	Aksu et al.	

UNPUBLISHED U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2 (if known)]	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	87	60/078,549	03-19-1998	Jacobsen et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	88	JP 2002-118527	04/19/2002	MATSUSHITA ELECTRIC IND CO LTD		(Includes English Translation of Abstract)
	89	KR 10-0295086 B1	04/24/2001	C&S TECHNOLOGY CO LTD		(Includes an English Translation of Abstract)
	90	WO 98/47238	10/22/1998	NORTHERN TELECOM LIMITED		
	91	WO 00/41395	07/13/2000	SARNOFF CORPORATION		

Examiner Signature	/Osman Alshack/	Date Considered	12/18/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	4	of	6	Attorney Docket Number	6936-57-PUS-CON-3

	92	WO 01/11833	02/15/2001	BERKELEY CONCEPT RESEARCH CORPORATION		

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	93	ARAMVITH, Supavadee et al. "Wireless Video Transport Using Conditional Retransmission and Low-Delay Interleaving" IEEE 2001 (4 pages)
	94	BAUER, Rainer et al. "Iterative Source/Channel-Decoding Using Reversible Variable Length Codes" Munich University of Technology, 2000 (10 pages)
	95	BUSINESS WIRE "New FatPipe T1 Speed Product Produces Speeds up to 4.5Mbps and Redundancy for a Fraction of the Cost of a Fractional T3!" Business Wire, Oct. 16, 1998 (2 pages)
	96	BUZZARD, Greg et al., "An Implementation of the Hamlyn Sender-Managed Interface Architecture" The Second Symposium on Operating Systems Design and Implementation (OSDI '96) Proceedings (Seattle, WA), 28-31 October 1996 (15 pages)
	97	CISCO SYSTEMS, INC. "Alternatives for High Bandwidth Connections Using Parallel T1/E1 Links" 1998 (8 pages)
	98	EBERLE, Wolfgang et al. "80-Mb/S QPSK and 72-Mb/s 64-QAM Flexible and Scalable Digital OFDM Transceiver ASICs for Wireless Local Area Networks in the 5-GHz Band" IEEE Journal of Solid-State Circuits, Vol. 36, No. 11, November 2001 (10 pages)
	99	~~GOODMAN, David et al. "Maximizing the Throughput to CDMA Data Communications" Polytechnic University, Brooklyn, NY (5 pages)~~ No date provided.
	100	"ITU-T Recommendation G.992.1, "Series G: Transmission Systems and Media, Digital Systems and Networks" June 1999 (256 pages)
	101	ITU-T Recommendation G.992.3, "Asymmetric Digital Subscriber Line Transceivers 2 (ADSL2) " International Telecommunication Union, April 2009, 404 pages
	102	ITU-T Recommendation G.992.3 Annex C, "Annex C: Specific Requirements for an ADSL System Operating in the Same Cable as ISDN as Defined in Appendix III of Recommendation ITU-T G.961" International Telecommunication Union, April 2009, 296 pages
	103	ITU-T Recommendation G.993.1 "Very High Speed Digital Subscriber Line Transceivers" June 2004 (228 pages)

Examiner Signature	/Osman Alshack/	Date Considered	12/18/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	5	of	6	Attorney Docket Number	6936-57-PUS-CON-3

	104	ITU-T SG15/Q4 Contribution LB-031 "VDSL2 - Constraining the Interleaver Complexity" Texas Instruments, Inc. June 2004 (7 pages)
	105	JOHNS, David A., et al. "Integrated Circuits for Data Transmission Over Twisted-Pair Channels" IEEE Journal of Solid-State Circuits, Vol. 32, Nov. 3, March 1997 (9 pages)
	106	PETZOLD, Mark C. et al. "Multicarrier Spread Spectrum Performance in Fading Channels with Serial Concatenated Convolutional Coding" IEEE 1998 (4 pages)
	107	SKLOWER, K. et al. "The PPP Multilink Protocol (MP)" Network Working Group, November 1994 (15 pages)
	108	WOLMAN, Alec et al. "Latency Analysis of TCP on an ATM Network" University of Washington, Printed Sept. 19, 2014 (14 pages)
	109	YAMADA, Hitoshi et al. "QoS Control by Traffic Engineering in Content Delivery Networks" Fujitsu Science and Technology Journal, December 2003 (11 pages)
	110	Official Action for European Patent Application No. 10000017.3, dated October 20, 2015 (Attorney Ref. No. 6936-57-PEP-DIV)
	111	Official Action (Including Translation) for Japanese Patent Application No. 2013-246257 dispatched November 16, 2015 (Attorney Ref. No.: 6936-57-PJP-DIV-3)
	112	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed from Nov. 4, 2013 - Oct. 19, 2015 - Docket Nos., 1-122;** (3,844 pages)
	113	Defendant 2WIRE, INC.'s Preliminary Invalidity Contentions with Regard to Representative Asserted Claims for TQ DELTA, LLC v. 2WIRE, INC. - **Including Claim Charts for FAMILY 3 with Exhibits F-1 to F-9 and G-1 to G-25**; In the United States District Court for the District of Delaware; Civil Action No. 13-01835-RGA; filed September 24, 2015 (539 pages)
	114	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed from Nov. 4, 2013 - Nov. 30, 2015 - Docket Nos., 1-100;** (1722 pages)
	115	Defendant ZHONE TECHNOLOGIES, INC.'S Invalidity Contentions with Regard to Representative Asserted Claims for TQ DELTA, LLC v. ZHONE TECHNOLOGIES, INC. - **Including Claim Charts for FAMILY 3 with Exhibits 43-79**; In the United States District Court for the District of Delaware; Civil Action No. 13-01836-RGA; filed September 25, 2015 (961 pages)
	116	Defendant ZHONE TECHNOLOGIES, INC.'S Invalidity Contentions with Regard to Representative Asserted Claims for TQ DELTA, LLC v. ZHONE TECHNOLOGIES, INC. - **Including Claim Charts for FAMILY 9 with Exhibits 138-150**; In the United States District Court for the District of Delaware; Civil Action No. 13-01836-RGA; filed September 25, 2015 (246 pages)

Examiner Signature	/Osman Alshack/	Date Considered	12/18/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	6	of	6	Attorney Docket Number	6936-57-PUS-CON-3

	117	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed from Dec. 9, 2013 - Nov. 30, 2015 - Docket Nos., 1-117;** (1996 pages)
	118	Defendant Zyxel's Initial Invalidity Contentions with Respect to Representative Asserted Claims for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS, INC. and ZYXEL COMMUNICATIONS CORPORATION - **Including Claim Charts for FAMILY 3 with Exhibits C1-C36;** In the United States District Court for the District of Delaware; Civil Action No. 13-02013-RGA; filed September 25, 2015 (729 pages)
	119	Defendant Zyxel's Initial Invalidity Contentions with Respect to Representative Asserted Claims for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS, INC. and ZYXEL COMMUNICATIONS CORPORATION - **Including Claim Charts for FAMILY 9 with Exhibits J2 - J13;** In the United States District Court for the District of Delaware; Civil Action No. 13-2013-RGA; filed September 25, 2015 (236 pages)
	120	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ADTRAN INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA; **Includes documents filed from July 17, 2014 - Oct. 19, 2015 - Docket Nos., 1-65;** (2,489 pages)

Examiner Signature	/Osman Alshack/	Date Considered	12/18/2015

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015	06/04/2015	12/18/2015						
	1	-	-	-						
	2	-	-	-						
	3	-	-	-						
	4	-	-	-						
	5	-	-	-						
	6	-	-	-						
	7	-	-	-						
	8	-	-	-						
	9	-	-	-						
	10	-	-	-						
	11	-	-	-						
	12	-	-	-						
	13	-	-	-						
	14	-	-	-						
	15	-	-	-						
	16	-	-	-						
	17	-	-	-						
	18	-	-	-						
	19	-	-	-						
	20	-	-	-						
	21	-	-	-						
	22	-	-	-						
	23	-	-	-						
	24	-	-	-						
	25	-	-	-						
	26	-	-	-						
	27	-	-	-						
	28	-	-	-						
	29	-	-	-						
	30	-	-	-						
	31	-	-	-						
	32	-	-	-						
	33	-	-	-						
	34	-	-	-						
	35	-	-	-						
	36	-	-	-						

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 533 of 739

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015	06/04/2015	12/18/2015						
	37	-	-	-						
	38	-	-	-						
	39	-	-	-						
	40	-	-	-						
	41	-	-	-						
	42	-	-	-						
	43	-	-	-						
	44	-	-	-						
	45	-	-	-						
	46	-	-	-						
	47	-	-	-						
	48	-	-	-						
	49	-	-	-						
	50	-	-	-						
	51	-	-	-						
	52	-	-	-						
	53	-	-	-						
	54	-	-	-						
	55	-	-	-						
	56	-	-	-						
	57	-	-	-						
	58	-	-	-						
	59	-	-	-						
	60	-	-	-						
	61	-	-	-						
	62	-	-	-						
	63	-	-	-						
	64	-	-	-						
	65	-	-	-						
	66	-	-	-						
	67	-	-	-						
	68	-	-	-						
	69	-	-	-						
	70	-	-	-						
	71	-	-	-						
	72	-	-	-						

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 534 of 739

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015	06/04/2015	12/18/2015						
	73	-	-	-						
	74	-	-	-						
	75	-	-	-						
	76	-	-	-						
	77	-	-	-						
	78	-	-	-						
	79	-	-	-						
	80	-	-	-						
	81	-	-	-						
	82	-	-	-						
	83	-	-	-						
	84	-	-	-						
	85	-	-	-						
	86	-	-	-						
	87	-	-	-						
	88	-	-	-						
	89	-	-	-						
	90	-	-	-						
	91	-	-	-						
	92	-	-	-						
	93	-	-	-						
	94	-	-	-						
	95	-	-	-						
	96	-	-	-						
	97	-	-	-						
	98	-	-	-						
	99	-	-	-						
	100	-	-	-						
	101	-	-	-						
	102	-	-	-						
	103	-	-	-						
	104	-	-	-						
	105	-	-	-						
	106	✓	✓	✓						
	107	✓	✓	✓						
	108	✓	✓	✓						

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 535 of 739

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015	06/04/2015	12/18/2015						
	109	✓	✓	✓						
	110	✓	✓	✓						
	111	✓	✓	✓						
	112	✓	✓	✓						
	113	✓	✓	✓						
	114	✓	✓	✓						
	115	✓	✓	✓						
	116	✓	✓	✓						
	117	✓	✓	✓						
	118	✓	✓	✓						
	119	✓	✓	✓						
	120	✓	✓	✓						
	121	✓	✓	✓						
	122	✓	✓	✓						
	123	✓	✓	✓						
	124	✓	✓	✓						
	125	✓	✓	✓						

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"14159125"	US-PGPUB; USPAT	OR	OFF	2015/01/21 11:11
S2	103	((Marcos) near2 (Tzannes)).INV.	USPAT; USOCR	OR	OFF	2015/01/21 11:14
S3	2	(retransmi$5 resend$3)near3((packet block group set package chunk)near3 type)with(first original primary second$3)same((per latency)near2 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:19
S4	3	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)with(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:23
S5	13	(transmi$5 transceiv$3 retransmi$5 resend$3)same((packet block group set package chunk)near3 type)same(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:24
S6	117	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:27
S7	0	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)same((per and latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:28
S8	3	S2 and S6	US-PGPUB; USPAT	OR	ON	2015/01/21 12:46
S9	3	S2 and (transmi$5 transceiv$3 retransmi$5 resend$3)same(packet block group set package chunk)same(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:54
S10	17	S2 and (transmi$5 transceiv$3 retransmi$5 resend$3)same(packet block group set package chunk)same(first original primary second$3)and((per latency)near3 low)same(identif$7 indicat$3	US-PGPUB; USPAT	OR	ON	2015/01/21 12:55

		determin$3)				
S11	32	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)and((per and latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:56
S12	17	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)same(identif$7 indicat$3 determin$3)and((per and latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:08
S13	13	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)with(buffer stor$3 memory)same(identif$7 indicat$3 determin$3)and((per and latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:11
S14	26	("2004/0179494").URPN.	USPAT	OR	OFF	2015/01/21 13:19
S15	1	S14 and(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)and((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:20
S16	4737	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)with(identif$7 indicat$3 determin$3)and((per error latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:38
S17	74538	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:39
S18	1496	(low-per low adj per)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:40
S19	32050	(low-latency low adj latency)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:40
S20	41	S18 and S19	US-PGPUB; USPAT	OR	ON	2015/01/21 13:40
S21	12	S17 and S20	US-PGPUB; USPAT	OR	ON	2015/01/21 13:41
S22	35	(transmi$5 transceiv$3 retransmi$5 resend$3)same(packet block group set package chunk)same(first original primary second$3)and(identif$7 indicat$3 determin$3)same((per and latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:47
S23	129	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)near3(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:50

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 538 of 739

S24	81	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)near(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:51
S25	24	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near type)near(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:52
S26	39	(transmi$5 transceiv$3 retransmi$5 resend$3)near2((packet block group set package chunk frame)near2 type)near2(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:58
S27	1	("5524116").PN.	US-PGPUB; USPAT	OR	OFF	2015/01/21 14:27
S28	1	(14/075194).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 14:29
S29	1	(14/081469).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 14:31
S30	4	S2 and (transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near3 type)with(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 14:33
S31	20962	packet near2 identifier	US-PGPUB; USPAT	OR	ON	2015/01/21 14:49
S32	99	S31 with(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near3 type)with(first original primary second$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 14:51
S33	389	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near2 type)near2(identif$7 indicat$3 determin$3)with(buffer stor$3 memory)	US-PGPUB; USPAT	OR	ON	2015/01/21 14:57
S34	129524	(Quality near2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/01/21 15:00
S35	75	S33 and S34	US-PGPUB; USPAT	OR	ON	2015/01/21 15:00
S36	22753	(Quality near2 Service QOS)and((per error rat$3 latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 15:06
S37	1301	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near3 type)with(identif$7 indicat$3 determin$3)with(buffer stor$3 memory)	US-PGPUB; USPAT	OR	ON	2015/01/21 15:06
S38	65	S36 and S37	US-PGPUB; USPAT	OR	ON	2015/01/21 15:07

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 539 of 739

S39	84	(Quality near2 Service QOS)same(low high)near3(delay late$3)same((error data bit loss)near2 rate)same(identif$7 indicat$3 determin$3)and(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)near2(video voice data information bit$1)	US-PGPUB; USPAT	OR	ON	2015/01/21 16:20
S40	7	(Quality near2 Service QOS)same(low high)near3(delay late$3)same((error data bit loss)near2 rate)same(identif$7 indicat$3 determin$3 ID)same(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)near2(video voice data information bit$1)	US-PGPUB; USPAT	OR	ON	2015/01/21 16:31
S41	2	(10/696507).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 17:01
S42	2	(10/901940).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 17:03
S43	4	(Quality near2 Service QOS)with(identif$7 indicat$3 determin$3)with(packet block group set package chunk)near2(video voice data information bit$1)same(low high)near3(delay late$3)same((error data bit loss)near2 rate)	US-PGPUB; USPAT	OR	ON	2015/01/21 17:14
S44	201	(Quality near2 Service QOS)with(identif$7 indicat$3 determin$3)with(packet block group set package chunk)near2(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near2 rate)	US-PGPUB; USPAT	OR	ON	2015/01/21 17:16
S45	2524	714/748.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/21 17:31
S46	967	714/749.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/21 17:31
S47	1	S44 and S45	US-PGPUB; USPAT	OR	ON	2015/01/21 17:32
S48	0	S44 and S46	US-PGPUB; USPAT	OR	ON	2015/01/21 17:32
S49	16	("20010025239" | "20030133462" | "20040072541" | "20050141480" | "20060002465" | "20060095944" | "20060168133" | "20070009015" | "20070217339" | "20080101476" | "20080225983" | "20090034610" | "6856756" | "7292553" | "7706384" | "7782779").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2015/01/21 17:34
S50	25	(Customer with Premises)and(digital with signal with prosessor DSP)and (integrated with ciruit ASIC)and linecard	US-PGPUB; USPAT; USOCR	OR	ON	2015/01/21 17:59
S51	185383	packet$1 near2 $2transmi$5	US-PGPUB; USPAT	OR	ON	2015/01/22 09:06
S54	107	(Quality near2 Service QOS)same((packet block group set	US-PGPUB; USPAT	OR	ON	2015/01/22 09:09

		payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)				
S55	68	S51 and S54	US-PGPUB; USPAT	OR	ON	2015/01/22 09:09
S56	17	S51 same S54	US-PGPUB; USPAT	OR	ON	2015/01/22 09:09
S57	1	(Quality near2 Service QOS)same(first original primary)near3((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:24
S58	6	(Quality near2 Service QOS)and(first original primary)near3((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:27
S59	15	(Quality near2 Service QOS)and(first original primary)with((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:27
S62	19	(first original primary)near2((packet block group set payload frame)near2 type)near2(identif$7 indicat$3 determin$3)and(Quality near2 Service QOS)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:42
S63	1250	H04L1/1809.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:50
S64	2991	H04L1/1812.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:50
S65	2252	H04L1/1887.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:51
S66	1569	H04L1/1819.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:51
S67	2107	H04L2001/0093.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:51
S71	3061	H04L12/5601.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 10:02
S72	0	S54 and S63	US-PGPUB; USPAT	OR	ON	2015/01/22 10:03
S73	0	S54 and S64	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04

S74	4	S54 and S65	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04
S75	0	S54 and S66	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04
S76	0	S54 and S67	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04
S77	1174	H04L45/302.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S78	1222	H04L47/6215.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S79	0	S54 and S77	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S80	1	S54 and S78	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S83	457	packet$1 near2 $2transmi$5 with(second$3 near2 packet)with(stor$3 retain$3)with(buffer memory)	US-PGPUB; USPAT	OR	OFF	2015/01/22 11:44
S84	80	packet$1 near2 $2transmi$5 with(second$3 near2 packet)near2(stor$3 retain$3)near2(buffer memory)	US-PGPUB; USPAT	OR	OFF	2015/01/22 11:45
S87	29	retransmi$5 same(second$3 with type with packet)same(stor$3 retain$3)same(buffer memory storage)	US-PGPUB; USPAT	OR	OFF	2015/01/22 11:47
S89	1	(Quality near2 Service QOS)with(identif$7 indicat$3 determin$3)with((packet block group set)near type)near(second$3)and(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near2 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 13:40
S90	393	"5524116" "5663910" "5898698" "5983382" "6098188" "6775320" "6778589" "6337877" "6496481" "6707822" "6778596" "6826589" "7200792" "7164654" "7174493" "7519124" "7600172" "7657818" "7764595" "7782758" "7831890" "7844882" "7836381" "8074138" "8149904" "8276048" "8335956" "8407546" "8468411" "8495473" "8595577" "8607126" "8645784" 2001/0014962	US-PGPUB; USPAT	OR	ON	2015/01/22 17:51
S92	33	("5524116" | "5663910" | "5898698" | "5983382" | "6098188" | "6775320" | "6778589" | "6337877" | "6496481" | "6707822" | "6778596" | "6826589" | "7200792" | "7164654" | "7174493" | "7519124" | "7600172" | "7657818" | "7764595" | "7782758" | "7831890" | "7844882" | "7836381" | "8074138" | "8149904" | "8276048" | "8335956" | "8407546" | "8468411" | "8495473" | "8595577" | "8607126" | "8645784" | " 2001/0014962").PN.	US-PGPUB; USPAT	OR	ON	2015/01/22 17:55
S94	13	("20020087710" | " 20020126675 " |	US-PGPUB;	OR	ON	2015/01/22

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 542 of 739

		"20020154600 " | "20030067877 " | "200310076870" | " 20040114536 " | "2004/0148552" | " 20040196786 " | "20040203455" | " 20050180323" | " 20060092871 " | "200610236045 " | "20070198898" | " 20070263528 " | "20080212582 " | "20100061376").PN.	USPAT			18:01
S95	46	S92 or S94	US-PGPUB; USPAT	OR	ON	2015/01/22 18:03
S96	11	S93 and S95	US-PGPUB; USPAT	OR	ON	2015/01/22 18:04
S97	10	S95 and (Quality near2 Service QOS)and((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/22 18:06
S98	11	S95 and (Quality near2 Service QOS)and((packet block group set payload frame)near5 type)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/22 18:11
S99	27	(packet adj transfer adj mode adj transmission adj convergence PTM-TC PTMTC PTM adj TC)	US-PGPUB; USPAT	OR	ON	2015/01/22 19:13
S100	1614	714/776.ccls.	US-PGPUB; USPAT	OR	OFF	2015/01/23 10:24
S101	185383	packet$1 near2 $2transmi$5	US-PGPUB; USPAT	OR	ON	2015/01/23 10:25
S102	107	(Quality near2 Service QOS)same((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/23 10:25
S103	68	S101 and S102	US-PGPUB; USPAT	OR	ON	2015/01/23 10:25
S104	0	S100 and S102	US-PGPUB; USPAT	OR	ON	2015/01/23 10:26
S105	0	S100 and S103	US-PGPUB; USPAT	OR	ON	2015/01/23 10:26
S106	0	S100 and (Quality near2 Service QOS)and((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/23 10:26
S107	368	(packet block frame set group)near3(second$3 next another other)with(stor$3 retain$3 accumulat$3)with(buffer memory storage)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:33
S108	79	(packet block frame set group)near3(second$3 next another other)with(stor$3 retain$3	US-PGPUB; USPAT	OR	ON	2015/01/23 14:34

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 543 of 739

		accumulat$3)with(buffer memory storage)near2(retransmi$5 re-transmi$5 resend$3 re-send$3)				
S109	1	(packet block frame set group)near3((second$3 next another other)near2 type)with(stor$3 retain$3 accumulat$3)with(buffer memory storage)near2(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:34
S110	232	(head$3 field portion sector)with(packet block frame set group)near3(second$3 next another other)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:39
S111	93	(head$3 field portion sector)near3(packet block frame set group)near3(second$3 next another other)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:50
S112	16	(head$3 field portion sector)with(packet block frame set group)near3((second$3 next another other)near2 type)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:52
S113	22	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 15:07
S114	44	(head$3 field portion sector)and(packet block frame set group payload stream)and(second$3 next another other type)and(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:10
S115	41	(head$3 field portion sector)and(packet block frame set group payload stream)and(second$3 next another other type)same(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:11
S116	40	(head$3 field portion sector)and(packet block frame set group payload stream)same(second$3 next another other type)same(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:11
S117	38	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:11
S118	33	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(identif$7	EPO; JPO	OR	ON	2015/01/23 15:11

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 544 of 739

		indicat$3 determin$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)				
S119	107	(head$3 field portion sector)and(packet block frame set group payload stream)and((second$3 next another other)near2 type)and(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	USOCR; FPRS; DERWENT; IBM_TDB	OR	ON	2015/01/23 15:15
S120	10	(head$3 field portion sector)same(packet block frame set group payload stream)same((second$3 next another other)near2 type)same(identif$7 indicat$3 determin$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	USOCR; FPRS; DERWENT; IBM_TDB	OR	ON	2015/01/23 15:15
S121	57	(head$3 field portion sector)same(packet block frame set group payload stream)same((second$3 next another other)near2 type)same(count$3 identif$7 indicat$3 determin$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:11
S122	27	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:33
S123	2718	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:33
S124	58403	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S125	23	S123 with S124	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S126	25	S123 same S124	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S127	198	S123 and S124	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S128	25	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)same(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$4)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:42
S129	27	(retransmi$5 re-transmi$5 resend$3 re-send$3)same(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3	US-PGPUB; USPAT	OR	ON	2015/01/26 12:43

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 545 of 739

		determin$3 control$4)				
S130	77	(retransmi$5 re-transmi$5 resend$3 re-send$3)same2(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other two)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$4)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:46
S131	98	(head$3 field portion sector)near2(packet block frame set group payload stream)near2((second$3 next another other)near2 type)near2(count$3 identif$7 indicat$3 determin$3 control$4)	US-PGPUB; USPAT	OR	ON	2015/01/26 13:22
S132	24	S124 and S131	US-PGPUB; USPAT	OR	ON	2015/01/26 13:24
S133	1	(head$3 field portion sector)near2(packet block frame set group payload stream)near2((second$3 next another other)near2 type)near2(count$3 identif$7 indicat$3 determin$3 control$4)	EPO; JPO	OR	ON	2015/01/26 13:32
S134	76	(head$3 field portion sector)and(packet block frame set group payload stream)and(second$3 next another other type)and(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:33
S135	74	(head$3 field portion sector)same(packet block frame set group payload stream)and(second$3 next another other type)and(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S136	68	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)and(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S137	61	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S138	52	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(count$3 identif$7 indicat$3 determin$3 control$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S139	44	(head$3 field portion	EPO; JPO	OR	ON	2015/01/26

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 546 of 739

		sector)same(packet block frame set group payload stream)same(second$3 next another other)same(count$3 identif$7 indicat$3 determin$3 control$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)				13:34
S140	28	(head$3 field portion sector)near2(packet block frame set group payload stream)near2(second$3 next another other)near2(count$3 identif$7 indicat$3 determin$3 control$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 13:39
S141	73	(head$3 field portion sector)near2(packet block frame set group payload stream)near2(second$3 next another other)near2(count$3 identif$7 indicat$3 determin$3 control$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:03
S142	17	(head$3 field portion sector)near2(packet block frame set group payload stream)near2(second$3 next another other)near2((count$3 identif$7 indicat$3 determin$3 control$4)near2 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:08
S143	42	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(head$3 field portion sector)with(packet block frame set group payload stream)with(second$3 next another other)with(count$3 identif$7 indicat$3 determin$3 control$4)with(exclude$3 or separate$3 or avoid$3 or discard$3 or remov$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:22
S144	20	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(head$3 field portion sector)with(packet block frame set group payload stream)with(second$3 next another other)with(count$3 identif$7 indicat$3 determin$3 control$4)with(exclud$3 or avoid$3 or discard$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:35
S145	11551	370/389.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/26 16:08
S146	2182	370/394.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/26 16:08
S147	23	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 16:10
S148	4	S145 and S147	US-PGPUB; USPAT	OR	ON	2015/01/26 16:10
S149	1	S146 and S147	US-PGPUB; USPAT	OR	ON	2015/01/26 16:10

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 547 of 739

S150	33	("5524116" | "5663910" | "5898698" | "5983382" | "6098188" | "6775320" | "6778589" | "6337877" | "6496481" | "6707822" | "6778596" | "6826589" | "7200792" | "7164654" | "7174493" | "7519124" | "7600172" | "7657818" | "7764595" | "7782758" | "7831890" | "7844882" | "7836381" | "8074138" | "8149904" | "8276048" | "8335956" | "8407546" | "8468411" | "8495473" | "8595577" | "8607126" | "8645784" | "2001/0014962").PN.	US-PGPUB; USPAT	OR	ON	2015/01/26 18:15
S151	13	("20020087710" | " 20020126675 " | "20020154600 " | "20030067877 " | "200310076870" | " 20040114536 " | "2004/0148552" | " 20040196786 " | "20040203455" | " 20050180323" | " 20060092871 " | "200610236045 " | "20070198898" | " 20070263528 " | "20080212582 " | "20100061376").PN.	US-PGPUB; USPAT	OR	ON	2015/01/26 18:15
S152	46	S150 or S151	US-PGPUB; USPAT	OR	ON	2015/01/26 18:15
S153	28	S152 and (retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/26 18:16
S154	33	("5524116" | "5663910" | "5898698" | "5983382" | "6098188" | "6775320" | "6778589" | "6337877" | "6496481" | "6707822" | "6778596" | "6826589" | "7200792" | "7164654" | "7174493" | "7519124" | "7600172" | "7657818" | "7764595" | "7782758" | "7831890" | "7844882" | "7836381" | "8074138" | "8149904" | "8276048" | "8335956" | "8407546" | "8468411" | "8495473" | "8595577" | "8607126" | "8645784" | "2001/0014962").PN.	US-PGPUB; USPAT	OR	ON	2015/01/27 10:45
S155	13	("20020087710" | " 20020126675 " | "20020154600 " | "20030067877 " | "200310076870" | " 20040114536 " | "2004/0148552" | " 20040196786 " | "20040203455" | " 20050180323" | " 20060092871 " | "200610236045 " | "20070198898" | " 20070263528 " | "20080212582 " | "20100061376").PN.	US-PGPUB; USPAT	OR	ON	2015/01/27 10:45
S156	46	S154 or S155	US-PGPUB; USPAT	OR	ON	2015/01/27 10:45
S157	28	S156 and (count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)same(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/27 10:46
S158	23	S156 and (count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/27 10:47
S159	10	S156 and (count$3 identif$7 indicat$3 determin$3 control$4	US-PGPUB; USPAT	OR	ON	2015/01/27 10:59

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 548 of 739

		sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)same(packet block frame set group payload stream)same (quality near2 service QoS)				
S160	46	("8850089" "4792753" "4807224" "4905225" "4914653" "4970714" "5339313" "5404353" "5430738" "5555266" "5664091" "5875292" "5905720" "6072726" "6073180" "6172983" "6278718" "6416471" "6493318" "6701370" "6728878" "6741554" "6763030" "6772375" "6788704" "7149192" "7277390" "7296204" "7346701" "7376426" "7412338" "7450599" "7596091" "7693070" "7701846" "7787368" "7821933" "7849208" "7885264" "7969901" "8023417" "8077601" "7885264" "7969901" "8023417" "8077601" "8151155" "8156407" "8228917" "8291034").pn.	US-PGPUB; USPAT	OR	ON	2015/01/27 14:01
S161	42	("4766591" "5444856" "5727149" RE36182 "6005851" "6021177" "6185427" "6278921" "6438585" "6477595" "6556582" "6701151" "6765891" "7058387" "7068610" "7099339" "7103313" "7116640" "7221268" "7260399" "7293289" "7328036" "7356614" "7395347" "7403514" "7593428" "7609747" "7639641" "7686520" "7734253" "7839824" "7945206" "8013732" "8024481" "8040917" "8045501" "8060419" "8060681" "8077702" "7945206" "8013732" "8024481" "8040917" "8045501" "8060419" "8060681" "8077702" "8149783" "8160000" "8228924").pn.	US-PGPUB; USPAT	OR	ON	2015/01/27 14:01
S162	8	S160 and (head$3 field portion sector)with(packet block frame set group payload stream)with(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:02
S163	0	S161 and (head$3 field portion sector)with(packet block frame set group payload stream)with(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:02
S164	2	S161 and (head$3 field portion sector)same(packet block frame set group payload stream)same(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:04
S165	49	("5844918" "4799215" "5875292" "4412326" "4551834" "4617657" "4888767" "4989204" "5222061" "5235599" "5267237" "5444718" "5610595" "5740167" "5754754"	US-PGPUB; USPAT	OR	ON	2015/01/27 14:48

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 549 of 739

		"5828293" "6161207" "6181700" "6219713" "6219713" "6453438" "6483845" "6587985" "6684354" "6732313" "6785259" "6891799" "6914903" "6918077" "6987730" "7088701" "7099300" "7124333" "7263644" "7356750" "7386872" "7397861" "7400616" "7447969" "7477621" "7484157" "7486700" "7535840" "7583701" "7633880" "7689644" "7701846" "7710889" "7769014" "7823039").pn.				
S166	28	S165 and (head$3 field portion sector)same(packet block frame set group payload stream)same(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:48
S167	19	S165 and (head$3 field portion sector)with(packet block frame set group payload stream)with(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:49
S168	7	"18337261".FMID.	US-PGPUB; USPAT; FPRS	OR	OFF	2015/01/27 15:04
S169	145	(transmi$5 transceiv$3)with(two type different second$3)near(packet block group set package chunk)with((identif$7 indicat$3 determin$3)near header)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:08
S170	533	(transmi$5 transceiv$3)with(two type different second$3)with(packet block group set package chunk)with((identif$7 indicat$3 determin$3)near header)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:09
S171	135339	(Quality near2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:12
S172	1669	((packet adj error adj rate PER)near2 low$3)and((delay late$3)near2 low$3)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:14
S173	0	S170 and S172	US-PGPUB; USPAT	OR	ON	2015/06/03 19:14
S174	396	S171 and S172	US-PGPUB; USPAT	OR	ON	2015/06/03 19:14
S175	7346	(transmi$5 transceiv$3)same(two type different second$3)same(packet block group set package chunk frame)same((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:17
S176	8	S174 and S175	US-PGPUB; USPAT	OR	ON	2015/06/03 19:17
S177	478	(transmi$5 send$3)near2(two type different second$3)near2(packet block group set package chunk frame)same((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:15
S178	28	(transmi$5 send$3)near2(two type different second$3)near2(packet block	US-PGPUB; USPAT	OR	ON	2015/06/04 11:15

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 550 of 739

		group set package chunk frame)near2((identif$7 indicat$3 determin$3)near2 header)				
S179	12	("20020154600" | "6754188" | "7483421" | "6005851" | "20040179494" | "20070206621" | "7031259" | "20050036497" | "20020126675" | "20090319854" | "20030009717" | "7826438").PN.	US-PGPUB; USPAT	OR	OFF	2015/06/04 11:16
S180	0	S177 and S179	US-PGPUB; USPAT	OR	ON	2015/06/04 11:17
S181	3	S179 and (transmi$5 send$3)same(two type different second$3)same(packet block group set package chunk frame)same((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:17
S182	63	(Quality near2 Service QOS)same((packet adj error adj rate PER)near2 low$3)and((delay late$3)near2 low$3)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:38
S183	1507	(transmi$5 send$3)with(two type different second$3)with(packet block group set package chunk frame)with((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:38
S184	1	S182 and S183	US-PGPUB; USPAT	OR	ON	2015/06/04 11:39
S185	43	S183 same(Quality near2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:39
S186	24	(transmi$5 send$3)with(two type different second$3)with(packet block group set package chunk frame)with(Quality near2 Service QOS)with((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:00
S187	44	(Quality near2 Service QOS)same((packet adj2 error adj2 rate PER)near2 low$3)same((delay late$3)near2 low$3)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:18
S188	26	((Quality near2 Service QOS)near2 level)same((packet adj2 error adj2 rate PER)near low$3)same((delay late$3)near low$3)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:35
S189	44	((Quality near2 Service QOS)near2 level)and((packet adj2 error adj2 rate PER)near low$3)and((delay late$3)near low$3)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:36
S190	6709	(transmi$5 send$3)with(packet block group set package chunk frame)with((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:36
S191	2	S189 and S190	US-PGPUB; USPAT	OR	ON	2015/06/04 12:37
S192	106584	((transmi$5 send$3 retransmi$5 re-transmi$5 resend$3 re-send$)near2 transceiver)	US-PGPUB; USPAT	OR	ON	2015/12/18 10:31
S193	436	(Quality adj2 Service QOS)and((packet adj2 error adj2 rate PER)near2	US-PGPUB; USPAT	OR	ON	2015/12/18 10:38

		low$3)and((delay late$3)near2 low$3)				
S195	16748	(header field portion sector)near3((packet block frame set group payload stream)near3 type)with(identif$7 indicat$3 determin$3 control$3)	US-PGPUB; USPAT	OR	ON	2015/12/18 10:44
S197	1058	S192 and S195	US-PGPUB; USPAT	OR	OFF	2015/12/18 10:45
S199	13	S193 and S197	US-PGPUB; USPAT	OR	OFF	2015/12/18 10:56
S200	37	S192 same S195	US-PGPUB; USPAT	OR	OFF	2015/12/18 10:57
S207	383	(identifier indicator)with(((packet block frame set group payload stream chunk)near2 secon$3)near2 type)	US-PGPUB; USPAT	OR	ON	2015/12/18 11:23
S208	38	S192 and S207	US-PGPUB; USPAT	OR	ON	2015/12/18 11:24
S209	1669	(classifi$6 identif$7 indicat$3 determin$3 control$3)near3(((packet block frame set group payload stream chunk)near2 secon$3)near2 type)	US-PGPUB; USPAT	OR	ON	2015/12/18 11:27
S210	2	S192 same S207	US-PGPUB; USPAT	OR	ON	2015/12/18 11:28
S211	135774	(Quality adj2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/12/18 11:29
S212	67	S192 and S209	US-PGPUB; USPAT	OR	ON	2015/12/18 11:29
S213	15	S211 and S212	US-PGPUB; USPAT	OR	ON	2015/12/18 11:29
S216	10143	S192 and S211	US-PGPUB; USPAT	OR	ON	2015/12/18 11:39
S218	567	(classifi$6 identif$7 indicat$3 determin$3 control$3 "sequence identifier")with(((packet block frame set group payload stream chunk)near2 secon$3)near2 type)with(header field portion sector)	US-PGPUB; USPAT	OR	ON	2015/12/18 11:44
S219	27	S216 and S218	US-PGPUB; USPAT	OR	ON	2015/12/18 11:44
S220	2606	714/748.ccls.	US-PGPUB; USPAT	OR	ON	2015/12/18 11:53
S221	15	S218 and S220	US-PGPUB; USPAT	OR	ON	2015/12/18 11:53
S222	1330	H04L1/1809.cpc.	US-PGPUB; USPAT	OR	ON	2015/12/18 11:55
S223	3711	H04L1/1812.cpc.	US-PGPUB; USPAT	OR	ON	2015/12/18 11:55
S224	2686	H04L1/1887.cpc.	US-PGPUB; USPAT	OR	ON	2015/12/18 11:55
S225	1766	H04L1/1819.cpc.	US-PGPUB; USPAT	OR	ON	2015/12/18 11:56
S226	2331	H04L2001/0093.cpc.	US-PGPUB; USPAT	OR	ON	2015/12/18 11:56
S227	17	S218 and S222	US-PGPUB; USPAT	OR	ON	2015/12/18 11:56

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 552 of 739

S228	3	S218 and S223	US-PGPUB; USPAT	OR	ON	2015/12/18 11:56
S229	5	S218 and S224	US-PGPUB; USPAT	OR	ON	2015/12/18 11:56
S230	2	S218 and S225	US-PGPUB; USPAT	OR	ON	2015/12/18 11:56
S231	4	S218 and S226	US-PGPUB; USPAT	OR	ON	2015/12/18 11:57
S232	4	(classifi$6 identif$7 indicat$3 determin$3 control$3 "sequence identifier")with(((packet block frame set group payload stream chunk)near2 secon$3)near2 type)with(header field portion sector)	EPO; JPO	OR	ON	2015/12/18 11:59
S233	47	(classifi$6 identif$7 indicat$3 determin$3 control$3 "sequence identifier")with(((packet block frame set group payload stream chunk)near2 secon$3)near2 type)with(header field portion sector)	USOCR; FPRS; DERWENT; IBM_TDB	OR	ON	2015/12/18 12:00
S234	572	((delay late$3)near2 low$3)near3(packet block frame set group payload stream chunk)with(header field portion sector)	US-PGPUB; USPAT	OR	ON	2015/12/18 16:07
S235	106584	((transmi$5 send$3 retransmi$5 re-transmi$5 resend$3 re-send$)near2 transceiver)	US-PGPUB; USPAT	OR	ON	2015/12/18 16:07
S236	135774	(Quality adj2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/12/18 16:08
S237	20	S234 and S235 and S236	US-PGPUB; USPAT	OR	ON	2015/12/18 16:08
S238	125	(Quality adj2 Service QOS)and((delay late$3)near2 low$3)with(packet block frame set group payload stream chunk)near2(head$3 field portion sector)	US-PGPUB; USPAT	OR	ON	2015/12/18 17:49
S239	24	S235 and S238	US-PGPUB; USPAT	OR	ON	2015/12/18 17:50
S240	37	(packet block frame set group payload stream chunk)with(exclud$3 "not includ$3")near2((classifi$6 identif$7 indicat$3 determin$3 control$3 "sequence identifier")near2 head$3)	US-PGPUB; USPAT	OR	ON	2015/12/18 20:14
S241	147	(packet block frame set group payload stream chunk)with(except exclud$3 "not includ$3")near2((classifi$6 identif$7 indicat$3 determin$3 control$3 "sequence identifier")near3 head$3)	US-PGPUB; USPAT	OR	ON	2015/12/18 20:42
S242	9	S235 and S241	US-PGPUB; USPAT	OR	ON	2015/12/18 20:42
S243	0	S238 and S241	US-PGPUB; USPAT	OR	ON	2015/12/18 20:42
S244	16	("20020154600" | "6754188" | "7483421" | "20050068916" | "20060089833" | "6266337" | "6005851" | "20050068916" |	US-PGPUB; USPAT	OR	OFF	2015/12/18 22:07

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 553 of 739

		"20020154600" | "7031259" | "7826438" | "20040179494" | "20070206621" | "20070206621" | "20040109455" | "7031259" | "20050036497" | "20020126675" | "20040179494" | "6005851" | "20020126675" | "20090319854" | "20030009717" | "20040109455" | "6754188" | "7483421" | "7826438").PN.				

EAST Search History (Interference)

< This search history is empty>

12/ 18/ 2015 10:11:43 PM
C:\ Users\ oalshack\ Documents\ EAST\ Workspaces\ 14159125.wsp

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	1	of	2	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

UNPUBLISHED U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] (if known)	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	15/046821	02-18-2016	Tzannes et al.	

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	2	EP 1385292	01-28-2004	SAMSUNG ELECTRONICS CO, LTD.		
	3	KR 10-2004-0009928	01-31-2004	SAMSUNG ELECTRONICS CO., LTD		(Believed to corresponding to EP 1385292 cited herein)
	4	KR 10-2004-0014977	02-18-2004	Koninklijke Philips N.V.		(Believed to Correspond to WO 03/003747 cited herein)
	5	WO 03/003747	01-09-2003	KONINKLIJKE PHILIPS ELECTRONICS N.V.		

OTHER ART (including Author, Title, Date, Pertinent Pages, etc.)	
Examiner Initials*	Cite No.[1]
	6 GOODMAN, David et al. "Maximizing the Throughput to CDMA Data Communications" Polytechnic University, Brooklyn, NY, October 2003 (5 pages)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	2	of	2	Attorney Docket Number	6936-57-PUS-CON-3

	7	Official Action for European Application No. 05807443.6, mailed Dec. 8, 2015 (Attorney Ref. No.: 6936-54-PEP)
	8	Official Action (including translation) for Korean Patent Application No. 10-2008-7024792 dated Dec. 14, 2015 (Attorney Ref. No. 6936-57-PKR)
	9	Official Action (including translation) for Korean Patent Application No. 10-2014-7005299 mailed Dec. 14, 2015 (Attorney Ref. No.: 6936-57-PKR-DIV)
	10	Notice of Allowance for U.S. Patent Application No. 14/730,874 mailed Jan. 7, 2016 (Attorney Ref. No.: 6936-54-CON-7)
	11	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed from Nov. 10, 2015 - Jan. 5, 2016 - Docket Nos., 123-129;** (102 pages)
	12	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed from Jan. 20, 2016 - Feb. 2, 2016 - Docket Nos., 131 - 137;** (104 pages)
	13	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed from Dec. 16, 2015 - Jan. 6, 2016 - Docket Nos., 104-112;** (193 pages)
	14	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed from Jan. 20, 2016 - Feb. 8, 2016 - Docket Nos., 113-124;** (252 pages)
	15	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed from Dec. 16, 2015 - Dec. 16, 2015 - Docket Nos., 119;** (48 pages)
	16	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed from Jan. 20, 2016 - Feb. 8, 2016 - Docket Nos. 125-139;** (349 pages)
	17	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ADTRAN INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA; **Includes documents filed from Jan. 20, 2016 - Feb. 8, 2016 - Docket Nos., 67-68;** (81 pages)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Electronic Patent Application Fee Transmittal

Application Number:	14159125
Filing Date:	20-Jan-2014
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Filer:	Jason Vick/Joanne Vos
Attorney Docket Number:	6936-57-PUS-CON-3

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt	
EFS ID:	25023766
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	25-FEB-2016
Filing Date:	20-JAN-2014
Time Stamp:	16:07:11
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	18982
Deposit Account	191970
Authorized User	VICK, JASON H.
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 CFR 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 CFR 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 CFR 1.19 (Document supply fees)

Charge any Additional Fees required under 37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		IDS_11.pdf	216416 33ff28aa20199b366ed6a7e2ecd1bc630dc7f193	yes	5
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	3	
	Information Disclosure Statement (IDS) Form (SB08)		4	5	
Warnings:					
Information:					
2	Foreign Reference	EP1385292A2.pdf	1121443 da6c419bf7457220ea8575391044b5a46bf4c490	no	19
Warnings:					
Information:					
3	Foreign Reference	KR1020040009928.pdf	848668 d69051a0a797bc891ff3ca761229c26c735a7c60	no	16
Warnings:					
Information:					
4	Foreign Reference	KR1020040014977.pdf	1341898 f2d31448a72c57631af00313206578 30e64895cf	no	27
Warnings:					
Information:					
5	Foreign Reference	WO03003747A1.pdf	2081123 dc10c454f25e90257092ec2b49b7f03b89df584a	no	45
Warnings:					
Information:					
6	Non Patent Literature	Goodman_Maximizing_the_Throughput_of_CDMA.pdf	4227285 daef192b27cc9cf83d1a1ce7748b544976779eee	no	5
Warnings:					
Information:					

7	Non Patent Literature	6936-54-PEP_OA_12-08-2015.pdf	721511 30771b83d5deb7f612d6d6dfc71326cadd1dd337	no	9
Warnings:					
Information:					
8	Non Patent Literature	6936-57-PKR_OA_12-14-2015.pdf	1629234 3ca55abaa53e878232fc0f204add6f8a6f98714e	no	9
Warnings:					
Information:					
9	Non Patent Literature	6936-57-PKR-DIV_OA_12-14-2015.pdf	1442189 0d1e88bd46a1b5dbf324fe56672b0b07f15d97f9	no	5
Warnings:					
Information:					
10	Non Patent Literature	6936-54-CON-7_NOA_01-07-2016.pdf	522491 ec98e4f3155610c6f3142c3f6f2eaeeb45ea8cb1	no	11
Warnings:					
Information:					
11	Non Patent Literature	PART_2_2WIRE_0001.pdf	4993819 2da505f8ae6a6dc700dcd7de61c6cc95e5150d34	no	102
Warnings:					
Information:					
12	Non Patent Literature	PART_3_2WIRE_0001.pdf	6209846 d9b433a2109dc9e437861b705c67a80e66e91989	no	104
Warnings:					
Information:					
13	Non Patent Literature	PART_2_ZHONE_0001.pdf	9027309 11701d7df9d6c6d86f37a9f38649c246993d6928	no	193
Warnings:					
Information:					
14	Non Patent Literature	PART_3_ZHONE_0001.pdf	7557152 8fb9ee5ec7a8cee94e22905d4c02f28ed09dd67d	no	252
Warnings:					
Information:					
15	Non Patent Literature	PART_2_ZYXEL_0001.pdf	4792390 c56179844bf4977ae19aec1b88910f30ede002a8	no	48
Warnings:					
Information:					

16	Non Patent Literature	PART_3_ZYXEL_0001.pdf	9825154 659fefbfb831cbb9814c64a6ab1fc850252c5272	no	349
Warnings:					
Information:					
17	Non Patent Literature	PART_2_ADTRAN_0001.pdf	5276653 5b001cc6fd58ddc81510795129db8a185b3b5c87	no	81
Warnings:					
Information:					
18	Fee Worksheet (SB06)	fee-info.pdf	30774 8e27d96521ad65d50f45e6afad63c853224414f9	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	61865355	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of: Marcos C. Tzannes Serial No.: 14/159,125 Filed: January 20, 2014 Atty File No.: 6936-57-PUS-CON-3 Entitled: "PACKET RETRANSMISSION AND MEMORY SHARING"	Group Art Unit: 2112 Confirmation No.: 3369 Examiner: Alshack, Osman M SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT Electronically Submitted

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Madam:

The references cited on attached Form PTO-1449 are being called to the attention of the Examiner.

☒ Copies of the cited non-patent and/or foreign references are enclosed herewith.

☐ Copies of the cited U.S. patents and/or patent applications are enclosed herewith.

☒ Copies of the cited U.S. patents/unpublished patent applications/patent application publications are not enclosed in accordance with 37 C.F.R. § 1.98(a).

☐ Copies of the cited references are not enclosed, in accordance with 37 C.F.R. § 1.98(d), because the references were cited by or submitted to the U.S. Patent and Trademark Office in prior application Serial No. _____ filed _____, which is relied upon for an earlier filing date under 35 U.S.C. § 120.

☒ To the best of applicants' belief, the pertinence of the foreign-language references are believed to be summarized in the attached English translation/abstracts and/or in the figures, although applicants do not necessarily vouch for the accuracy of the translation.

☒ Examiner's attention is drawn to the following related applications:

- Serial No. 15/046,821 filed Feb. 18, 2016 (Attorney Ref. No. 6936-54-CON-8)

☐ Other: _____

Submission of the above information is not intended as an admission that any item is citable under the statutes or rules to support a rejection, that any item disclosed represents

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 563 of 739

analogous art, or that those skilled in the art would refer to or recognize the pertinence of any reference without the benefit of hindsight, nor should an inference be drawn as to the pertinence of the references based on the order in which they are presented. Submission of this statement should not be taken as an indication that a search has been conducted, or that no better art exists.

It is respectfully requested that the cited information be expressly considered during the prosecution of this application and the references made of record therein.

FEES

☐	**37 CFR 1.97(b):** No fee is believed due in connection with this submission, because the information disclosure statement submitted herewith is satisfied by one of the following conditions ("X" indicates satisfaction): ☐ Within three months of the filing date of a national application other than a continued prosecution application under 37 CFR 1.53(d), or ☐ Within three months of the date of entry into the national stage of an international application as set forth in 37 CFR 1.491 or ☐ Before the mailing date of a first Office Action on the merits, or ☐ Before the mailing of a first Office action after the filing of a request for continued examination under 37 CFR 1.114. Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970.
☒	**37 CFR 1.97(c):** The information disclosure statement transmitted herewith is being filed after all the above conditions (37 CFR 1.97(b)), but before the mailing date of one of the following conditions: (1) a final action under 37 C.F.R. 1.113 or (2) a notice of allowance under 37 C.F.R. 1.311, or (3) an action that otherwise closes prosecution in the application. This Information Disclosure Statement is accompanied by: ☐ A Certification (below) as specified by 37 C.F.R. 1.97(e). Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970. OR ☒ Please charge Deposit Account 19-1970 in the amount of $180.00 for the fee set forth in 37 C.F.R. 1.17(p) for submission of an information disclosure statement. Please credit any overpayment or charge any underpayment to Deposit Account 19-1970.
☐	**37 CFR 1.97(d):** This Information Disclosure Statement is being submitted after the period specified in 37 CFR 1.97(c). ☐ This information Disclosure Statement includes a Certification (below) as specified by 37 C.F.R. 1.97(e) AND ☐ Applicants hereby requests consideration of the reference(s) disclosed herein. Please charge Deposit Account 19-1970 in the amount of $180.00 under 37 C.F.R. 1.17(p). Please credit any overpayment or charge any underpayment to Deposit Account 19-1970. Election to pay the fee should not be taken as an indication that applicant(s) cannot execute a certification.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 564 of 739

Certification (37 C.F.R. 1.97(e))
(Applicable only if checked)

☐ The undersigned certifies that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(1).

☐ A copy of the communication from the foreign patent office is enclosed.

OR

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned after making reasonable inquiry, no item of information contained in this Information Disclosure Statement was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(2).

Respectfully submitted,

SHERIDAN ROSS P.C.

Date: February 25, 2016

By: /Jason H. Vick/
Jason H. Vick
Reg. No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202
Telephone: 303-863-9700

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 565 of 739

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/159,125	01/20/2014	Marcos C. Tzannes	6936-57-PUS-CON-3	3369

62574 7590 04/21/2016

Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

EXAMINER	
ALSHACK, OSMAN M	

ART UNIT	PAPER NUMBER
2112	

NOTIFICATION DATE	DELIVERY MODE
04/21/2016	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jvick@sheridanross.com

Applicant-Initiated Interview Summary	**Application No.**	**Applicant(s)**	
	14/159,125	TZANNES, MARCOS C.	
	Examiner	**Art Unit**	
	OSMAN M. ALSHACk	2112	

All participants (applicant, applicant's representative, PTO personnel):

(1) *OSMAN M. ALSHACk*. (3)_____.

(2) *Jason Vick (Reg. No. 45,285)*. (4)_____.

Date of Interview: *12 April 2016*.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☒103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *106*.

Identification of prior art discussed: *Plamondon et al (U.S. PN: 2007/0206621) & Marco (U.S. PN: 6,266,337)*.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Applicant's Attorney breifly described the invention and argued the cited references fail to teach or disclose the limitation of " wherein the first type of packet is stored in a retransmission buffer after transmission and the second type of packet is not stored in a retransmission buffer after transmission, wherein the header field of the first type of packet comprises a sequence identifier (SID) that is incremented after the first type of packet is transmitted and the header field of the second type of packet does not comprise the SID of the first type of packet." Examiner, will review the cited references, and update the search upon filling of said argument and /or amendment. Agreement was not reach.

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/OSMAN M ALSHACk/ Examiner, Art Unit 2112	/ALBERT DECADY/ Supervisory Patent Examiner, Art Unit 2112

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of: Marcos C. Tzannes	)	Group Art Unit: 2112
Application No.: 14/159,125	)	Examiner: ALSHACK, Osman M.
Filed: January 20, 2014	)	Confirmation No.: 3369
Atty. File No.: 6936-57-PUS-CON-3	)	

For: PACKET RETRANSMISSION AND MEMORY SHARING

AMENDMENT AND RESPONSE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Madam:

Applicant submits this Amendment and Response to address the Non-Final Office Action having a mailing date of December 31, 2015. Please credit any overpayment or charge any underpayment to Deposit Account No. 19-1970.

Please amend the above-identified patent application as follows:

Amendments to the Claims are shown in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 5 of this paper.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 569 of 739

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-105. (Cancelled)

106. (Previously Presented) A method of packet retransmission, in a transceiver, comprising:

transmitting, by the transceiver, a first type of packet; and

transmitting, by the transceiver, a second type of packet,

wherein the first type of packet is stored in a retransmission buffer after transmission and the second type of packet is not stored in a retransmission buffer after transmission,

wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and

wherein the header field of the first type of packet comprises a sequence identifier (SID) that is incremented after the first type of packet is transmitted and the header field of the second type of packet does not comprise the SID of the first type of packet.

107. (Previously Presented) The method of claim 106, wherein the transceiver is connected to a second transceiver using a wired or wireless channel and the transceivers are used to transport one or more of video and voice data.

108. (Previously Presented) The method of claim 106, wherein the method is performed in a linecard that is operable to transport video.

109. (Previously Presented) The method of claim 106, wherein the method is performed in a customer premises modem that is operable to transport video.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 570 of 739

110. (Previously Presented) The method of claim 106, wherein the transceiver includes at least one digital signal processor.

111. (Previously Presented) The method of claim 106, wherein the transceiver includes at least one ASIC (Application Specific Integrated Circuit).

112. (Previously Presented) The method of claim 106, wherein the first type of packet comprises one or more PTM-TC (Packet Transfer Mode - Transmission Convergence) codewords.

113. (Previously Presented) The method of claim 106, wherein the first type of packet comprises one or more ATM (Asynchronous Transfer Mode) cells.

114. (Previously Presented) The method of claim 106, wherein the first type of packet comprises one or more Reed Solomon codewords.

115. (Previously Presented) The method of claim 106, wherein the first type of packet is a low-PER (Packet Error Rate) packet and the second type of packet is a low-latency packet.

116. (Previously Presented) A transceiver operable to transmit a first type of packet and to transmit a second type of packet, wherein the first type of packet is stored in a retransmission buffer after transmission and the second type of packet is not stored in a retransmission buffer after transmission, and wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and wherein the header field of the first type of packet comprises a sequence identifier (SID) that is incremented after the first type of packet is transmitted and the header field of the second type of packet does not comprise the SID of the first type of packet.

117. (Previously Presented) The transceiver of claim 116, wherein the transceiver is connected to a second transceiver using a wired or wireless channel and the transceivers are used to transport one or more of video and voice data.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 571 of 739

118. (Previously Presented) The transceiver of claim 116, wherein the transceiver is located in a linecard that is operable to transport video.

119. (Previously Presented) The transceiver of claim 116, wherein the transceiver is located in a customer premises modem that is operable to transport video.

120. (Previously Presented) The transceiver of claim 116, wherein the transceiver includes at least one digital signal processor.

121. (Previously Presented) The transceiver of claim 116, wherein the transceiver includes at least one ASIC (Application Specific Integrated Circuit).

122. (Previously Presented) The transceiver of claim 116, wherein the first type of packet comprises one or more PTM-TC (Packet Transfer Mode - Transmission Convergence) codewords.

123. (Previously Presented) The transceiver of claim 116, wherein the first type of packet comprises one or more ATM (Asynchronous Transfer Mode) cells.

124. (Previously Presented) The transceiver of claim 116, wherein the first type of packet comprises one or more Reed Solomon codewords.

125. (Previously Presented) The transceiver of claim 116, wherein the first type of packet is a low-PER (Packet Error Rate) packet and the second type of packet is a low-latency packet.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 572 of 739

REMARKS

Applicant respectfully requests reconsideration of this application as amended.

Applicant expressly thanks Ex. Alshack for the courtesies extended during the 12 April Telephone Interview. During the interview, claim 106 was discussed and the following points were made.

In particular it was emphasized that claim 106 recites:

... wherein the first type of packet *is stored in a retransmission buffer* after transmission and the second type of packet *is not stored in a retransmission buffer* after transmission,

wherein the *first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet*, and

wherein the *header field of the first type of packet comprises a sequence identifier (SID) that is incremented after the first type of packet is transmitted and the header field of the second type of packet* ***does not comprise*** *the SID of the first type of packet.* (Emphasis Added)

The Office Action points to paragraph 0413 of Plamondon for teaching the claimed SID. (Applicant notes that Plamondon does not have a paragraph 0413)

Paragraphs 144 and 145 of Plamondon state:

> In some embodiments, the appliance **200** or flow controller **220** uses wavefront detection and disambiguation techniques in managing and controlling flow of network traffic. In this technique, the flow controller **220** uses transmit identifiers or numbers to determine whether particular data packets need to be retransmitted. By way of example, a sender transmits data packets over a network, where each instance of a transmitted data packet is associated with a transmit number. It can be appreciated that the transmit number for a packet is not the same as the packet's sequence number, since a sequence number references the data in the packet while the transmit number references an instance of a transmission of that data. The transmit number can be any information usable for this purpose, including a timestamp associated with a packet or simply an increasing number (similar to a sequence number or a packet number). Because a data segment may be retransmitted, different transmit numbers may be associated with a particular sequence number. [0145]
>
> As the sender transmits data packets, the sender maintains a data structure of acknowledged instances of data packet transmissions. Each instance of a data packet transmission is referenced by its sequence number and transmit number. By maintaining a transmit number for each packet, the sender retains the ordering of the transmission of data packets. When the sender receives an ACK or a SACK, the sender determines the highest transmit number associated with packets that the receiver indicated has arrived (in the received acknowledgement). Any outstanding unacknowledged packets with lower transmit numbers are presumed lost.

While Plamondon does mention sequence number in these paragraphs, Plamondon does not teach, suggest or disclose the claimed feature of ... wherein the first type of packet *is stored*

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 573 of 739

in a retransmission buffer after transmission and the second type of packet *is not stored in a retransmission buffer* after transmission… wherein the ***header field*** *of the first type of packet comprises a sequence identifier (SID) that is incremented after the first type of packet is transmitted and the header field of the second type of packet* ***does not comprise*** *the SID of the first type of packet*. (Emphasis Added)

In contrast to the claimed features, Plamondon states in paragraph 143 that:

> The *appliance **200** or flow controller **220** maintains a count* of retransmissions is maintained on a per-packet basis. Each time that a packet is retransmitted, the count is incremented by one and the appliance **200** continues to transmit packets. (Emphasis Added)

Applicant therefore respectfully submits that it is the appliance 200 or flow controller 220 of Plamondon that maintains a count of retransmissions – Plamondon does not disclose that the header field of the first type of packet comprises a sequence identifier (SID) that is incremented after the first type of packet is transmitted and the header field of the second type of packet does not comprise the SID of the first type of packet.

The Office Action on page 3 concedes that:

> Plamondon does not explicitly teach wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and wherein the header field of the second type of packet does not comprise the SID of the first type of packet.

The Office Action points to Marco for this teaching.

Specifically, the Office Action states:

> (see column 5, lines 39-46, herein, if the packet is a regular packet, the packet routing controller 156 causes a copy of the packet data 158 to be stored in a data memory 160 (block 206). In addition, the packet routing controller 156 causes a CRC generator 162 to compute the checksum of the packet. This is done in a similar manner as described above using CRC-32 and excluding packet header fields such as the identifier and the time-to-live fields).

Applicant respectfully submits the relied upon portion of the reference is absolutely devoid of the claimed feature. The relied upon passage does not even mention header let alone the claimed feature of wherein the first and second types of packet comprise a header field that indicates whether a transmitted packet is a first type of packet or a second type of packet, and wherein the header field of the second type of packet does not comprise the SID of the first type of packet.

At least based on the above, Applicant respectfully submits the rejection of claims 106-125 under 35 U.S.C. §103 is untenable and should be withdrawn.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 574 of 739

With the rejections having been overcome, Applicant respectfully submits the application is in condition for allowance.

A prompt notice of allowance is respectfully solicited.

Should the Examiner believe anything further is desirable in order to place the application in even better condition for allowance, the Examiner is encouraged to contact Applicants undersigned representative at the telephone number listed below.

The Commissioner is hereby authorized to charge to deposit account number 19-1970 any fees under 37 CFR § 1.16 and 1.17 that may be required by this paper and to credit any overpayment to that Account. If any extension of time is required in connection with the filing of this paper and has not been separately requested, such extension is hereby Petitioned.

Respectfully submitted,

SHERIDAN ROSS P.C.

Date: April 26, 2016

By: /Jason H. Vick/

Jason H. Vick
Reg. No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202
Telephone: 303-863-9700

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 575 of 739

PTO/AIA/22 (03-13)
Approved for use through 7/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)	Docket Number (Optional) 6936-57-PUS-CON-3
Application Number 14/159,125	Filed January 20, 2014
For PACKET RETRANSMISSION AND MEMORY SHARING	
Art Unit 2112	Examiner ALSHACK, OSMAN M

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

		Fee	Small Entity Fee	Micro Entity Fee	
☑	One month (37 CFR 1.17(a)(1))	$200	$100	$50	$ 200
☐	Two months (37 CFR 1.17(a)(2))	$600	$300	$150	$
☐	Three months (37 CFR 1.17(a)(3))	$1,400	$700	$350	$
☐	Four months (37 CFR 1.17(a)(4))	$2,200	$1,100	$550	$
☐	Five months (37 CFR 1.17(a)(5))	$3,000	$1,500	$750	$

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☑ The Director has already been authorized to charge fees in this application to a Deposit Account.

☑ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 19-1970.

☑ Payment made via EFS-Web.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant.

☑ attorney or agent of record. Registration number 45285.

☐ attorney or agent acting under 37 CFR 1.34. Registration number _____.

/Jason H. Vick/	April 26, 2016
Signature	Date
Jason H. Vick	303-863-9700
Typed or printed name	Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☑ * Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:	)	Group Art Unit: 2112
Marcos C. Tzannes	)	Confirmation No.: 3369
Serial No.: 14/159,125	)	Examiner: Alshack, Osman M
Filed: January 20, 2014	)	
Atty File No.: 6936-57-PUS-CON-3	)	SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT
Entitled: "PACKET RETRANSMISSION AND MEMORY SHARING"	)	Electronically Submitted

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Madam:

The references cited on attached Form PTO-1449 are being called to the attention of the Examiner.

☒ Copies of the cited non-patent and/or foreign references are enclosed herewith.

☐ Copies of the cited U.S. patents and/or patent applications are enclosed herewith.

☐ Copies of the cited U.S. patents/unpublished patent applications/patent application publications are not enclosed in accordance with 37 C.F.R. § 1.98(a).

☐ Copies of the cited references are not enclosed, in accordance with 37 C.F.R. § 1.98(d), because the references were cited by or submitted to the U.S. Patent and Trademark Office in prior application Serial No. _____ filed _____, which is relied upon for an earlier filing date under 35 U.S.C. § 120.

☐ To the best of applicants' belief, the pertinence of the foreign-language references are believed to be summarized in the attached English translation/abstracts and/or in the figures, although applicants do not necessarily vouch for the accuracy of the translation.

☐ Examiner's attention is drawn to the following related applications:

- Serial No. _____ filed _____ (Attorney Ref. No. _____)

☐ Other: _____

Submission of the above information is not intended as an admission that any item is citable under the statutes or rules to support a rejection, that any item disclosed represents

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 577 of 739

analogous art, or that those skilled in the art would refer to or recognize the pertinence of any reference without the benefit of hindsight, nor should an inference be drawn as to the pertinence of the references based on the order in which they are presented. Submission of this statement should not be taken as an indication that a search has been conducted, or that no better art exists.

It is respectfully requested that the cited information be expressly considered during the prosecution of this application and the references made of record therein.

FEES

☐	**37 CFR 1.97(b):** No fee is believed due in connection with this submission, because the information disclosure statement submitted herewith is satisfied by one of the following conditions ("X" indicates satisfaction): ☐ Within three months of the filing date of a national application other than a continued prosecution application under 37 CFR 1.53(d), or ☐ Within three months of the date of entry into the national stage of an international application as set forth in 37 CFR 1.491 or ☐ Before the mailing date of a first Office Action on the merits, or ☐ Before the mailing of a first Office action after the filing of a request for continued examination under 37 CFR 1.114. Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970.
☒	**37 CFR 1.97(c):** The information disclosure statement transmitted herewith is being filed after all the above conditions (37 CFR 1.97(b)), but before the mailing date of one of the following conditions: (1) a final action under 37 C.F.R. 1.113 or (2) a notice of allowance under 37 C.F.R. 1.311, or (3) an action that otherwise closes prosecution in the application. This Information Disclosure Statement is accompanied by: ☐ A Certification (below) as specified by 37 C.F.R. 1.97(e). Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970. OR ☒ Please charge Deposit Account 19-1970 in the amount of $180.00 for the fee set forth in 37 C.F.R. 1.17(p) for submission of an information disclosure statement. Please credit any overpayment or charge any underpayment to Deposit Account 19-1970.
☐	**37 CFR 1.97(d):** This Information Disclosure Statement is being submitted after the period specified in 37 CFR 1.97(c). ☐ This information Disclosure Statement includes a Certification (below) as specified by 37 C.F.R. 1.97(e) AND ☐ Applicants hereby requests consideration of the reference(s) disclosed herein. Please charge Deposit Account 19-1970 in the amount of $180.00 under 37 C.F.R. 1.17(p). Please credit any overpayment or charge any underpayment to Deposit Account 19-1970. Election to pay the fee should not be taken as an indication that applicant(s) cannot execute a certification.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 578 of 739

Certification (37 C.F.R. 1.97(e))
(Applicable only if checked)

☐ The undersigned certifies that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(1).

☐ A copy of the communication from the foreign patent office is enclosed.

OR

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned after making reasonable inquiry, no item of information contained in this Information Disclosure Statement was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(2).

Respectfully submitted,

SHERIDAN ROSS P.C.

Date: April 26, 2016

By: /Jason H. Vick/
Jason H. Vick
Reg. No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202
Telephone: 303-863-9700

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 579 of 739

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	1	of	2	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	1	Office Action for U.S. Patent Application No. 15/046,821 mailed March 24, 2016 (Attorney Ref. No.: 6936-54-CON-8)
	2	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed from Feb. 9, 2016 - March 2, 2016 - Docket Nos., 138-157;** (228 pages)
	3	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed from Aug. 31, 2015 and March 17, 2016 - April 22, 2016 - Docket Nos., 108 and 180-208;** (194 pages)
	4	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed from Feb. 9, 2016 - March 2, 2016 - Docket Nos., 125-142;** (225 pages)
	5	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed from March 17, 2016 - April 22, 2016; Docket Nos., 165-193;** (152 pages)
	6	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed from Feb. 9, 2016 - March 2, 2015; Docket Nos. 140-157;** (223 pages)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	2	of	2	Attorney Docket Number	6936-57-PUS-CON-3

	7	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **includes documents filed from March 17, 2016-April 22, 2016; Docket Nos. 180-208;** (152 pages)
	8	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ADTRAN INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA; **includes documents filed from Feb. 9, 2016 - March 1, 2016 Docket Nos., 69-72;** (13 pages)
	9	Defendant Adtran, Inc.'s Preliminary Invalidity Contentions with Regard to Representative Asserted Claims for TQ DELTA, LLC v. ADTRAN, INC. - **including Claim Charts for FAMILY 3 as Exhibits 3-1 - 3-28**; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA and Civil Action No. 1:15-cv-00121-RGA; filed February 9, 2016 (643 pages)
	10	Defendant Adtran, Inc.'s Preliminary Invalidity Contentions with Regard to Representative Asserted Claims for TQ DELTA, LLC v. ADTRAN, INC. - **including Claim Charts for FAMILY 9 as Exhibits 9-1 - 9-23**; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA and Civil Action No. 1:15-cv-00121-RGA; filed February 9, 2016 (406 pages)
	11	Documents filed with District Court Proceedings for ADTRAN INC. v. TQ DELTA, LLC; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:15-cv-00121-RGA; **includes documents filed from July 17, 2014 - March 1, 2016 Docket Nos., 1-77;** (1,444) pages)
	12	Documents filed with District Court Proceedings for ADTRAN INC. vs. TQ DELTA, LLC; U.S. District Court, for the Northern District of Alabama (Northeastern); Civil Action No. 5:14-cv-01381-JEO; **includes documents filed from July 17, 2014 - Jan. 27, 2015 - Docket Nos., 1-32;** (568 pages)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Electronic Patent Application Fee Transmittal

Application Number:	14159125
Filing Date:	20-Jan-2014
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Filer:	Jason Vick/Joanne Vos
Attorney Docket Number:	6936-57-PUS-CON-3

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 1 month with $0 paid	1251	1	200	200
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**380**

Electronic Acknowledgement Receipt	
EFS ID:	25603769
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	26-APR-2016
Filing Date:	20-JAN-2014
Time Stamp:	17:29:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$380
RAM confirmation Number	4093
Deposit Account	191970
Authorized User	VICK, JASON H.
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 CFR 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 CFR 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 CFR 1.19 (Document supply fees)

Charge any Additional Fees required under 37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		AMEND_03.pdf	221073 a01d9a1b5929fcd1f5ce84932fd47dc2b0e7ae24	yes	8

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Amendment/Req. Reconsideration-After Non-Final Reject	1	1
Claims	2	4
Applicant Arguments/Remarks Made in an Amendment	5	7
Extension of Time	8	8

Warnings:

Information:

2		IDS_12.pdf	215691 7c7ee1365e39591ae4ddabbcccf18a0532a8542c	yes	5

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Transmittal Letter	1	3
Information Disclosure Statement (IDS) Form (SB08)	4	5

Warnings:

Information:

3	Non Patent Literature	6936-54-CON-8_OA_03-24-2016.pdf	194126 cce86e6f1843291c0ed846ed35afdb0d79e70d22	no	6

Warnings:

Information:

4	Non Patent Literature	PART_4_2WIRE.pdf	19889336 65db9c9c5dacfa93025251c0e81f52c0a6c8d025	no	228

Warnings:

Information:					
5	Non Patent Literature	PART_5_2WIRE.pdf	9017124 e5a9d39405b7382e0fd13b55f17e534254eb2bce	no	194
Warnings:					
Information:					
6	Non Patent Literature	PART_4_ZHONE.pdf	19667446 4718b5e5acb117cfa88a72af5a090fbad8491601	no	225
Warnings:					
Information:					
7	Non Patent Literature	PART_5_ZHONE.pdf	8844259 752c532f79ec5ac0c5a1be3a79cec42f4864bb9a	no	152
Warnings:					
Information:					
8	Non Patent Literature	PART_4_ZYXEL.pdf	19585313 3c7235ab8d42210740bb3d8b4c3905fe853d2962	no	223
Warnings:					
Information:					
9	Non Patent Literature	PART_5_ZYXEL.pdf	8844314 0a0303adf9c6faef79c81b7215d6e4fba2fab2bc	no	152
Warnings:					
Information:					
10	Non Patent Literature	PART_3_ADTRAN.pdf	384309 c9081ffbbcc6d621cc20a27dcb07f34e8111a6e8	no	13
Warnings:					
Information:					
11	Non Patent Literature	ADTRAN_Invalidity_Contentions_FAMILY_3_02-09-2016.pdf	5461858 0dae231479b1b65a475232ae98226490c22a6a38	no	643
Warnings:					
Information:					
12	Non Patent Literature	ADTRAN_Invalidity_Contentions_FAMILY_9_02-09-2016.pdf	4007976 c431d3fe94bb89f23706335f12b6972f52a1fcf9	no	406
Warnings:					
Information:					
13	Non Patent Literature	PART_1_ADTRAN_v_TQD_001.pdf	10906838 165cdab30f2648aca0a846b4f46fb737229f1815	no	417
Warnings:					

Information:					
14	Non Patent Literature	PART_1_ADTRAN_v_TQD_0002.pdf	21977225 67624f2f76f347886e69216dfc9c95dd228b057d	no	431
Warnings:					
Information:					
15	Non Patent Literature	PART_1_ADTRAN_v_TQD_0003.pdf	24257260 b722ac8dd2bbded9bc97d176585bbdcaa328d503	no	237
Warnings:					
Information:					
16	Non Patent Literature	PART_1_ADTRAN_v_TQD_0004.pdf	22248584 5a7a5b3b7d9b19c31a8b5fd2aed75e413eb397b2	no	221
Warnings:					
Information:					
17	Non Patent Literature	PART_1_ADTRAN_v_TQD_0005.pdf	16412133 be2b6972cfc533075b83da3a856de658087a6e68	no	138
Warnings:					
Information:					
18	Non Patent Literature	PART_1_ADTRAN_ALABAMA_001.pdf	7970069 0378fd6ddebc25daf49860b0b9537dc3c9ca1185	no	410
Warnings:					
Information:					
19	Non Patent Literature	PART_1_ADTRAN_ALABAMA_0002.pdf	5759853 956d267553968e40cb2fe001e080869581fc803e	no	158
Warnings:					
Information:					
20	Fee Worksheet (SB06)	fee-info.pdf	32886 650296f65932b72759e8c2947af371b594914159	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	205897673	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 14/159,125	Filing Date 01/20/2014	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	04/26/2016	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	X $80 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***2	= 1	X $420 =	420
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	**420**

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/EMORY LANE/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	1	of	3	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	1	Examiner's Report for Canadian Patent Application No. 2,647,589, mailed February 25, 2016 (Attorney Ref. No.: 6936-57-PCA)
	2	Communication Under Rule 71(3) EPC - Intention to Grant for European Application No. 07811844.5, mailed May 9, 2016 (Attorney Ref. No.: 6936-57-PEP)
	3	Notice of Allowance (Including Translation) for Japanese Patent Application No. 2013-246257 dispatched May 30, 2016 (Attorney Ref. No.: 6936-57-PJP-DIV-3)
	4	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed on Feb. 25, 2016, mailed publically available on May 25, 2016 Docket No. 155** (40 pages)
	5	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed from April 27, 2016 - May 24, 2016; Docket Nos., 209-226;** (813 pages)
	6	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed on March 6, 2016 - made publically available JUNE 1, 2016 Docket Nos., 158;** (61 pages)
	7	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed from June 3, 2016 - June 6, 2016; Docket Nos., 227-228;** (67 pages)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	2	of	3	Attorney Docket Number	6936-57-PUS-CON-3

	8	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed on February 25, 2016, made publically available May 25, 2016; Docket No. 140;** (40 pages)
	9	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed from April 27, 2016 - May 24, 2016; Docket Nos., 194-211;** (813 pages)
	10	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed on March 3, 2016 made publically available JUNE 1, 2016; Docket Nos., 143;** (61 pages)
	11	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed from June 3, 2016 - June 7, 2016; Docket Nos., 212-215;** (138 pages)
	12	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed on February 25, 2016, made publically available May 25, 2016; Docket No. 155; (40 pages)**
	13	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed from April 27, 2016 - May 24, 2016; Docket Nos. 209-226;** (809 pages)
	14	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed on March 3, 2016, made publically JUNE 1, 2016; Docket No. 158;** (61 pages)
	15	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed from June 3, 2016 - June 13, 2016; Docket Nos. 227-232;** (140 pages)
	16	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ADTRAN INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA; **Includes documents filed from March 28, 2016 - May 31, 2016 - Docket Nos., 74-77;** (8 pages)
	17	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ADTRAN INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA; **Includes documents filed from March 8, 2016, made publically available JUNE 6, 2016 - Docket No., 73;** (60 pages)
	18	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ADTRAN INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA; **Includes documents filed from June 7, 2016 - June 8, 2016; Docket Nos., 78-80;** (73 pages)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	3	of	3	Attorney Docket Number	6936-57-PUS-CON-3

	19	Documents filed with District Court Proceedings for ADTRAN INC. v. TQ DELTA, LLC; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:15-cv-00121-RGA; **Includes documents filed from March 28, 2016 - May 31, 2016; Docket Nos., 79-82;** (8 pages)
	20	Documents filed with District Court Proceedings for ADTRAN INC. v. TQ DELTA, LLC; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:15-cv-00121-RGA; **Includes documents on March 8, 2016 made publically available JUNE 6, 2016; Docket Nos., 78;** (60 pages)
	21	Documents filed with District Court Proceedings for ADTRAN INC. v. TQ DELTA, LLC; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:15-cv-00121-RGA; **Includes documents filed from June 7, 2016 - June 8, 2016; Docket Nos., 83-85;** (73 pages)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Electronic Patent Application Fee Transmittal

Application Number:	14159125
Filing Date:	20-Jan-2014
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Filer:	Jason Vick/Joanne Vos
Attorney Docket Number:	6936-57-PUS-CON-3

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt	
EFS ID:	26060240
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	14-JUN-2016
Filing Date:	20-JAN-2014
Time Stamp:	14:54:51
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$180
RAM confirmation Number	061516INTEFSW00000997191970
Deposit Account	191970
Authorized User	Joanne Vos
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		IDS_13.pdf	236131 e737a6276f24eb0c02e421adf87f00de022152bc	yes	6
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	3	
	Information Disclosure Statement (IDS) Form (SB08)		4	6	
Warnings:					
Information:					
2	Non Patent Literature	6936-57-PCA_OA_02-25-2016.pdf	5290066 fa3a48be0247a2c03746088393074 1816b94bec6	no	5
Warnings:					
Information:					
3	Non Patent Literature	6936-57-PEP_NOA_05-09-2016.pdf	527872 56bfb0d07e411f6d5599293ad35c388a6ac244ea	no	6
Warnings:					
Information:					
4	Non Patent Literature	6936-57-PJP-DIV-3_NOA_05-30-2016.pdf	1642909 d17b027ffd92a6a8040b5aa9f3e85dab99e0866e	no	5
Warnings:					
Information:					
5	Non Patent Literature	PART_6_2WIRE.pdf	243731 fef6c1699de3c3703ac1a40af1454ab25f822b11	no	40
Warnings:					
Information:					
6	Non Patent Literature	PART_7_2WIRE_0001.pdf	24374433 e07e0dd6b68c29f699146bba52e2f7976b37149e	no	564
Warnings:					
Information:					

7	Non Patent Literature	PART_7_2WIRE_0002.pdf	13066176 6ea09dd2c46478911a87aac65dbbbbbe298e28d8	no	249
Warnings:					
Information:					
8	Non Patent Literature	PART_8_2WIRE.pdf	364189 d76518cc5829254a40c40f1bb2f97c08b6900f65	no	61
Warnings:					
Information:					
9	Non Patent Literature	PART_9_2WIRE.pdf	3723632 cf9f38c51c5aee2b91ecb2a6e9ce3af4e2f5177f	no	67
Warnings:					
Information:					
10	Non Patent Literature	PART_6_ZHONE.pdf	243438 1a87bea7bb117df20749d4ac98d99863f1219b5a	no	40
Warnings:					
Information:					
11	Non Patent Literature	PART_7_ZHONE_0001.pdf	24386279 477e6e8a77f6df88e63d95a096087adde202ff30	no	564
Warnings:					
Information:					
12	Non Patent Literature	PART_7_ZHONE_0002.pdf	13066700 1ea96d423974ad5eaa07fb3aff6efae6a514a95f	no	249
Warnings:					
Information:					
13	Non Patent Literature	PART_8_ZHONE.pdf	364101 e138daa65969155c1aa9137ef254c650bf79a9cb	no	61
Warnings:					
Information:					
14	Non Patent Literature	PART_9_ZHONE.pdf	7943707 529d4f1bcfffb82af8b3a7e584c0c9658319ca61	no	138
Warnings:					
Information:					
15	Non Patent Literature	PART_6_ZYXEL.pdf	243496 665d07c36337c3b35892849138 0d3dffdaf56ded	no	40
Warnings:					
Information:					

16	Non Patent Literature	PART_7_ZYXEL_0001.pdf	25743298 af3d7c914865a6c3007511bc5306d4ccfbc0bc2b	no	215
Warnings:					
Information:					
17	Non Patent Literature	PART_7_ZYXEL_0002.pdf	20516220 620b8d50ed81ec6bb634fc857fe00a0980a901d5	no	246
Warnings:					
Information:					
18	Transmittal Letter	PART_7_ZYXEL_0003.pdf	24158509 760dfe2f119320c50dbbcfe1bb908f5098d0234a	no	348
Warnings:					
Information:					
19	Non Patent Literature	PART_8_ZYXEL.pdf	364077 c1a965951c18bd153e98b1719a6c7e221e19edfb	no	61
Warnings:					
Information:					
20	Non Patent Literature	PART_9_ZYXEL.pdf	8263608 a5f7e80ad2a1779c5fb7a422e7347bc3827fa271	no	140
Warnings:					
Information:					
21	Non Patent Literature	PART_4_ADTRAN.pdf	133579 9891411fa2d3b8b6d9cab204820c9675273dd2c9	no	8
Warnings:					
Information:					
22	Non Patent Literature	PART_5_ADTRAN.pdf	255002 cfa172b8dca8a5d89e26a541ae143ba36f1eec1e	no	60
Warnings:					
Information:					
23	Non Patent Literature	PART_6_ADTRAN.pdf	4326850 2d663b4e17bf4557fb18f8e1e52d83a82be7de31	no	73
Warnings:					
Information:					
24	Non Patent Literature	PART_2_ADTRAN_v_TQD.pdf	133562 0b88c458c8d6c7d4192027f1b447585f515f6ee2	no	8
Warnings:					
Information:					

25	Non Patent Literature	PART_3_ADTRAN_v_TQD.pdf	254972 24391e4ee44d200a188412926b2abc90ec9ba707	no	60
Warnings:					
Information:					
26	Non Patent Literature	PART_4_ADTRAN_v_TQD.pdf	4326749 d3a4a4e4371cc69f6b497960fe650ce1d840876d	no	73
Warnings:					
Information:					
27	Fee Worksheet (SB06)	fee-info.pdf	30775 1f665fbf8aa6f7b3c8418ad2654385aa9b2ea8d3	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	184224061	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:	)	Group Art Unit: 2112
Marcos C. Tzannes	)	Confirmation No.: 3369
Serial No.: 14/159,125	)	Examiner: Alshack, Osman M
Filed: January 20, 2014	)	
Atty File No.: 6936-57-PUS-CON-3	)	SUPPLEMTNAL INFORMATION DISCLOSURE STATEMENT
Entitled: "PACKET RETRANSMISSION AND MEMORY SHARING"	)	Electronically Submitted

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Madam:

The references cited on attached Form PTO-1449 are being called to the attention of the Examiner.

☒ Copies of the cited non-patent and/or foreign references are enclosed herewith.

☐ Copies of the cited U.S. patents and/or patent applications are enclosed herewith.

☐ Copies of the cited U.S. patents/unpublished patent applications/patent application publications are not enclosed in accordance with 37 C.F.R. § 1.98(a).

☐ Copies of the cited references are not enclosed, in accordance with 37 C.F.R. § 1.98(d), because the references were cited by or submitted to the U.S. Patent and Trademark Office in prior application Serial No. _____filed _____, which is relied upon for an earlier filing date under 35 U.S.C. § 120.

☒ To the best of applicants' belief, the pertinence of the foreign-language references are believed to be summarized in the attached English translation/abstracts and/or in the figures, although applicants do not necessarily vouch for the accuracy of the translation.

☐ Examiner's attention is drawn to the following related applications:

- Serial No. _____ filed _____ (Attorney Ref. No. _____)

☐ Other: _____

Submission of the above information is not intended as an admission that any item is citable under the statutes or rules to support a rejection, that any item disclosed represents

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 600 of 739

analogous art, or that those skilled in the art would refer to or recognize the pertinence of any reference without the benefit of hindsight, nor should an inference be drawn as to the pertinence of the references based on the order in which they are presented. Submission of this statement should not be taken as an indication that a search has been conducted, or that no better art exists.

It is respectfully requested that the cited information be expressly considered during the prosecution of this application and the references made of record therein.

FEES

☐	**37 CFR 1.97(b):** No fee is believed due in connection with this submission, because the information disclosure statement submitted herewith is satisfied by one of the following conditions ("X" indicates satisfaction): ☐ Within three months of the filing date of a national application other than a continued prosecution application under 37 CFR 1.53(d), or ☐ Within three months of the date of entry into the national stage of an international application as set forth in 37 CFR 1.491 or ☐ Before the mailing date of a first Office Action on the merits, or ☐ Before the mailing of a first Office action after the filing of a request for continued examination under 37 CFR 1.114. Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970.
☒	**37 CFR 1.97(c):** The information disclosure statement transmitted herewith is being filed after all the above conditions (37 CFR 1.97(b)), but before the mailing date of one of the following conditions: (1) a final action under 37 C.F.R. 1.113 or (2) a notice of allowance under 37 C.F.R. 1.311, or (3) an action that otherwise closes prosecution in the application. This Information Disclosure Statement is accompanied by: ☐ A Certification (below) as specified by 37 C.F.R. 1.97(e). Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970. OR ☒ Please charge Deposit Account 19-1970 in the amount of $180.00 for the fee set forth in 37 C.F.R. 1.17(p) for submission of an information disclosure statement. Please credit any overpayment or charge any underpayment to Deposit Account 19-1970.
☐	**37 CFR 1.97(d):** This Information Disclosure Statement is being submitted after the period specified in 37 CFR 1.97(c). ☐ This information Disclosure Statement includes a Certification (below) as specified by 37 C.F.R. 1.97(e) AND ☐ Applicants hereby requests consideration of the reference(s) disclosed herein. Please charge Deposit Account 19-1970 in the amount of $180.00 under 37 C.F.R. 1.17(p). Please credit any overpayment or charge any underpayment to Deposit Account 19-1970. Election to pay the fee should not be taken as an indication that applicant(s) cannot execute a certification.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 601 of 739

Certification (37 C.F.R. 1.97(e))
(Applicable only if checked)

☐ The undersigned certifies that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(1).

☐ A copy of the communication from the foreign patent office is enclosed.

OR

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned after making reasonable inquiry, no item of information contained in this Information Disclosure Statement was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(2).

Respectfully submitted,

SHERIDAN ROSS P.C.

Date: June 14, 2016

By: /Jason H. Vick/
Jason H. Vick
Reg. No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202
Telephone: 303-863-9700

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 602 of 739

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

62574 7590 08/01/2016

Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

EXAMINER
ALSHACK, OSMAN M

ART UNIT	PAPER NUMBER
2112	

DATE MAILED: 08/01/2016

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/159,125	01/20/2014	Marcos C. Tzannes	6936-57-PUS-CON-3	3369

TITLE OF INVENTION: PACKET RETRANSMISSION AND MEMORY SHARING

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$960	$0	$0	$960	11/01/2016

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 02/11)

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

62574 7590 08/01/2016

Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/159,125	01/20/2014	Marcos C. Tzannes	6936-57-PUS-CON-3	3369

TITLE OF INVENTION: PACKET RETRANSMISSION AND MEMORY SHARING

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$960	$0	$0	$960	11/01/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS
ALSHACK, OSMAN M	2112	714-748000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

❑ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

❑ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 604 of 739

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/159,125	01/20/2014	Marcos C. Tzannes	6936-57-PUS-CON-3	3369

62574 7590 08/01/2016

Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

EXAMINER	
ALSHACK, OSMAN M	
ART UNIT	PAPER NUMBER
2112	

DATE MAILED: 08/01/2016

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 14/159,125	Applicant(s) TZANNES, MARCOS C.	
	Examiner OSMAN M. ALSHACk	Art Unit 2112	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *04/26/2016*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *106-125*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:
   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 02/25/2016, 04/26/2016, and 06/14/2016
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/OSMAN M ALSHACk/
Examiner, Art Unit 2112

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 607 of 739

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	1	of	3	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	1	Examiner's Report for Canadian Patent Application No. 2,647,589, mailed February 25, 2016 (Attorney Ref. No.: 6936-57-PCA)
	2	Communication Under Rule 71(3) EPC - Intention to Grant for European Application No. 07811844.5, mailed May 9, 2016 (Attorney Ref. No.: 6936-57-PEP)
	3	Notice of Allowance (including Translation) for Japanese Patent Application No. 2013-246257 dispatched May 30, 2016 (Attorney Ref. No.: 6936-57-PJP-DIV-3)
	4	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed on Feb. 25, 2016, mailed publically available on May 25, 2016 Docket No. 155** (40 pages)
	5	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed from April 27, 2016 - May 24, 2016; Docket Nos., 209-226;** (813 pages)
	6	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed on March 6, 2016 - made publically available JUNE 1, 2016 Docket Nos., 158;** (61 pages)
	7	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed from June 3, 2016 - June 6, 2016; Docket Nos., 227-228;** (67 pages)

Examiner Signature	/Osman Alshack/	Date Considered	07/21/2016

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	2	of	3	Attorney Docket Number	6936-57-PUS-CON-3

	8	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed on February 25, 2016, made publically available May 25, 2016; Docket No. 140;** (40 pages)
	9	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed from April 27, 2016 - May 24, 2016; Docket Nos., 194-211;** (813 pages)
	10	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed on March 3, 2016 made publically available JUNE 1, 2016; Docket Nos., 143;** (61 pages)
	11	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed from June 3, 2016 - June 7, 2016; Docket Nos., 212-215;** (138 pages)
	12	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed on February 25, 2016, made publically available May 25, 2016; Docket No. 155; (40 pages)**
	13	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed from April 27, 2016 - May 24, 2016; Docket Nos. 209-226;** (809 pages)
	14	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed on March 3, 2016, made publically JUNE 1, 2016; Docket No. 158;** (61 pages)
	15	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed from June 3, 2016 - June 13, 2016; Docket Nos. 227-232;** (140 pages)
	16	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ADTRAN INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA; **Includes documents filed from March 28, 2016 - May 31, 2016 - Docket Nos., 74-77;** (8 pages)
	17	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ADTRAN INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA; **Includes documents filed from March 8, 2016, made publically available JUNE 6, 2016 - Docket No., 73;** (60 pages)
	18	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ADTRAN INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA; **Includes documents filed from June 7, 2016 - June 8, 2016; Docket Nos., 78-80;** (73 pages)

Examiner Signature	/Osman Alshack/	Date Considered	07/21/2016

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	3	of	3	Attorney Docket Number	6936-57-PUS-CON-3

	19	Documents filed with District Court Proceedings for ADTRAN INC. v. TQ DELTA, LLC; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:15-cv-00121-RGA; **Includes documents filed from March 28, 2016 - May 31, 2016; Docket Nos., 79-82;** (8 pages)
	20	Documents filed with District Court Proceedings for ADTRAN INC. v. TQ DELTA, LLC; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:15-cv-00121-RGA; **Includes documents on March 8, 2016 made publically available JUNE 6, 2016; Docket Nos., 78;** (60 pages)
	21	Documents filed with District Court Proceedings for ADTRAN INC. v. TQ DELTA, LLC; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:15-cv-00121-RGA; **Includes documents filed from June 7, 2016 - June 8, 2016; Docket Nos., 83-85;** (73 pages)

Examiner Signature	/Osman Alshack/	Date Considered	07/21/2016

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015	06/04/2015	12/18/2015	07/21/2016					
	1	-	-	-	-					
	2	-	-	-	-					
	3	-	-	-	-					
	4	-	-	-	-					
	5	-	-	-	-					
	6	-	-	-	-					
	7	-	-	-	-					
	8	-	-	-	-					
	9	-	-	-	-					
	10	-	-	-	-					
	11	-	-	-	-					
	12	-	-	-	-					
	13	-	-	-	-					
	14	-	-	-	-					
	15	-	-	-	-					
	16	-	-	-	-					
	17	-	-	-	-					
	18	-	-	-	-					
	19	-	-	-	-					
	20	-	-	-	-					
	21	-	-	-	-					
	22	-	-	-	-					
	23	-	-	-	-					
	24	-	-	-	-					
	25	-	-	-	-					
	26	-	-	-	-					
	27	-	-	-	-					
	28	-	-	-	-					
	29	-	-	-	-					
	30	-	-	-	-					
	31	-	-	-	-					
	32	-	-	-	-					
	33	-	-	-	-					
	34	-	-	-	-					
	35	-	-	-	-					
	36	-	-	-	-					

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 611 of 739

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015	06/04/2015	12/18/2015	07/21/2016					
	37	-	-	-	-					
	38	-	-	-	-					
	39	-	-	-	-					
	40	-	-	-	-					
	41	-	-	-	-					
	42	-	-	-	-					
	43	-	-	-	-					
	44	-	-	-	-					
	45	-	-	-	-					
	46	-	-	-	-					
	47	-	-	-	-					
	48	-	-	-	-					
	49	-	-	-	-					
	50	-	-	-	-					
	51	-	-	-	-					
	52	-	-	-	-					
	53	-	-	-	-					
	54	-	-	-	-					
	55	-	-	-	-					
	56	-	-	-	-					
	57	-	-	-	-					
	58	-	-	-	-					
	59	-	-	-	-					
	60	-	-	-	-					
	61	-	-	-	-					
	62	-	-	-	-					
	63	-	-	-	-					
	64	-	-	-	-					
	65	-	-	-	-					
	66	-	-	-	-					
	67	-	-	-	-					
	68	-	-	-	-					
	69	-	-	-	-					
	70	-	-	-	-					
	71	-	-	-	-					
	72	-	-	-	-					

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 612 of 739

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015	06/04/2015	12/18/2015	07/21/2016					
	73	-	-	-	-					
	74	-	-	-	-					
	75	-	-	-	-					
	76	-	-	-	-					
	77	-	-	-	-					
	78	-	-	-	-					
	79	-	-	-	-					
	80	-	-	-	-					
	81	-	-	-	-					
	82	-	-	-	-					
	83	-	-	-	-					
	84	-	-	-	-					
	85	-	-	-	-					
	86	-	-	-	-					
	87	-	-	-	-					
	88	-	-	-	-					
	89	-	-	-	-					
	90	-	-	-	-					
	91	-	-	-	-					
	92	-	-	-	-					
	93	-	-	-	-					
	94	-	-	-	-					
	95	-	-	-	-					
	96	-	-	-	-					
	97	-	-	-	-					
	98	-	-	-	-					
	99	-	-	-	-					
	100	-	-	-	-					
	101	-	-	-	-					
	102	-	-	-	-					
	103	-	-	-	-					
	104	-	-	-	-					
	105	-	-	-	-					
1	106	✓	✓	✓	=					
2	107	✓	✓	✓	=					
3	108	✓	✓	✓	=					

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 613 of 739

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015	06/04/2015	12/18/2015	07/21/2016					
4	109	✓	✓	✓	=					
5	110	✓	✓	✓	=					
6	111	✓	✓	✓	=					
7	112	✓	✓	✓	=					
8	113	✓	✓	✓	=					
9	114	✓	✓	✓	=					
10	115	✓	✓	✓	=					
11	116	✓	✓	✓	=					
12	117	✓	✓	✓	=					
13	118	✓	✓	✓	=					
14	119	✓	✓	✓	=					
15	120	✓	✓	✓	=					
16	121	✓	✓	✓	=					
17	122	✓	✓	✓	=					
18	123	✓	✓	✓	=					
19	124	✓	✓	✓	=					
20	125	✓	✓	✓	=					

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

CPC- SEARCHED		
Symbol	Date	Examiner
H04L 1/1809, H04L 1/1812, H04L 1/1887, H04L 1/1819	01/23/2015	O.A
H04L 2001/0093, H04L 45/302, H04L 47/6215	01/23/2015	O.A

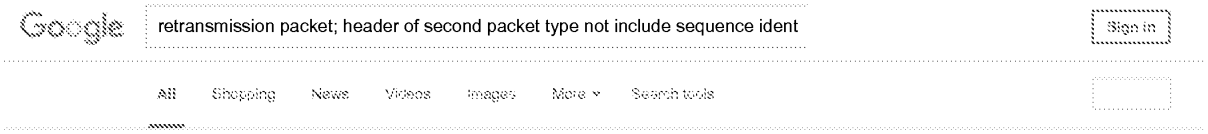
CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
714	748, 749, 776	01/23/2015	O.A

SEARCH NOTES		
Search Notes	Date	Examiner
East Inventor search	01/23/2015	O.A
East text search	01/23/2015	O.A
East text search updated	06/04/2015	O.A
East text search updated	12/18/2015	O.A
East text search updated	07/21/2016	O.A

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
US PGPUB East for claims search		07/21/2016	O.A
714	748,749, 776	07/21/2016	O.A
H04L	1/1809, 1/1812, 1/1819, 1/1887, 2001/0093	07/21/2016	O.A

/OSMAN M ALSHACk/ Examiner, Art Unit 2112	



Page 6 of about 8,380,000 results (0.64 seconds)

Patent US7124333 - Retransmission packet structure having multiple ...
www.google.com.au/patents/US7124333?cl=en - Google
The packet data structure of claim 1 , wherein the second sequence number assigned to the retransmission packet is included in an RTP header. ... Therefore, the download type transmission method is not suitable for long-hours of ..... The apparatus 101 includes a receiving unit 11, a transmission queue management unit ...

WhatRoute packet monitor / unix tcpdump reference
www.westwind.com/reference/tn/tcpdump.html
-O Does not run the packet-matching code optimizer. ... -S Prints absolute, rather than relative, TCP sequence numbers. ... For example, the time to live and type of service information in an IP packet is printed, ... iden- tifier, that all FDDI packets include an LLC header, and that the LLC header is in so-called SNAP format.

The ATP Packet Format(IM:N)
mirror.informatimago.com/next/developer.apple.com/.../mac/.../Networking-145.html
An ATP packet includes an 8-byte header followed by up to 578 bytes of data. ... The second byte contains a bitmap/sequence number. ... The third and fourth bytes carry the transaction ID assigned to a request and used by the ... ATP driver code on the responder side which response packets the requester has not received.

X Display Manager Control Protocol X.Org Standard Keith Packard X ...
https://www.x.org/releases/X11R7.6/doc/libXdmcp/xdmcp.txt - X.Org Server
(For example, the server cannot simply be started by a fork/exec sequence on the .... Description 2 CARD16 version number 2 CARD16 opcode packet header 2 ... If the packet is of type Manage or Refuse, the Session ID should match the ... Each manager that receives this packet will not respond with an Unwilling packet.

TCP / IP Suite | IP | IPv6 | TCP | UDP - Protocols
www.protocols.com/pbook/tcpip2/ - Protocols.com
The IP frame header contains routing information and control information ... TTL by at least one (even if it processes the datagram in less than 1 second), the TTL must ... For example, IPv6 packets are carried over Ethernet with the content type ... If SYN is present, the sequence number is the initial sequence number (ISN) ...

[PDF] Overview
https://cseweb.ucsd.edu/classes/fa11/.../Project2.pd... - University of California, San Diego
Also, SRMP will not provide congestion control mechanisms, although it will ... The "seqno" field indicates the sequence number of the packet. This field is used ...

OSPF Implementation > Establishing OSPF Neighbor Relationships
www.ciscopress.com/articles/article.asp?p=2294214 - Cisco Press
Feb 3, 2015 - OSPF uses five types of routing protocol packets, which share a common protocol header. Every OSPF packet is directly encapsulated in the IP header. ... Process ID numbers between neighbors do not need to match for the routers to ..... and choose the initial sequence number for adjacency formation.

[PDF] SpaceWire-R - ESA
spacewire.esa.int/content/Standard/documents/SpW-R%2004.pdf
Aug 13, 2015 - 4) Ack Packets for Control Packets have a different Packet Type .... The Service Data Unit Identifier (SDU ID) is a sequence number ... the second octet (octet 1) of the Header shall contain the Protocol ID of ... It shall not include any octets in the Header or Trailer but does ..... It shall perform retransmission of.

[PDF] UTP Trade Data Feed - UTP Plan
www.utpplan.com/DOC/utpfspecification.pdf
Nov 16, 2015 - Message Header Format / Session Identifier . ... Message Sequence Number (MSN) . ..... second planning interval to 100-milliseconds (1/10 of a second). The use of the 100-millisecond .... Not supported for UDP/IP packets. • FLAGS ... types not logged and therefore unavailable for retransmission include:.

CIFS Explained - CodeFX
www.codefx.com/CIFS_Explained.htm
The CIFS protocol works by sending packets from the client to the server. .... NetBIOS names exist in a flat name space with no hierarchical format. .... The second section introduces the CIFS

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 616 of 739

standard packet header by diagramming ... The final section has two typical packet sequence walkthroughs: logging into a server and ...

Searches related to retransmission packet; header of second packet type not include sequence identifier or sequence number

udp header **format**	**tcp** header **format**
ip header **format**	**tcp** header **size**
tcp header	**tcp** packet
tcp sequence number	**udp** header **size**

Previous 1 2 3 4 5 6 7 8 9 10 Next

Alexandria, VA - From your Internet address - Use precise location - Learn more

Help Send feedback Privacy Terms

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 617 of 739

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"14159125"	US-PGPUB; USPAT	OR	OFF	2015/01/21 11:11
S2	103	((Marcos) near2 (Tzannes)).INV.	USPAT; USOCR	OR	OFF	2015/01/21 11:14
S3	2	(retransmi$5 resend$3)near3((packet block group set package chunk)near3 type)with(first original primary second$3)same((per latency)near2 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:19
S4	3	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)with(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:23
S5	13	(transmi$5 transceiv$3 retransmi$5 resend$3)same((packet block group set package chunk)near3 type)same(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:24
S6	117	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:27
S7	0	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)same((per and latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:28
S8	3	S2 and S6	US-PGPUB; USPAT	OR	ON	2015/01/21 12:46
S9	3	S2 and (transmi$5 transceiv$3 retransmi$5 resend$3)same(packet block group set package chunk)same(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:54
S10	17	S2 and (transmi$5 transceiv$3 retransmi$5 resend$3)same(packet block group set package chunk)same(first original primary second$3)and((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:55

S11	32	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)and((per and latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:56
S12	17	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)same(identif$7 indicat$3 determin$3)and((per and latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:08
S13	13	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)with(buffer stor$3 memory)same(identif$7 indicat$3 determin$3)and((per and latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:11
S14	26	("2004/0179494").URPN.	USPAT	OR	OFF	2015/01/21 13:19
S15	1	S14 and(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)and((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:20
S16	4737	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)with(identif$7 indicat$3 determin$3)and((per error latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:38
S17	74538	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:39
S18	1496	(low-per low adj per)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:40
S19	32050	(low-latency low adj latency)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:40
S20	41	S18 and S19	US-PGPUB; USPAT	OR	ON	2015/01/21 13:40
S21	12	S17 and S20	US-PGPUB; USPAT	OR	ON	2015/01/21 13:41
S22	35	(transmi$5 transceiv$3 retransmi$5 resend$3)same(packet block group set package chunk)same(first original primary second$3)and(identif$7 indicat$3 determin$3)same((per and latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:47
S23	129	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)near3(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:50
S24	81	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set	US-PGPUB; USPAT	OR	ON	2015/01/21 13:51

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 619 of 739

		package chunk)near3 type)near(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)				
S25	24	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near type)near(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:52
S26	39	(transmi$5 transceiv$3 retransmi$5 resend$3)near2((packet block group set package chunk frame)near2 type)near2(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:58
S27	1	("5524116").PN.	US-PGPUB; USPAT	OR	OFF	2015/01/21 14:27
S28	1	(14/075194).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 14:29
S29	1	(14/081469).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 14:31
S30	4	S2 and (transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near3 type)with(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 14:33
S31	20962	packet near2 identifier	US-PGPUB; USPAT	OR	ON	2015/01/21 14:49
S32	99	S31 with(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near3 type)with(first original primary second$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 14:51
S33	389	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near2 type)near2(identif$7 indicat$3 determin$3)with(buffer stor$3 memory)	US-PGPUB; USPAT	OR	ON	2015/01/21 14:57
S34	129524	(Quality near2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/01/21 15:00
S35	75	S33 and S34	US-PGPUB; USPAT	OR	ON	2015/01/21 15:00
S36	22753	(Quality near2 Service QOS)and((per error rat$3 latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 15:06
S37	1301	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near3 type)with(identif$7 indicat$3 determin$3)with(buffer stor$3 memory)	US-PGPUB; USPAT	OR	ON	2015/01/21 15:06
S38	65	S36 and S37	US-PGPUB; USPAT	OR	ON	2015/01/21 15:07
S39	84	(Quality near2 Service QOS)same(low	US-PGPUB;	OR	ON	2015/01/21

		high)near3(delay late$3)same((error data bit loss)near2 rate)same(identif$7 indicat$3 determin$3)and(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)near2(video voice data information bit$1)	USPAT			16:20
S40	7	(Quality near2 Service QOS)same(low high)near3(delay late$3)same((error data bit loss)near2 rate)same(identif$7 indicat$3 determin$3 ID)same(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)near2(video voice data information bit$1)	US-PGPUB; USPAT	OR	ON	2015/01/21 16:31
S41	2	(10/696507).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 17:01
S42	2	(10/901940).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 17:03
S43	4	(Quality near2 Service QOS)with(identif$7 indicat$3 determin$3)with(packet block group set package chunk)near2(video voice data information bit$1)same(low high)near3(delay late$3)same((error data bit loss)near2 rate)	US-PGPUB; USPAT	OR	ON	2015/01/21 17:14
S44	201	(Quality near2 Service QOS)with(identif$7 indicat$3 determin$3)with(packet block group set package chunk)near2(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near2 rate)	US-PGPUB; USPAT	OR	ON	2015/01/21 17:16
S45	2524	714/748.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/21 17:31
S46	967	714/749.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/21 17:31
S47	1	S44 and S45	US-PGPUB; USPAT	OR	ON	2015/01/21 17:32
S48	0	S44 and S46	US-PGPUB; USPAT	OR	ON	2015/01/21 17:32
S49	16	("20010025239" | "20030133462" | "20040072541" | "20050141480" | "20060002465" | "20060095944" | "20060168133" | "20070009015" | "20070217339" | "20080101476" | "20080225983" | "20090034610" | "6856756" | "7292553" | "7706384" | "7782779").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2015/01/21 17:34
S50	25	(Customer with Premises)and(digital with signal with prosessor DSP)and (integrated with ciruit ASIC)and linecard	US-PGPUB; USPAT; USOCR	OR	ON	2015/01/21 17:59
S51	185383	packet$1 near2 $2transmi$5	US-PGPUB; USPAT	OR	ON	2015/01/22 09:06
S54	107	(Quality near2 Service QOS)same((packet block group set payload frame)near2 type)same(identif$7 indicat$3	US-PGPUB; USPAT	OR	ON	2015/01/22 09:09

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 621 of 739

		determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)				
S55	68	S51 and S54	US-PGPUB; USPAT	OR	ON	2015/01/22 09:09
S56	17	S51 same S54	US-PGPUB; USPAT	OR	ON	2015/01/22 09:09
S57	1	(Quality near2 Service QOS)same(first original primary)near3((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:24
S58	6	(Quality near2 Service QOS)and(first original primary)near3((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:27
S59	15	(Quality near2 Service QOS)and(first original primary)with((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:27
S62	19	(first original primary)near2((packet block group set payload frame)near2 type)near2(identif$7 indicat$3 determin$3)and(Quality near2 Service QOS)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:42
S63	1250	H04L1/1809.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:50
S64	2991	H04L1/1812.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:50
S65	2252	H04L1/1887.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:51
S66	1569	H04L1/1819.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:51
S67	2107	H04L2001/0093.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:51
S71	3061	H04L12/5601.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 10:02
S72	0	S54 and S63	US-PGPUB; USPAT	OR	ON	2015/01/22 10:03
S73	0	S54 and S64	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04
S74	4	S54 and S65	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 622 of 739

S75	0	S54 and S66	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04
S76	0	S54 and S67	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04
S77	1174	H04L45/302.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S78	1222	H04L47/6215.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S79	0	S54 and S77	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S80	1	S54 and S78	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S83	457	packet$1 near2 $2transmi$5 with(second$3 near2 packet)with(stor$3 retain$3)with(buffer memory)	US-PGPUB; USPAT	OR	OFF	2015/01/22 11:44
S84	80	packet$1 near2 $2transmi$5 with(second$3 near2 packet)near2(stor$3 retain$3)near2(buffer memory)	US-PGPUB; USPAT	OR	OFF	2015/01/22 11:45
S87	29	retransmi$5 same(second$3 with type with packet)same(stor$3 retain$3)same(buffer memory storage)	US-PGPUB; USPAT	OR	OFF	2015/01/22 11:47
S89	1	(Quality near2 Service QOS)with(identif$7 indicat$3 determin$3)with((packet block group set)near type)near(second$3)and(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near2 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 13:40
S90	393	"5524116" "5663910" "5898698" "5983382" "6098188" "6775320" "6778589" "6337877" "6496481" "6707822" "6778596" "6826589" "7200792" "7164654" "7174493" "7519124" "7600172" "7657818" "7764595" "7782758" "7831890" "7844882" "7836381" "8074138" "8149904" "8276048" "8335956" "8407546" "8468411" "8495473" "8595577" "8607126" "8645784" 2001/0014962	US-PGPUB; USPAT	OR	ON	2015/01/22 17:51
S92	33	("5524116" | "5663910" | "5898698" | "5983382" | "6098188" | "6775320" | "6778589" | "6337877" | "6496481" | "6707822" | "6778596" | "6826589" | "7200792" | "7164654" | "7174493" | "7519124" | "7600172" | "7657818" | "7764595" | "7782758" | "7831890" | "7844882" | "7836381" | "8074138" | "8149904" | "8276048" | "8335956" | "8407546" | "8468411" | "8495473" | "8595577" | "8607126" | "8645784" | " 2001/0014962").PN.	US-PGPUB; USPAT	OR	ON	2015/01/22 17:55
S94	13	("20020087710" | " 20020126675 " | "20020154600 " | "20030067877 " | "200310076870" | " 20040114536 " | "2004/0148552" | " 20040196786 " | "20040203455" | " 20050180323" | " 20060092871 " | "200610236045 " |	US-PGPUB; USPAT	OR	ON	2015/01/22 18:01

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 623 of 739

		"20070198898" | " 20070263528 " | "20080212582 " | "20100061376").PN.				
S95	46	S92 or S94	US-PGPUB; USPAT	OR	ON	2015/01/22 18:03
S96	11	S93 and S95	US-PGPUB; USPAT	OR	ON	2015/01/22 18:04
S97	10	S95 and (Quality near2 Service QOS)and((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/22 18:06
S98	11	S95 and (Quality near2 Service QOS)and((packet block group set payload frame)near5 type)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/22 18:11
S99	27	(packet adj transfer adj mode adj transmission adj convergence PTM-TC PTMTC PTM adj TC)	US-PGPUB; USPAT	OR	ON	2015/01/22 19:13
S100	1614	714/776.ccls.	US-PGPUB; USPAT	OR	OFF	2015/01/23 10:24
S101	185383	packet$1 near2 $2transmi$5	US-PGPUB; USPAT	OR	ON	2015/01/23 10:25
S102	107	(Quality near2 Service QOS)same((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/23 10:25
S103	68	S101 and S102	US-PGPUB; USPAT	OR	ON	2015/01/23 10:25
S104	0	S100 and S102	US-PGPUB; USPAT	OR	ON	2015/01/23 10:26
S105	0	S100 and S103	US-PGPUB; USPAT	OR	ON	2015/01/23 10:26
S106	0	S100 and (Quality near2 Service QOS)and((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/23 10:26
S107	368	(packet block frame set group)near3(second$3 next another other)with(stor$3 retain$3 accumulat$3)with(buffer memory storage)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:33
S108	79	(packet block frame set group)near3(second$3 next another other)with(stor$3 retain$3 accumulat$3)with(buffer memory storage)near2(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:34
S109	1	(packet block frame set	US-PGPUB;	OR	ON	2015/01/23

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 624 of 739

		group)near3((second$3 next another other)near2 type)with(stor$3 retain$3 accumulat$3)with(buffer memory storage)near2(retransmi$5 re-transmi$5 resend$3 re-send$3)	USPAT			14:34
S110	232	(head$3 field portion sector)with(packet block frame set group)near3(second$3 next another other)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:39
S111	93	(head$3 field portion sector)near3(packet block frame set group)near3(second$3 next another other)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:50
S112	16	(head$3 field portion sector)with(packet block frame set group)near3((second$3 next another other)near2 type)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:52
S113	22	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 15:07
S114	44	(head$3 field portion sector)and(packet block frame set group payload stream)and(second$3 next another other type)and(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:10
S115	41	(head$3 field portion sector)and(packet block frame set group payload stream)and(second$3 next another other type)same(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:11
S116	40	(head$3 field portion sector)and(packet block frame set group payload stream)same(second$3 next another other type)same(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:11
S117	38	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:11
S118	33	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(identif$7 indicat$3 determin$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:11
S119	107	(head$3 field portion sector)and(packet block frame set group payload	USOCR; FPRS;	OR	ON	2015/01/23 15:15

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 625 of 739

		stream)and((second$3 next another other)near2 type)and(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	DERWENT; IBM_TDB			
S120	10	(head$3 field portion sector)same(packet block frame set group payload stream)same((second$3 next another other)near2 type)same(identif$7 indicat$3 determin$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	USOCR; FPRS; DERWENT; IBM_TDB	OR	ON	2015/01/23 15:15
S121	57	(head$3 field portion sector)same(packet block frame set group payload stream)same((second$3 next another other)near2 type)same(count$3 identif$7 indicat$3 determin$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:11
S122	27	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:33
S123	2718	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:33
S124	58403	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S125	23	S123 with S124	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S126	25	S123 same S124	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S127	198	S123 and S124	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S128	25	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)same(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$4)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:42
S129	27	(retransmi$5 re-transmi$5 resend$3 re-send$3)same(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$4)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:43
S130	77	(retransmi$5 re-transmi$5 resend$3 re-send$3)same2(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other two)near2 type)with(count$3 identif$7 indicat$3	US-PGPUB; USPAT	OR	ON	2015/01/26 12:46

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 626 of 739

		determin$3 control$4)				
S131	98	(head$3 field portion sector)near2(packet block frame set group payload stream)near2((second$3 next another other)near2 type)near2(count$3 identif$7 indicat$3 determin$3 control$4)	US-PGPUB; USPAT	OR	ON	2015/01/26 13:22
S132	24	S124 and S131	US-PGPUB; USPAT	OR	ON	2015/01/26 13:24
S133	1	(head$3 field portion sector)near2(packet block frame set group payload stream)near2((second$3 next another other)near2 type)near2(count$3 identif$7 indicat$3 determin$3 control$4)	EPO; JPO	OR	ON	2015/01/26 13:32
S134	76	(head$3 field portion sector)and(packet block frame set group payload stream)and(second$3 next another other type)and(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:33
S135	74	(head$3 field portion sector)same(packet block frame set group payload stream)and(second$3 next another other type)and(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S136	68	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)and(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S137	61	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S138	52	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(count$3 identif$7 indicat$3 determin$3 control$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S139	44	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other)same(count$3 identif$7 indicat$3 determin$3 control$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S140	28	(head$3 field portion sector)near2(packet block frame set group payload stream)near2(second$3	US-PGPUB; USPAT	OR	ON	2015/01/26 13:39

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 627 of 739

		next another other)near2(count$3 identif$7 indicat$3 determin$3 control$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)				
S141	73	(head$3 field portion sector)near2(packet block frame set group payload stream)near2(second$3 next another other)near2(count$3 identif$7 indicat$3 determin$3 control$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:03
S142	17	(head$3 field portion sector)near2(packet block frame set group payload stream)near2(second$3 next another other)near2((count$3 identif$7 indicat$3 determin$3 control$4)near2 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:08
S143	42	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(head$3 field portion sector)with(packet block frame set group payload stream)with(second$3 next another other)with(count$3 identif$7 indicat$3 determin$3 control$4)with(exclude$3 or separate$3 or avoid$3 or discard$3 or remov$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:22
S144	20	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(head$3 field portion sector)with(packet block frame set group payload stream)with(second$3 next another other)with(count$3 identif$7 indicat$3 determin$3 control$4)with(exclud$3 or avoid$3 or discard$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:35
S145	11551	370/389.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/26 16:08
S146	2182	370/394.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/26 16:08
S147	23	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 16:10
S148	4	S145 and S147	US-PGPUB; USPAT	OR	ON	2015/01/26 16:10
S149	1	S146 and S147	US-PGPUB; USPAT	OR	ON	2015/01/26 16:10
S150	33	("5524116" | "5663910" | "5898698" | "5983382" | "6098188" | "6775320" | "6778589" | "6337877" | "6496481" | "6707822" | "6778596" | "6826589" | "7200792" | "7164654" | "7174493" | "7519124" | "7600172" | "7657818" | "7764595" | "7782758" | "7831890" | "7844882" | "7836381" | "8074138" | "8149904" | "8276048" | "8335956" | "8407546" | "8468411" | "8495473" |	US-PGPUB; USPAT	OR	ON	2015/01/26 18:15

		"8595577" | "8607126" | "8645784" | " 2001/0014962").PN.				
S151	13	("20020087710" | " 20020126675 " | "20020154600 " | "20030067877 " | "200310076870" | " 20040114536 " | "2004/0148552" | " 20040196786 " | "20040203455" | " 20050180323" | " 20060092871 " | "200610236045 " | "20070198898" | " 20070263528 " | "20080212582 " | "20100061376").PN.	US-PGPUB; USPAT	OR	ON	2015/01/26 18:15
S152	46	S150 or S151	US-PGPUB; USPAT	OR	ON	2015/01/26 18:15
S153	28	S152 and (retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/26 18:16
S154	33	("5524116" | "5663910" | "5898698" | "5983382" | "6098188" | "6775320" | "6778589" | "6337877" | "6496481" | "6707822" | "6778596" | "6826589" | "7200792" | "7164654" | "7174493" | "7519124" | "7600172" | "7657818" | "7764595" | "7782758" | "7831890" | "7844882" | "7836381" | "8074138" | "8149904" | "8276048" | "8335956" | "8407546" | "8468411" | "8495473" | "8595577" | "8607126" | "8645784" | " 2001/0014962").PN.	US-PGPUB; USPAT	OR	ON	2015/01/27 10:45
S155	13	("20020087710" | " 20020126675 " | "20020154600 " | "20030067877 " | "200310076870" | " 20040114536 " | "2004/0148552" | " 20040196786 " | "20040203455" | " 20050180323" | " 20060092871 " | "200610236045 " | "20070198898" | " 20070263528 " | "20080212582 " | "20100061376").PN.	US-PGPUB; USPAT	OR	ON	2015/01/27 10:45
S156	46	S154 or S155	US-PGPUB; USPAT	OR	ON	2015/01/27 10:45
S157	28	S156 and (count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)same(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/27 10:46
S158	23	S156 and (count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/27 10:47
S159	10	S156 and (count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)same(packet block frame set group payload stream)same (quality near2 service QoS)	US-PGPUB; USPAT	OR	ON	2015/01/27 10:59
S160	46	("8850089" "4792753" "4807224" "4905225" "4914653" "4970714" "5339313" "5404353" "5430738" "5555266" "5664091" "5875292"	US-PGPUB; USPAT	OR	ON	2015/01/27 14:01

		"5905720" "6072726" "6073180" "6172983" "6278718" "6416471" "6493318" "6701370" "6728878" "6741554" "6763030" "6772375" "6788704" "7149192" "7277390" "7296204" "7346701" "7376426" "7412338" "7450599" "7596091" "7693070" "7701846" "7787368" "7821933" "7849208" "7885264" "7969901" "8023417" "8077601" "7885264" "7969901" "8023417" "8077601" "8151155" "8156407" "8228917" "8291034").pn.				
S161	42	("4766591" "5444856" "5727149" RE36182 "6005851" "6021177" "6185427" "6278921" "6438585" "6477595" "6556582" "6701151" "6765891" "7058387" "7068610" "7099339" "7103313" "7116640" "7221268" "7260399" "7293289" "7328036" "7356614" "7395347" "7403514" "7593428" "7609747" "7639641" "7686520" "7734253" "7839824" "7945206" "8013732" "8024481" "8040917" "8045501" "8060419" "8060681" "8077702" "7945206" "8013732" "8024481" "8040917" "8045501" "8060419" "8060681" "8077702" "8149783" "8160000" "8228924").pn.	US-PGPUB; USPAT	OR	ON	2015/01/27 14:01
S162	8	S160 and (head$3 field portion sector)with(packet block frame set group payload stream)with(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:02
S163	0	S161 and (head$3 field portion sector)with(packet block frame set group payload stream)with(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:02
S164	2	S161 and (head$3 field portion sector)same(packet block frame set group payload stream)same(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:04
S165	49	("5844918" "4799215" "5875292" "4412326" "4551834" "4617657" "4888767" "4989204" "5222061" "5235599" "5267237" "5444718" "5610595" "5740167" "5754754" "5828293" "6161207" "6181700" "6219713" "6219713" "6453438" "6483845" "6587985" "6684354" "6732313" "6785259" "6891799" "6914903" "6918077" "6987730" "7088701" "7099300" "7124333" "7263644" "7356750" "7386872" "7397861" "7400616" "7447969" "7477621" "7484157" "7486700"	US-PGPUB; USPAT	OR	ON	2015/01/27 14:48

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 630 of 739

		"7535840" "7583701" "7633880" "7689644" "7701846" "7710889" "7769014" "7823039").pn.				
S166	28	S165 and (head$3 field portion sector)same(packet block frame set group payload stream)same(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:48
S167	19	S165 and (head$3 field portion sector)with(packet block frame set group payload stream)with(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:49
S168	7	"18337261".FMID.	US-PGPUB; USPAT; FPRS	OR	OFF	2015/01/27 15:04
S169	145	(transmi$5 transceiv$3)with(two type different second$3)near(packet block group set package chunk)with((identif$7 indicat$3 determin$3)near header)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:08
S170	533	(transmi$5 transceiv$3)with(two type different second$3)with(packet block group set package chunk)with((identif$7 indicat$3 determin$3)near header)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:09
S171	135339	(Quality near2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:12
S172	1669	((packet adj error adj rate PER)near2 low$3)and((delay late$3)near2 low$3)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:14
S173	0	S170 and S172	US-PGPUB; USPAT	OR	ON	2015/06/03 19:14
S174	396	S171 and S172	US-PGPUB; USPAT	OR	ON	2015/06/03 19:14
S175	7346	(transmi$5 transceiv$3)same(two type different second$3)same(packet block group set package chunk frame)same((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:17
S176	8	S174 and S175	US-PGPUB; USPAT	OR	ON	2015/06/03 19:17
S177	478	(transmi$5 send$3)near2(two type different second$3)near2(packet block group set package chunk frame)same((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:15
S178	28	(transmi$5 send$3)near2(two type different second$3)near2(packet block group set package chunk frame)near2((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:15
S179	12	("20020154600" | "6754188" | "7483421" | "6005851" | "20040179494" | "20070206621" | "7031259" | "20050036497" | "20020126675" | "20090319854" | "20030009717" | "7826438").PN.	US-PGPUB; USPAT	OR	OFF	2015/06/04 11:16

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 631 of 739

S180	0	S177 and S179	US-PGPUB; USPAT	OR	ON	2015/06/04 11:17
S181	3	S179 and (transmi$5 send$3)same(two type different second$3)same(packet block group set package chunk frame)same((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:17
S182	63	(Quality near2 Service QOS)same((packet adj error adj rate PER)near2 low$3)and((delay late$3)near2 low$3)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:38
S183	1507	(transmi$5 send$3)with(two type different second$3)with(packet block group set package chunk frame)with((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:38
S184	1	S182 and S183	US-PGPUB; USPAT	OR	ON	2015/06/04 11:39
S185	43	S183 same(Quality near2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:39
S186	24	(transmi$5 send$3)with(two type different second$3)with(packet block group set package chunk frame)with(Quality near2 Service QOS)with((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:00
S187	44	(Quality near2 Service QOS)same((packet adj2 error adj2 rate PER)near2 low$3)same((delay late$3)near2 low$3)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:18
S188	26	((Quality near2 Service QOS)near2 level)same((packet adj2 error adj2 rate PER)near low$3)same((delay late$3)near low$3)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:35
S189	44	((Quality near2 Service QOS)near2 level)and((packet adj2 error adj2 rate PER)near low$3)and((delay late$3)near low$3)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:36
S190	6709	(transmi$5 send$3)with(packet block group set package chunk frame)with((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:36
S191	2	S189 and S190	US-PGPUB; USPAT	OR	ON	2015/06/04 12:37
S192	106584	((transmi$5 send$3 retransmi$5 re-transmi$5 resend$3 re-send$)near2 transceiver)	US-PGPUB; USPAT	OR	ON	2015/12/18 10:31
S193	436	(Quality adj2 Service QOS)and((packet adj2 error adj2 rate PER)near2 low$3)and((delay late$3)near2 low$3)	US-PGPUB; USPAT	OR	ON	2015/12/18 10:38
S195	16748	(header field portion sector)near3((packet block frame set group payload stream)near3 type)with(identif$7 indicat$3 determin$3 control$3)	US-PGPUB; USPAT	OR	ON	2015/12/18 10:44
S197	1058	S192 and S195	US-PGPUB; USPAT	OR	OFF	2015/12/18 10:45
S199	13	S193 and S197	US-PGPUB;	OR	OFF	2015/12/18

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 632 of 739

			USPAT			10:56
S200	37	S192 same S195	US-PGPUB; USPAT	OR	OFF	2015/12/18 10:57
S207	383	(identifier indicator)with(((packet block frame set group payload stream chunk)near2 secon$3)near2 type)	US-PGPUB; USPAT	OR	ON	2015/12/18 11:23
S208	38	S192 and S207	US-PGPUB; USPAT	OR	ON	2015/12/18 11:24
S209	1669	(classifi$6 identif$7 indicat$3 determin$3 control$3)near3(((packet block frame set group payload stream chunk)near2 secon$3)near2 type)	US-PGPUB; USPAT	OR	ON	2015/12/18 11:27
S210	2	S192 same S207	US-PGPUB; USPAT	OR	ON	2015/12/18 11:28
S211	135774	(Quality adj2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/12/18 11:29
S212	67	S192 and S209	US-PGPUB; USPAT	OR	ON	2015/12/18 11:29
S213	15	S211 and S212	US-PGPUB; USPAT	OR	ON	2015/12/18 11:29
S216	10143	S192 and S211	US-PGPUB; USPAT	OR	ON	2015/12/18 11:39
S218	567	(classifi$6 identif$7 indicat$3 determin$3 control$3 "sequence identifier")with(((packet block frame set group payload stream chunk)near2 secon$3)near2 type)with(header field portion sector)	US-PGPUB; USPAT	OR	ON	2015/12/18 11:44
S219	27	S216 and S218	US-PGPUB; USPAT	OR	ON	2015/12/18 11:44
S220	2606	714/748.ccls.	US-PGPUB; USPAT	OR	ON	2015/12/18 11:53
S221	15	S218 and S220	US-PGPUB; USPAT	OR	ON	2015/12/18 11:53
S222	1330	H04L1/1809.cpc.	US-PGPUB; USPAT	OR	ON	2015/12/18 11:55
S223	3711	H04L1/1812.cpc.	US-PGPUB; USPAT	OR	ON	2015/12/18 11:55
S224	2686	H04L1/1887.cpc.	US-PGPUB; USPAT	OR	ON	2015/12/18 11:55
S225	1766	H04L1/1819.cpc.	US-PGPUB; USPAT	OR	ON	2015/12/18 11:56
S226	2331	H04L2001/0093.cpc.	US-PGPUB; USPAT	OR	ON	2015/12/18 11:56
S227	17	S218 and S222	US-PGPUB; USPAT	OR	ON	2015/12/18 11:56
S228	3	S218 and S223	US-PGPUB; USPAT	OR	ON	2015/12/18 11:56
S229	5	S218 and S224	US-PGPUB; USPAT	OR	ON	2015/12/18 11:56
S230	2	S218 and S225	US-PGPUB; USPAT	OR	ON	2015/12/18 11:56
S231	4	S218 and S226	US-PGPUB; USPAT	OR	ON	2015/12/18 11:57
S232	4	(classifi$6 identif$7 indicat$3	EPO; JPO	OR	ON	2015/12/18

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 633 of 739

		determin$3 control$3 "sequence identifier")with(((packet block frame set group payload stream chunk)near2 secon$3)near2 type)with(header field portion sector)				11:59
S233	47	(classifi$6 identif$7 indicat$3 determin$3 control$3 "sequence identifier")with(((packet block frame set group payload stream chunk)near2 secon$3)near2 type)with(header field portion sector)	USOCR; FPRS; DERWENT; IBM_TDB	OR	ON	2015/12/18 12:00
S234	572	((delay late$3)near2 low$3)near3(packet block frame set group payload stream chunk)with(header field portion sector)	US-PGPUB; USPAT	OR	ON	2015/12/18 16:07
S235	106584	((transmi$5 send$3 retransmi$5 re-transmi$5 resend$3 re-send$)near2 transceiver)	US-PGPUB; USPAT	OR	ON	2015/12/18 16:07
S236	135774	(Quality adj2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/12/18 16:08
S237	20	S234 and S235 and S236	US-PGPUB; USPAT	OR	ON	2015/12/18 16:08
S238	125	(Quality adj2 Service QOS)and((delay late$3)near2 low$3)with(packet block frame set group payload stream chunk)near2(head$3 field portion sector)	US-PGPUB; USPAT	OR	ON	2015/12/18 17:49
S239	24	S235 and S238	US-PGPUB; USPAT	OR	ON	2015/12/18 17:50
S240	37	(packet block frame set group payload stream chunk)with(exclud$3 "not includ$3")near2((classifi$6 identif$7 indicat$3 determin$3 control$3 "sequence identifier")near2 head$3)	US-PGPUB; USPAT	OR	ON	2015/12/18 20:14
S241	147	(packet block frame set group payload stream chunk)with(except exclud$3 "not includ$3")near2((classifi$6 identif$7 indicat$3 determin$3 control$3 "sequence identifier")near3 head$3)	US-PGPUB; USPAT	OR	ON	2015/12/18 20:42
S242	9	S235 and S241	US-PGPUB; USPAT	OR	ON	2015/12/18 20:42
S243	0	S238 and S241	US-PGPUB; USPAT	OR	ON	2015/12/18 20:42
S244	16	("20020154600" | "6754188" | "7483421" | "20050068916" | "20060089833" | "6266337" | "6005851" | "20050068916" | "20020154600" | "7031259" | "7826438" | "20040179494" | "20070206621" | "20070206621" | "20040109455" | "7031259" | "20050036497" | "20020126675" | "20040179494" | "6005851" | "20020126675" | "20090319854" | "20030009717" | "20040109455" | "6754188" | "7483421" | "7826438").PN.	US-PGPUB; USPAT	OR	OFF	2015/12/18 22:07
S245	5482	((packet block frame set group payload	US-PGPUB;	OR	ON	2016/07/21

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 634 of 739

		stream chunk)near2 header)with((identifier identif$7 number "ID")near3 sequence)	USPAT			15:12
S246	228	(first with second$3)with((packet block frame set group payload stream chunk)near2 header)with((identifier identif$7 number "ID")near3 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/21 15:13
S247	25886	(retransmi$5 resend$3)and(Quality adj2 Service QOS)	US-PGPUB; USPAT	OR	ON	2016/07/21 15:16
S248	38	S247 and S246	US-PGPUB; USPAT	OR	ON	2016/07/21 15:16
S249	18	(first with second$3)with((packet block frame set group payload stream chunk)near2 type)same(((identifier identif$7 number "ID")near3 sequence)near5 header)	US-PGPUB; USPAT	OR	ON	2016/07/21 15:24
S250	177	(((packet block frame set group payload stream chunk)near2 second$3)near5 header)with((identifier identif$7 number "ID")near3 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/21 16:15
S251	40	S247 and S250	US-PGPUB; USPAT	OR	ON	2016/07/21 16:19
S252	6	((((packet block frame set group payload stream chunk)near2 second$3)near type)near3 header)with((identifier identif$7 number "ID")near2 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/21 17:48
S253	12	((((packet block frame set group payload stream chunk)near2 second$3)near type)near3 header)same((identifier identif$7 number "ID")near2 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/21 17:49
S254	0	((((packet block frame set group payload stream chunk)near2 second$3)near type)near3 header)and((identifier identif$7 number "ID")near2 sequence)	EPO	OR	ON	2016/07/21 17:50
S255	1	(((packet block frame set group payload stream chunk)near2 second$3)near3 header)and((identifier identif$7 number "ID")near2 sequence)	EPO; JPO	OR	ON	2016/07/21 17:51
S256	1	(((packet block frame set group payload stream chunk)near2 second$3)near3 header)and((flow identifier identif$7 number "ID")near2 sequence)	EPO; JPO	OR	ON	2016/07/21 17:51
S257	353	(second$3 next other another)near3((packet block frame set group payload stream chunk)near5 header)with((number identifier identif$7 "ID")near2 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/21 18:32
S258	57	S247 and S257	US-PGPUB; USPAT	OR	ON	2016/07/21 18:33
S259	14	(second$3 next other another)near3(((packet block frame set group payload stream chunk)near3 type)near5 header)with((number identifier identif$7 "ID")near2 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/21 18:43

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 635 of 739

S260	12	714/748.ccls.and(retransmi$5 resend$3)same((first original primary)with(second$3 next other another))with((packet block frame set group payload stream chunk)near5 header)same((flow identifier identif$7 number "ID")near5 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/21 20:16
S261	2	714/748.ccls.and((first original primary)with(second$3 next other another))with(((packet block frame set group payload stream chunk)near5 type)near5 header)same((flow identifier identif$7 number "ID")near5 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/21 20:18
S262	3	714/$.ccls.and((first original primary)with(second$3 next other another))with(((packet block frame set group payload stream chunk)near5 type)near5 header)same((flow identifier identif$7 number "ID")near5 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/21 20:19

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S263	1	(retransmi$5 resend$3)with(first with second$3)with(((packet block frame set group payload stream chunk)near2 type)near3 header)with((identifier identif$7 number "ID")near3 sequence).clm.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:06
S264	1	(retransmi$5 resend$3)with(first with second$3)with(((packet block frame set group payload stream chunk)near5 type)near5 header)with((identifier identif$7 number "ID")near5 sequence).clm.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:07
S265	1	(retransmi$5 resend$3)same(first with second$3)with(((packet block frame set group payload stream chunk)near5 type)near5 header)with((identifier identif$7 number "ID")near5 sequence).clm.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:07
S266	17	(retransmi$5 resend$3)same((first original primary)with(second$3 next other another))with((packet block frame set group payload stream chunk)near5 header)same((flow identifier identif$7 number "ID")near5 sequence).clm.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:10
S267	2627	714/748.ccls.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:10
S268	1914	714/776.ccls.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:11
S269	1007	714/749.ccls.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:11
S270	1369	H04L1/1809.cpc.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:11

S271	4286	H04L1/1812.cpc.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:11
S272	2957	H04L1/1887.cpc.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:11
S273	1873	H04L1/1819.cpc.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12
S274	2462	H04L2001/0093.cpc.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12
S275	3	S266 and S267	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12
S276	0	S266 and S268	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12
S277	2	S266 and S269	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12
S278	9	S266 and S270	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12
S279	1	S266 and S271	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12
S280	5	S266 and S272	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12
S281	1	S266 and S273	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12
S282	1	S266 and S274	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12

7/ 21/ 2016 8:28:27 PM
C:\ Users\ oalshack\ Documents\ EAST\ Workspaces\ 14159125.wsp

IEEE.org | IEEE *Xplore* Digital Library | IEEE-SA | IEEE Spectrum | More Sites

Cart (0) | Create Account | Personal Sign In

Access provided by:
United States Patent and Trademark Office
Sign Out

BROWSE | MY SETTINGS | GET HELP | WHAT CAN I ACCESS?

Displaying 1 of 1 result for **retransmission packet; second packet header; sequence identifier ID or sequence number**

Select All on Page | Download Citations | Export to IEEE Collabratec | Set Search Alerts | Search History

A Network Coding Approach to IP Traceback

Pegah Sattari; Minas Gjoka; Athina Markopoulou

2010 IEEE International Symposium on Network Coding (NetCod)

Year: 2010

Pages: 1 - 6, DOI: 10.1109/NETCOD.2010.5487682

Cited by: Papers (5)

IEEE Conference Publications

Abstract (179 Kb)

Traceback schemes aim at identifying the source(s) of a sequence of packets and the nodes these packets traversed. This is useful for tracing the sources of high volume traffic, e.g., in Distributed Denial-of-Service (DDoS) attacks. In this paper, we are particularly interested in Probabilistic Packet Marking (PPM) schemes, where intermediate nodes probabilistically mark [... View more

« First < 1 > Last »

Personal Sign In | Create Account

IEEE Account
» Change Username/Password
» Update Address

Purchase Details
» Payment Options
» Order History
» View Purchased Documents

Profile Information
» Communications Preferences
» Profession and Education
» Technical Interests

Need Help?
» US & Canada: +1 800 678 4333
» Worldwide: +1 732 981 0060
» Contact & Support

About IEEE *Xplore* | Contact Us | Help | Terms of Use | Nondiscrimination Policy | Sitemap | Privacy & Opting Out of Cookies

A not-for-profit organization, IEEE is the world's largest technical professional organization dedicated to advancing technology for the benefit of humanity.
© Copyright 2016 IEEE - All rights reserved. Use of this web site signifies your agreement to the terms and conditions.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 638 of 739

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	**Art Unit**
	OSMAN M ALSHACK	2112

CPC							
Symbol						**Type**	**Version**
H04L		1	/	0041		F	2013-01-01
H04L		45	/	00		I	2013-01-01
H03M		13	/	09		I	2013-01-01
H03M		13	/	00		I	2013-01-01
H03M		13	/	2707		I	2013-01-01
H03M		13	/	6513		I	2013-01-01
H03M		13	/	091		I	2013-01-01
H04L		12	/	5601		I	2013-01-01
H04L		47	/	10		I	2013-01-01
H04L		47	/	2433		I	2013-01-01
H04L		47	/	2441		I	2013-01-01
H04L		47	/	32		I	2013-01-01
H04L		2012	/	5647		A	2013-01-01
H04L		1	/	1835		I	2013-01-01
H04L		1	/	1874		I	2013-01-01
H04L		1	/	1809		I	2013-01-01
H04L		45	/	72		I	2013-01-01
H04L		69	/	324		I	2013-01-01
H04L		1	/	0045		I	2013-01-01
H04L		1	/	0057		I	2013-01-01
H04L		1	/	08		I	2013-01-01
H04L		1	/	1607		I	2013-01-01
H04L		49	/	552		I	2013-01-01

CPC Combination Sets								
Symbol					**Type**	**Set**	**Ranking**	**Version**
			/					
			/					

/OSMAN M ALSHACK/ Examiner.Art Unit 2112	7/25/2016	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	20	
/ESAW ABRAHAM/ Primary Examiner.Art Unit 2112	07/26/2016	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	**Art Unit**
	OSMAN M ALSHACK	2112

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION										
CLASS	SUBCLASS	CLAIMED					NON-CLAIMED					
		H	0	4	L	1 / 18 (2006.01.01)						
CROSS REFERENCE(S)												
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)											

/OSMAN M ALSHACK/ Examiner.Art Unit 2112	7/25/2016	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	20	
/ESAW ABRAHAM/ Primary Examiner.Art Unit 2112	07/26/2016	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	**Art Unit**
	OSMAN M ALSHACK	2112

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		19		37		55		73		91	4	109		
	2		20		38		56		74		92	5	110		
	3		21		39		57		75		93	6	111		
	4		22		40		58		76		94	7	112		
	5		23		41		59		77		95	8	113		
	6		24		42		60		78		96	9	114		
	7		25		43		61		79		97	10	115		
	8		26		44		62		80		98	11	116		
	9		27		45		63		81		99	12	117		
	10		28		46		64		82		100	13	118		
	11		29		47		65		83		101	14	119		
	12		30		48		66		84		102	15	120		
	13		31		49		67		85		103	16	121		
	14		32		50		68		86		104	17	122		
	15		33		51		69		87		105	18	123		
	16		34		52		70		88	1	106	19	124		
	17		35		53		71		89	2	107	20	125		
	18		36		54		72		90	3	108				

/OSMAN M ALSHACK/ Examiner.Art Unit 2112	7/25/2016	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	20	
/ESAW ABRAHAM/ Primary Examiner.Art Unit 2112	07/26/2016	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	1	of	2	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	1	Office Action for U.S. Patent Application No. 15/046,821 mailed March 24, 2016 (Attorney Ref. No.: 6936-54-CON-8)
	2	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed from Feb. 9, 2016 - March 2, 2016 - Docket Nos., 138-157;** (228 pages)
	3	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed from Aug. 31, 2015 and March 17, 2016 - April 22, 2016 - Docket Nos., 108 and 180-208;** (194 pages)
	4	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed from Feb. 9, 2016 - March 2, 2016 - Docket Nos., 125-142;** (225 pages)
	5	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed from March 17, 2016 - April 22, 2016; Docket Nos., 165-193;** (152 pages)
	6	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed from Feb. 9, 2016 - March 2, 2015; Docket Nos. 140-157;** (223 pages)

Examiner Signature	/Osman Alshack/	Date Considered	07/21/2016

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	2	of	2	Attorney Docket Number	6936-57-PUS-CON-3

	7	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed from March 17, 2016-April 22, 2016; Docket Nos. 180-208;** (152 pages)
	8	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ADTRAN INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA; **Includes documents filed from Feb. 9, 2016 - March 1, 2016 Docket Nos., 69-72;** (13 pages)
	9	Defendant Adtran, Inc.'s Preliminary Invalidity Contentions with Regard to Representative Asserted Claims for TQ DELTA, LLC v. ADTRAN, INC. - **Including Claim Charts for FAMILY 3 as Exhibits 3-1 - 3-28**; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA and Civil Action No. 1:15-cv-00121-RGA; filed February 9, 2016 (643 pages)
	10	Defendant Adtran, Inc.'s Preliminary Invalidity Contentions with Regard to Representative Asserted Claims for TQ DELTA, LLC v. ADTRAN, INC. - **Including Claim Charts for FAMILY 9 as Exhibits 9-1 - 9-23**; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA and Civil Action No. 1:15-cv-00121-RGA; filed February 9, 2016 (406 pages)
	11	Documents filed with District Court Proceedings for ADTRAN INC. v. TQ DELTA, LLC; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:15-cv-00121-RGA; **Includes documents filed from July 17, 2014 - March 1, 2016 Docket Nos., 1-77;** (1,444) pages)
	12	Documents filed with District Court Proceedings for ADTRAN INC. vs. TQ DELTA, LLC; U.S. District Court, for the Northern District of Alabama (Northeastern); Civil Action No. 5:14-cv-01381-JEO; **Includes documents filed from July 17, 2014 - Jan. 27, 2015 - Docket Nos., 1-32;** (568 pages)

Examiner Signature	/Osman Alshack/	Date Considered	07/21/2016

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	1	of	2	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

UNPUBLISHED U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] (if known)	Filing Date MM-DD-YYYY	Name of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	15/046821	02-18-2016	Tzannes et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	2	EP 1385292	01-28-2004	SAMSUNG ELECTRONICS CO, LTD.		
	3	KR 10-2004-0009928	01-31-2004	SAMSUNG ELECTRONICS CO., LTD		(Believed to corresponding to EP 1385292 cited herein)
	4	KR 10-2004-0014977	02-18-2004	Koninklijke Philips N.V.		(Believed to Correspond to WO 03/003747 cited herein)
	5	WO 03/003747	01-09-2003	KONINKLIJKE PHILIPS ELECTRONICS N.V.		

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)

Examiner Initials*	Cite No.[1]	
	6	GOODMAN, David et al. "Maximizing the Throughput to CDMA Data Communications" Polytechnic University, Brooklyn, NY, October 2003 (5 pages)

Examiner Signature	/Osman Alshack/	Date Considered	07/21/2016

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	2	of	2	Attorney Docket Number	6936-57-PUS-CON-3

	7	Official Action for European Application No. 05807443.6, mailed Dec. 8, 2015 (Attorney Ref. No.: 6936-54-PEP)
	8	Official Action (including translation) for Korean Patent Application No. 10-2008-7024792 dated Dec. 14, 2015 (Attorney Ref. No. 6936-57-PKR)
	9	Official Action (including translation) for Korean Patent Application No. 10-2014-7005299 mailed Dec. 14, 2015 (Attorney Ref. No.: 6936-57-PKR-DIV)
	10	Notice of Allowance for U.S. Patent Application No. 14/730,874 mailed Jan. 7, 2016 (Attorney Ref. No.: 6936-54-CON-7)
	11	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed from Nov. 10, 2015 - Jan. 5, 2016 - Docket Nos., 123-129;** (102 pages)
	12	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed from Jan. 20, 2016 - Feb. 2, 2016 - Docket Nos., 131 - 137;** (104 pages)
	13	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed from Dec. 16, 2015 - Jan. 6, 2016 - Docket Nos., 104-112;** (193 pages)
	14	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed from Jan. 20, 2016 - Feb. 8, 2016 - Docket Nos., 113-124;** (252 pages)
	15	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed from Dec. 16, 2015 - Dec. 16, 2015 - Docket Nos., 119;** (48 pages)
	16	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed from Jan. 20, 2016 - Feb. 8, 2016 - Docket Nos. 125-139;** (349 pages)
	17	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ADTRAN INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA; **Includes documents filed from Jan. 20, 2016 - Feb. 8, 2016 - Docket Nos., 67-68;** (81 pages)

Examiner Signature	/Osman Alshack/	Date Considered	07/21/2016

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Layer Two Tunneling Protocol" L2TP"

W Townsley, A Valencia, A Rubens, G Pall, G Zorn... - 1999 - rfc-editor.org

... Data messages are **not retransmitted** when **packet** loss occurs. ... Control messages are sent over a reliable L2TP Control Channel which transmits **packets** in-band over the same **Packet** Transport. ... **Packets** received with an unknown Ver field MUST be discarded. ...

Cited by 448 Related articles All 207 versions Cite Save More

Method and apparatus for preserving **packet** squencing in a **packet** transmission system

DR Buchholz, WK Doss, KE Robbins... - US Patent ..., 1994 - Google Patents

... suggests that lost and/or corrupted radio transmission **packets** can be **retransmitted**, the incident ... receive (RX) window bit map is updated to indicate receipt of the transmission **packet**. ... a check is performed to determine whether any previously received **packets** associated with ...

Cited by 73 Related articles All 2 versions Cite Save

Secure routing and intrusion detection in ad hoc networks

A Patwardhan, J Parker, A Joshi, M Iorga... - Third IEEE ..., 2005 - ieeexplore.ieee.org

... Nodes are expected to **retransmit** the message without modifying the payload towards the intended ... between mangled **packets** and dropped **packets**, since the **IDS** watches for exact **retransmissions**. ... will **not** match any **packets** the **IDS** is watching for **retransmission**, and thus ...

Cited by 228 Related articles All 13 versions Cite Save

Efficient transport of internet protocol **packets** using asynchronous transfer mode adaptation layer two

L Westberg - US Patent 6,041,054, 2000 - Google Patents

... information to the CID 304 and UUI 307 fields respectively, rather than **retransmit** them with ... If the IP/PPP data **packets** associated with a given session/connection contain uncompressed ... default code permits the decompression algorithm to recognize the IP/PPP data **packet** as a ...

Cited by 113 Related articles All 2 versions Cite Save

IP network address translator (NAT) terminology and considerations

P Srisuresh, M Holdrege - 1999 - tools.ietf.org

... FINs or SYNs will be the last **packets** of the session (ie, there could be **retransmissions**). ... that end-to-end ESP based transport mode authentication and confidentiality are permissible for **packets** such as ... port are encoded in ASCII, this may result in a change in the size of **packet**. ...

Cited by 990 Related articles All 6 versions Cite Save More

System for requesting missing network accounting records if there is a break in **sequence numbers** while the records are transmitting from a source device

WCC Bullard - US Patent 6,625,657, 2003 - Google Patents

... sends a request to the identified data collector to **retransmit** the missing record corresponding to the missing **sequence number**. ... 7 a base level “activity” NAR that **includes** source, destination, protocol, source port, destination port, byte and **packet** counts, etc ... Acct-Output-**Packets**. ...

Cited by 81 Related articles All 2 versions Cite Save

LS-SCTP: a bandwidth aggregation technique for stream control transmission protocol

A Abd, T Saadawi, M Lee - Computer Communications, 2004 - Elsevier

... **Retransmitted** data chunks use the alternate address(es), to improve the probability of reaching the ... to the ULA, taking into account that the data sender will **not retransmit** data chunks ... size (cwnd), slow-start threshold (ssthresh), Round Trip Time (RTT), **retransmission** time out ...

Cited by 142 Related articles All 6 versions Cite Save

Optimized link state routing protocol (OLSR)

T Clausen, P Jacquet - 2003 - rfc-editor.org

... a common **header** format, which enables nodes to correctly accept and (if applicable) **retransmit** messages of ... The Originator Address field MUST *NEVER* be changed in **retransmissions**. ... already **retransmitted**, D_iface_list is a list of the addresses of the interfaces on which the ...

Cited by 5493 Related articles All 36 versions Cite Save

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 646 of 739

RTP **retransmission** payload format

J Rey, D Leon, A Miyazaki, V Varsa, R Hakenberg - 2006 - rfc-editor.org

... In addition, if the sender chooses to **retransmit** at a lower rate, the values in the payload **header** of the original RTP **packet** may **no ...** If **retransmission** session sharing were allowed, it would be a problem for receivers, since they would receive **retransmissions** for original **...**

Cited by 176 Related articles All 192 versions Cite Save

SIP: session initiation protocol

M Handley, H Schulzrinne, E Schooler, J Rosenberg - 1999 - rfc-editor.org

... A request (and its **retransmissions**) together with the responses triggered by that request make up a SIP transaction. **...** unicast UDP, the response is sent to the address contained in the next Via **header** field (Section **...** For UDP, reliability is achieved using **retransmission** (Section 10 **...**

Cited by 2003 Related articles All 200 versions Cite Save More

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 647 of 739

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

62574 7598 08/01/2016
Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/159,125	01/20/2014	Marcos C. Tzannes	6936-57-PUS-CON-3	3369

TITLE OF INVENTION: PACKET RETRANSMISSION AND MEMORY SHARING

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$960	$0	$0	$960	11/01/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS
ALSHACK, OSMAN M	2112	714-748000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Jason H. Vick
2 Sheridan Ross, PC
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: TQ DELTA, LLC
(B) RESIDENCE: (CITY and STATE OR COUNTRY): Austin, TX

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☑ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☑ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number 19-1970 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ Applicant certifying micro entity status. See 37 CFR 1.29
NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
☐ Applicant asserting small entity status. See 37 CFR 1.27
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
☐ Applicant changing to regular undiscounted fee status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Jason H. Vick/ Date September 16, 2016
Typed or printed name Jason H. Vick Registration No. 45,285

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 648 of 739

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:	)	Group Art Unit: 2112
Marcos C. Tzannes	)	Confirmation No.: 3369
Serial No.: 14/159,125	)	Examiner: Alshack, Osman M
Filed: January 20, 2014	)	
Atty File No.: 6936-57-PUS-CON-3	)	SUPPLEMTNAL INFORMATION DISCLOSURE STATEMENT
Entitled: "PACKET RETRANSMISSION AND MEMORY SHARING"	)	Electronically Submitted

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Madam:

The references cited on attached Form PTO-1449 are being called to the attention of the Examiner.

☒ Copies of the cited non-patent and/or foreign references are enclosed herewith.

☐ Copies of the cited U.S. patents and/or patent applications are enclosed herewith.

☐ Copies of the cited U.S. patents/unpublished patent applications/patent application publications are not enclosed in accordance with 37 C.F.R. § 1.98(a).

☐ Copies of the cited references are not enclosed, in accordance with 37 C.F.R. § 1.98(d), because the references were cited by or submitted to the U.S. Patent and Trademark Office in prior application Serial No. _____filed _____, which is relied upon for an earlier filing date under 35 U.S.C. § 120.

☐ To the best of applicants' belief, the pertinence of the foreign-language references are believed to be summarized in the attached English translation/abstracts and/or in the figures, although applicants do not necessarily vouch for the accuracy of the translation.

☐ Examiner's attention is drawn to the following related applications:

- Serial No. _____ filed _____ (Attorney Ref. No. _____)

☐ Other: _____

Submission of the above information is not intended as an admission that any item is citable under the statutes or rules to support a rejection, that any item disclosed represents

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 649 of 739

analogous art, or that those skilled in the art would refer to or recognize the pertinence of any reference without the benefit of hindsight, nor should an inference be drawn as to the pertinence of the references based on the order in which they are presented. Submission of this statement should not be taken as an indication that a search has been conducted, or that no better art exists.

It is respectfully requested that the cited information be expressly considered during the prosecution of this application and the references made of record therein.

FEES

☐	**37 CFR 1.97(b):** No fee is believed due in connection with this submission, because the information disclosure statement submitted herewith is satisfied by one of the following conditions ("X" indicates satisfaction): ☐ Within three months of the filing date of a national application other than a continued prosecution application under 37 CFR 1.53(d), or ☐ Within three months of the date of entry into the national stage of an international application as set forth in 37 CFR 1.491 or ☐ Before the mailing date of a first Office Action on the merits, or ☐ Before the mailing of a first Office action after the filing of a request for continued examination under 37 CFR 1.114. Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970.
☐	**37 CFR 1.97(c):** The information disclosure statement transmitted herewith is being filed after all the above conditions (37 CFR 1.97(b)), but before the mailing date of one of the following conditions: (1) a final action under 37 C.F.R. 1.113 or (2) a notice of allowance under 37 C.F.R. 1.311, or (3) an action that otherwise closes prosecution in the application. This Information Disclosure Statement is accompanied by: ☐ A Certification (below) as specified by 37 C.F.R. 1.97(e). Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970. OR ☐ Please charge Deposit Account 19-1970 in the amount of $180.00 for the fee set forth in 37 C.F.R. 1.17(p) for submission of an information disclosure statement. Please credit any overpayment or charge any underpayment to Deposit Account 19-1970.
☒	**37 CFR 1.97(d):** This Information Disclosure Statement is being submitted after the period specified in 37 CFR 1.97(c). ☒ This information Disclosure Statement includes a Certification (below) as specified by 37 C.F.R. 1.97(e) AND ☒ Applicants hereby requests consideration of the reference(s) disclosed herein. Please charge Deposit Account 19-1970 in the amount of $180.00 under 37 C.F.R. 1.17(p). Please credit any overpayment or charge any underpayment to Deposit Account 19-1970. Election to pay the fee should not be taken as an indication that applicant(s) cannot execute a certification.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 650 of 739

Certification (37 C.F.R. 1.97(e))
(Applicable only if checked)

☒ The undersigned certifies that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(1).

☐ A copy of the communication from the foreign patent office is enclosed.

OR

☒ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned after making reasonable inquiry, no item of information contained in this Information Disclosure Statement was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(2).

Respectfully submitted,

SHERIDAN ROSS P.C.

Date: September 16, 2016

By: /Jason H. Vick/
Jason H. Vick
Reg. No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202
Telephone: 303-863-9700

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 651 of 739

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	1	of	2	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	1	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed on June 27, 2016; Docket Nos., 229;** (2 pages)
	2	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed on August 2 - Sept. 14, 2016; Docket Nos., 230-236;** (58 pages)
	3	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed on June 27, 2016; Docket Nos., 216;** (2 pages)
	4	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed from August 2 - August 23, 2016; Docket Nos., 217-219;** (9 pages)
	5	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed from September 16, 2016; Docket Nos., 220;** (2 pages)
	6	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed on June 27, 2016; Docket Nos. 235;** (2 pages)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	2	of	2	Attorney Docket Number	6936-57-PUS-CON-3

	7	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed from August 2, 2016 - September 1, 2016; Docket Nos. 236-239;** (11 pages)
	8	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ADTRAN INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA; **Includes documents filed on June 27, 2016; Docket Nos., 82;** (2 pages)
	9	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ADTRAN INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA; **Includes documents filed from Aug. 2 - Sept. 1, 2016; Docket Nos., 83-86;** (11 pages)
	10	Documents filed with District Court Proceedings for ADTRAN INC. v. TQ DELTA, LLC; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:15-cv-00121-RGA; **Includes documents filed on June 27, 2016; Docket Nos., 87;** (2 pages)
	11	Documents filed with District Court Proceedings for ADTRAN INC. v. TQ DELTA, LLC; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:15-cv-00121-RGA; **Includes documents filed from Aug. 2 - Sept. 1, 2016; Docket Nos., 88-91;** (11 pages)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:	)	Group Art Unit: 2112
Marcos C. Tzannes	)	Confirmation No.: 3369
Serial No.: 14/159,125	)	Examiner: Alshack, Osman M
Filed: January 20, 2014	)	
Atty File No.: 6936-57-PUS-CON-3	)	SUPPLEMTNAL INFORMATION DISCLOSURE STATEMENT
Entitled: "PACKET RETRANSMISSION AND MEMORY SHARING"	)	Electronically Submitted

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Madam:

The references cited on attached Form PTO-1449 are being called to the attention of the Examiner.

☒ Copies of the cited non-patent and/or foreign references are enclosed herewith.

☐ Copies of the cited U.S. patents and/or patent applications are enclosed herewith.

☐ Copies of the cited U.S. patents/unpublished patent applications/patent application publications are not enclosed in accordance with 37 C.F.R. § 1.98(a).

☐ Copies of the cited references are not enclosed, in accordance with 37 C.F.R. § 1.98(d), because the references were cited by or submitted to the U.S. Patent and Trademark Office in prior application Serial No. _____filed _____, which is relied upon for an earlier filing date under 35 U.S.C. § 120.

☒ To the best of applicants' belief, the pertinence of the foreign-language references are believed to be summarized in the attached English translation/abstracts and/or in the figures, although applicants do not necessarily vouch for the accuracy of the translation.

☐ Examiner's attention is drawn to the following related applications:

- Serial No. _____ filed _____ (Attorney Ref. No. _____)

☐ Other: _____

Submission of the above information is not intended as an admission that any item is citable under the statutes or rules to support a rejection, that any item disclosed represents

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 654 of 739

analogous art, or that those skilled in the art would refer to or recognize the pertinence of any reference without the benefit of hindsight, nor should an inference be drawn as to the pertinence of the references based on the order in which they are presented. Submission of this statement should not be taken as an indication that a search has been conducted, or that no better art exists.

It is respectfully requested that the cited information be expressly considered during the prosecution of this application and the references made of record therein.

FEES

☐	**37 CFR 1.97(b):** No fee is believed due in connection with this submission, because the information disclosure statement submitted herewith is satisfied by one of the following conditions ("X" indicates satisfaction): ☐ Within three months of the filing date of a national application other than a continued prosecution application under 37 CFR 1.53(d), or ☐ Within three months of the date of entry into the national stage of an international application as set forth in 37 CFR 1.491 or ☐ Before the mailing date of a first Office Action on the merits, or ☐ Before the mailing of a first Office action after the filing of a request for continued examination under 37 CFR 1.114. Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970.
☐	**37 CFR 1.97(c):** The information disclosure statement transmitted herewith is being filed after all the above conditions (37 CFR 1.97(b)), but before the mailing date of one of the following conditions: (1) a final action under 37 C.F.R. 1.113 or (2) a notice of allowance under 37 C.F.R. 1.311, or (3) an action that otherwise closes prosecution in the application. This Information Disclosure Statement is accompanied by: ☐ A Certification (below) as specified by 37 C.F.R. 1.97(e). Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970. OR ☐ Please charge Deposit Account 19-1970 in the amount of $180.00 for the fee set forth in 37 C.F.R. 1.17(p) for submission of an information disclosure statement. Please credit any overpayment or charge any underpayment to Deposit Account 19-1970.
☒	**37 CFR 1.97(d):** This Information Disclosure Statement is being submitted after the period specified in 37 CFR 1.97(c). ☒ This information Disclosure Statement includes a Certification (below) as specified by 37 C.F.R. 1.97(e) AND ☒ Applicants hereby requests consideration of the reference(s) disclosed herein. Please charge Deposit Account 19-1970 in the amount of $180.00 under 37 C.F.R. 1.17(p). Please credit any overpayment or charge any underpayment to Deposit Account 19-1970. Election to pay the fee should not be taken as an indication that applicant(s) cannot execute a certification.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 655 of 739

Certification (37 C.F.R. 1.97(e))
(Applicable only if checked)

☒ The undersigned certifies that:

☒ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(1).

☒ A copy of the communication from the foreign patent office is enclosed.

OR

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned after making reasonable inquiry, no item of information contained in this Information Disclosure Statement was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(2).

Respectfully submitted,

SHERIDAN ROSS P.C.

Date: September 16, 2016

By: /Jason H. Vick/
Jason H. Vick
Reg. No. 45,285
1560 Broadway, Suite 1200
Denver, Colorado 80202
Telephone: 303-863-9700

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 656 of 739

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	1	of	1	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	1	Official Action (including translation) for Korean Patent Application No. 10-2008-7024792 dated July 26, 2016 (Attorney Ref. No. 6936-57-PKR)

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

Electronic Patent Application Fee Transmittal

Application Number:	14159125
Filing Date:	20-Jan-2014
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Filer:	Jason Vick/Joanne Vos
Attorney Docket Number:	6936-57-PUS-CON-3

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl Issue Fee	1501	1	960	960

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**1140**

Electronic Acknowledgement Receipt	
EFS ID:	26952598
Application Number:	14159125
International Application Number:	
Confirmation Number:	3369
Title of Invention:	PACKET RETRANSMISSION AND MEMORY SHARING
First Named Inventor/Applicant Name:	Marcos C. Tzannes
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	6936-57-PUS-CON-3
Receipt Date:	16-SEP-2016
Filing Date:	20-JAN-2014
Time Stamp:	15:55:23
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$1140
RAM confirmation Number	091916INTEFSW00002642191970
Deposit Account	191970
Authorized User	Joanne Vos
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	ISSUE_FEE_PAYMENT.pdf	97206 26903b6410655df2ea5919810296981ec4d8b95a	no	1
Warnings:					
Information:					
2		IDS_14_US_Certified.pdf	244292 8a5ef3d9b3c10c3cf6fb22174cb935058201fc57	yes	5
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	3	
	Information Disclosure Statement (IDS) Form (SB08)		4	5	
Warnings:					
Information:					
3	Non Patent Literature	PART_10_2WIRE.pdf	106482 16bec6de5172932bf587b152a334367f6f6b480f	no	2
Warnings:					
Information:					
4	Non Patent Literature	PART_11_2WIRE.pdf	2674645 d569e437102fc33327e27b3b2395e8a35a964202	no	58
Warnings:					
Information:					
5	Non Patent Literature	PART_10_ZHONE.pdf	106120 cc08e11b5ef71255851b3d7761f3fab7d082a6a6	no	2
Warnings:					
Information:					

6	Non Patent Literature	PART_11_ZHONE.pdf	196463 3422 4c342ae03be97a7befc11f69b83c7050 7931	no	9
Warnings:					
Information:					
7	Non Patent Literature	PART_12_ZHONE.pdf	102289 50f6bda9e8e3d1c282fef6e18004e4cc4c16 95f2	no	2
Warnings:					
Information:					
8	Non Patent Literature	PART_11_ZYXEL.pdf	106121 04b28947aaeda09b5b0d9dee8a51180c4a d2f127	no	2
Warnings:					
Information:					
9	Non Patent Literature	PART_12_ZYXEL.pdf	212423 83e073240722060a4d17025d47c269b3de bebd2a	no	11
Warnings:					
Information:					
10	Non Patent Literature	PART_8_ADTRAN.pdf	106274 0a8ac085523ca6dd3a000b7fd8b18e8bc84 28ef1	no	2
Warnings:					
Information:					
11	Non Patent Literature	PART_9_ADTRAN.pdf	208820 07a6e6a6cfd3ed0f4e99cb78222ee74c571c ad1b	no	11
Warnings:					
Information:					
12	Non Patent Literature	PART_6_ADTRAN_v_TQD.pdf	105835 d032ba350fb8eef5691dcf429a4543bc6799 723e	no	2
Warnings:					
Information:					

13	Non Patent Literature	PART_7_ADTRAN_v_TQD.pdf	208792 1c69cf6b6d5d3bd1b2eafdd4cff9cfed56bb962e	no	11
Warnings:					
Information:					
14		IDS_15_Foreign_Certified.pdf	217414 36f92a5a1525b120634c36e21d946d3d3b6ea21d	yes	4
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	3	
	Information Disclosure Statement (IDS) Form (SB08)		4	4	
Warnings:					
Information:					
15	Non Patent Literature	6936-57-PKR_OA_07-26-2016.pdf	217900 37fb4038b9e64d725c562946478c4eca67dc0f71	no	7
Warnings:					
Information:					
16	Fee Worksheet (SB06)	fee-info.pdf	32401 5d826fc1ffc5d91585db420ef5185c8afc144e86	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	4943477	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"14159125"	US-PGPUB; USPAT	OR	OFF	2015/01/21 11:11
S2	103	((Marcos) near2 (Tzannes)).INV.	USPAT; USOCR	OR	OFF	2015/01/21 11:14
S3	2	(retransmi$5 resend$3)near3((packet block group set package chunk)near3 type)with(first original primary second$3)same((per latency)near2 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:19
S4	3	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)with(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:23
S5	13	(transmi$5 transceiv$3 retransmi$5 resend$3)same((packet block group set package chunk)near3 type)same(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:24
S6	117	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:27
S7	0	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)same((per and latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:28
S8	3	S2 and S6	US-PGPUB; USPAT	OR	ON	2015/01/21 12:46
S9	3	S2 and (transmi$5 transceiv$3 retransmi$5 resend$3)same(packet block group set package chunk)same(first original primary second$3)same((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:54
S10	17	S2 and (transmi$5 transceiv$3 retransmi$5 resend$3)same(packet block group set package chunk)same(first original primary second$3)and((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:55

S11	32	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)and((per and latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 12:56
S12	17	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)same(identif$7 indicat$3 determin$3)and((per and latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:08
S13	13	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)with(buffer stor$3 memory)same(identif$7 indicat$3 determin$3)and((per and latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:11
S14	26	("2004/0179494").URPN.	USPAT	OR	OFF	2015/01/21 13:19
S15	1	S14 and(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)and((per latency)near3 low)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:20
S16	4737	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)with(identif$7 indicat$3 determin$3)and((per error latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:38
S17	74538	(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)with(first original primary second$3)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:39
S18	1496	(low-per low adj per)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:40
S19	32050	(low-latency low adj latency)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:40
S20	41	S18 and S19	US-PGPUB; USPAT	OR	ON	2015/01/21 13:40
S21	12	S17 and S20	US-PGPUB; USPAT	OR	ON	2015/01/21 13:41
S22	35	(transmi$5 transceiv$3 retransmi$5 resend$3)same(packet block group set package chunk)same(first original primary second$3)and(identif$7 indicat$3 determin$3)same((per and latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:47
S23	129	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near3 type)near3(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:50
S24	81	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set	US-PGPUB; USPAT	OR	ON	2015/01/21 13:51

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 666 of 739

		package chunk)near3 type)near(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)				
S25	24	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk)near type)near(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:52
S26	39	(transmi$5 transceiv$3 retransmi$5 resend$3)near2((packet block group set package chunk frame)near2 type)near2(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 13:58
S27	1	("5524116").PN.	US-PGPUB; USPAT	OR	OFF	2015/01/21 14:27
S28	1	(14/075194).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 14:29
S29	1	(14/081469).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 14:31
S30	4	S2 and (transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near3 type)with(first original primary second$3)with(buffer stor$3 memory)with(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 14:33
S31	20962	packet near2 identifier	US-PGPUB; USPAT	OR	ON	2015/01/21 14:49
S32	99	S31 with(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near3 type)with(first original primary second$3)	US-PGPUB; USPAT	OR	ON	2015/01/21 14:51
S33	389	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near2 type)near2(identif$7 indicat$3 determin$3)with(buffer stor$3 memory)	US-PGPUB; USPAT	OR	ON	2015/01/21 14:57
S34	129524	(Quality near2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/01/21 15:00
S35	75	S33 and S34	US-PGPUB; USPAT	OR	ON	2015/01/21 15:00
S36	22753	(Quality near2 Service QOS)and((per error rat$3 latency)near3 low)	US-PGPUB; USPAT	OR	ON	2015/01/21 15:06
S37	1301	(transmi$5 transceiv$3 retransmi$5 resend$3)with((packet block group set package chunk frame)near3 type)with(identif$7 indicat$3 determin$3)with(buffer stor$3 memory)	US-PGPUB; USPAT	OR	ON	2015/01/21 15:06
S38	65	S36 and S37	US-PGPUB; USPAT	OR	ON	2015/01/21 15:07
S39	84	(Quality near2 Service QOS)same(low	US-PGPUB;	OR	ON	2015/01/21

		high)near3(delay late$3)same((error data bit loss)near2 rate)same(identif$7 indicat$3 determin$3)and(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)near2(video voice data information bit$1)	USPAT			16:20
S40	7	(Quality near2 Service QOS)same(low high)near3(delay late$3)same((error data bit loss)near2 rate)same(identif$7 indicat$3 determin$3 ID)same(transmi$5 transceiv$3 retransmi$5 resend$3)with(packet block group set package chunk)near2(video voice data information bit$1)	US-PGPUB; USPAT	OR	ON	2015/01/21 16:31
S41	2	(10/696507).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 17:01
S42	2	(10/901940).APP.	US-PGPUB; USPAT	OR	OFF	2015/01/21 17:03
S43	4	(Quality near2 Service QOS)with(identif$7 indicat$3 determin$3)with(packet block group set package chunk)near2(video voice data information bit$1)same(low high)near3(delay late$3)same((error data bit loss)near2 rate)	US-PGPUB; USPAT	OR	ON	2015/01/21 17:14
S44	201	(Quality near2 Service QOS)with(identif$7 indicat$3 determin$3)with(packet block group set package chunk)near2(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near2 rate)	US-PGPUB; USPAT	OR	ON	2015/01/21 17:16
S45	2524	714/748.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/21 17:31
S46	967	714/749.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/21 17:31
S47	1	S44 and S45	US-PGPUB; USPAT	OR	ON	2015/01/21 17:32
S48	0	S44 and S46	US-PGPUB; USPAT	OR	ON	2015/01/21 17:32
S49	16	("20010025239" | "20030133462" | "20040072541" | "20050141480" | "20060002465" | "20060095944" | "20060168133" | "20070009015" | "20070217339" | "20080101476" | "20080225983" | "20090034610" | "6856756" | "7292553" | "7706384" | "7782779").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2015/01/21 17:34
S50	25	(Customer with Premises)and(digital with signal with prosessor DSP)and (integrated with ciruit ASIC)and linecard	US-PGPUB; USPAT; USOCR	OR	ON	2015/01/21 17:59
S51	185383	packet$1 near2 $2transmi$5	US-PGPUB; USPAT	OR	ON	2015/01/22 09:06
S54	107	(Quality near2 Service QOS)same((packet block group set payload frame)near2 type)same(identif$7 indicat$3	US-PGPUB; USPAT	OR	ON	2015/01/22 09:09

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 668 of 739

		determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)				
S55	68	S51 and S54	US-PGPUB; USPAT	OR	ON	2015/01/22 09:09
S56	17	S51 same S54	US-PGPUB; USPAT	OR	ON	2015/01/22 09:09
S57	1	(Quality near2 Service QOS)same(first original primary)near3((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:24
S58	6	(Quality near2 Service QOS)and(first original primary)near3((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:27
S59	15	(Quality near2 Service QOS)and(first original primary)with((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:27
S62	19	(first original primary)near2((packet block group set payload frame)near2 type)near2(identif$7 indicat$3 determin$3)and(Quality near2 Service QOS)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 09:42
S63	1250	H04L1/1809.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:50
S64	2991	H04L1/1812.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:50
S65	2252	H04L1/1887.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:51
S66	1569	H04L1/1819.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:51
S67	2107	H04L2001/0093.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 09:51
S71	3061	H04L12/5601.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 10:02
S72	0	S54 and S63	US-PGPUB; USPAT	OR	ON	2015/01/22 10:03
S73	0	S54 and S64	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04
S74	4	S54 and S65	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04

S75	0	S54 and S66	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04
S76	0	S54 and S67	US-PGPUB; USPAT	OR	ON	2015/01/22 10:04
S77	1174	H04L45/302.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S78	1222	H04L47/6215.cpc.	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S79	0	S54 and S77	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S80	1	S54 and S78	US-PGPUB; USPAT	OR	ON	2015/01/22 10:14
S83	457	packet$1 near2 $2transmi$5 with(second$3 near2 packet)with(stor$3 retain$3)with(buffer memory)	US-PGPUB; USPAT	OR	OFF	2015/01/22 11:44
S84	80	packet$1 near2 $2transmi$5 with(second$3 near2 packet)near2(stor$3 retain$3)near2(buffer memory)	US-PGPUB; USPAT	OR	OFF	2015/01/22 11:45
S87	29	retransmi$5 same(second$3 with type with packet)same(stor$3 retain$3)same(buffer memory storage)	US-PGPUB; USPAT	OR	OFF	2015/01/22 11:47
S89	1	(Quality near2 Service QOS)with(identif$7 indicat$3 determin$3)with((packet block group set)near type)near(second$3)and(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near2 rate)	US-PGPUB; USPAT	OR	ON	2015/01/22 13:40
S90	393	"5524116" "5663910" "5898698" "5983382" "6098188" "6775320" "6778589" "6337877" "6496481" "6707822" "6778596" "6826589" "7200792" "7164654" "7174493" "7519124" "7600172" "7657818" "7764595" "7782758" "7831890" "7844882" "7836381" "8074138" "8149904" "8276048" "8335956" "8407546" "8468411" "8495473" "8595577" "8607126" "8645784" 2001/0014962	US-PGPUB; USPAT	OR	ON	2015/01/22 17:51
S92	33	("5524116" | "5663910" | "5898698" | "5983382" | "6098188" | "6775320" | "6778589" | "6337877" | "6496481" | "6707822" | "6778596" | "6826589" | "7200792" | "7164654" | "7174493" | "7519124" | "7600172" | "7657818" | "7764595" | "7782758" | "7831890" | "7844882" | "7836381" | "8074138" | "8149904" | "8276048" | "8335956" | "8407546" | "8468411" | "8495473" | "8595577" | "8607126" | "8645784" | " 2001/0014962").PN.	US-PGPUB; USPAT	OR	ON	2015/01/22 17:55
S94	13	("20020087710" | " 20020126675 " | "20020154600 " | "20030067877 " | "200310076870" | " 20040114536 " | "2004/0148552" | " 20040196786 " | "20040203455" | " 20050180323" | " 20060092871 " | "200610236045 " |	US-PGPUB; USPAT	OR	ON	2015/01/22 18:01

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 670 of 739

		"20070198898" | " 20070263528 " | "20080212582 " | "20100061376").PN.				
S95	46	S92 or S94	US-PGPUB; USPAT	OR	ON	2015/01/22 18:03
S96	11	S93 and S95	US-PGPUB; USPAT	OR	ON	2015/01/22 18:04
S97	10	S95 and (Quality near2 Service QOS)and((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/22 18:06
S98	11	S95 and (Quality near2 Service QOS)and((packet block group set payload frame)near5 type)same(identif$7 indicat$3 determin$3)	US-PGPUB; USPAT	OR	ON	2015/01/22 18:11
S99	27	(packet adj transfer adj mode adj transmission adj convergence PTM-TC PTMTC PTM adj TC)	US-PGPUB; USPAT	OR	ON	2015/01/22 19:13
S100	1614	714/776.ccls.	US-PGPUB; USPAT	OR	OFF	2015/01/23 10:24
S101	185383	packet$1 near2 $2transmi$5	US-PGPUB; USPAT	OR	ON	2015/01/23 10:25
S102	107	(Quality near2 Service QOS)same((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/23 10:25
S103	68	S101 and S102	US-PGPUB; USPAT	OR	ON	2015/01/23 10:25
S104	0	S100 and S102	US-PGPUB; USPAT	OR	ON	2015/01/23 10:26
S105	0	S100 and S103	US-PGPUB; USPAT	OR	ON	2015/01/23 10:26
S106	0	S100 and (Quality near2 Service QOS)and((packet block group set payload frame)near2 type)same(identif$7 indicat$3 determin$3)same(video voice data information bit$1)same(low high delay late$3)same((error data bit loss)near3 rate)	US-PGPUB; USPAT	OR	ON	2015/01/23 10:26
S107	368	(packet block frame set group)near3(second$3 next another other)with(stor$3 retain$3 accumulat$3)with(buffer memory storage)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:33
S108	79	(packet block frame set group)near3(second$3 next another other)with(stor$3 retain$3 accumulat$3)with(buffer memory storage)near2(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:34
S109	1	(packet block frame set	US-PGPUB;	OR	ON	2015/01/23

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 671 of 739

		group)near3((second$3 next another other)near2 type)with(stor$3 retain$3 accumulat$3)with(buffer memory storage)near2(retransmi$5 re-transmi$5 resend$3 re-send$3)	USPAT			14:34
S110	232	(head$3 field portion sector)with(packet block frame set group)near3(second$3 next another other)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:39
S111	93	(head$3 field portion sector)near3(packet block frame set group)near3(second$3 next another other)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:50
S112	16	(head$3 field portion sector)with(packet block frame set group)near3((second$3 next another other)near2 type)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 14:52
S113	22	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(identif$7 indicat$3 determin$3)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/23 15:07
S114	44	(head$3 field portion sector)and(packet block frame set group payload stream)and(second$3 next another other type)and(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:10
S115	41	(head$3 field portion sector)and(packet block frame set group payload stream)and(second$3 next another other type)same(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:11
S116	40	(head$3 field portion sector)and(packet block frame set group payload stream)same(second$3 next another other type)same(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:11
S117	38	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:11
S118	33	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(identif$7 indicat$3 determin$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/23 15:11
S119	107	(head$3 field portion sector)and(packet block frame set group payload	USOCR; FPRS;	OR	ON	2015/01/23 15:15

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 672 of 739

		stream)and((second$3 next another other)near2 type)and(identif$7 indicat$3 determin$3)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	DERWENT; IBM_TDB			
S120	10	(head$3 field portion sector)same(packet block frame set group payload stream)same((second$3 next another other)near2 type)same(identif$7 indicat$3 determin$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	USOCR; FPRS; DERWENT; IBM_TDB	OR	ON	2015/01/23 15:15
S121	57	(head$3 field portion sector)same(packet block frame set group payload stream)same((second$3 next another other)near2 type)same(count$3 identif$7 indicat$3 determin$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:11
S122	27	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$3)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:33
S123	2718	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:33
S124	58403	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S125	23	S123 with S124	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S126	25	S123 same S124	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S127	198	S123 and S124	US-PGPUB; USPAT	OR	ON	2015/01/26 12:35
S128	25	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)same(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$4)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:42
S129	27	(retransmi$5 re-transmi$5 resend$3 re-send$3)same(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$4)	US-PGPUB; USPAT	OR	ON	2015/01/26 12:43
S130	77	(retransmi$5 re-transmi$5 resend$3 re-send$3)same2(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other two)near2 type)with(count$3 identif$7 indicat$3	US-PGPUB; USPAT	OR	ON	2015/01/26 12:46

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 673 of 739

		determin$3 control$4)				
S131	98	(head$3 field portion sector)near2(packet block frame set group payload stream)near2((second$3 next another other)near2 type)near2(count$3 identif$7 indicat$3 determin$3 control$4)	US-PGPUB; USPAT	OR	ON	2015/01/26 13:22
S132	24	S124 and S131	US-PGPUB; USPAT	OR	ON	2015/01/26 13:24
S133	1	(head$3 field portion sector)near2(packet block frame set group payload stream)near2((second$3 next another other)near2 type)near2(count$3 identif$7 indicat$3 determin$3 control$4)	EPO; JPO	OR	ON	2015/01/26 13:32
S134	76	(head$3 field portion sector)and(packet block frame set group payload stream)and(second$3 next another other type)and(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:33
S135	74	(head$3 field portion sector)same(packet block frame set group payload stream)and(second$3 next another other type)and(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S136	68	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)and(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S137	61	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(count$3 identif$7 indicat$3 determin$3 control$4)and(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S138	52	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other type)same(count$3 identif$7 indicat$3 determin$3 control$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S139	44	(head$3 field portion sector)same(packet block frame set group payload stream)same(second$3 next another other)same(count$3 identif$7 indicat$3 determin$3 control$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	EPO; JPO	OR	ON	2015/01/26 13:34
S140	28	(head$3 field portion sector)near2(packet block frame set group payload stream)near2(second$3	US-PGPUB; USPAT	OR	ON	2015/01/26 13:39

		next another other)near2(count$3 identif$7 indicat$3 determin$3 control$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)				
S141	73	(head$3 field portion sector)near2(packet block frame set group payload stream)near2(second$3 next another other)near2(count$3 identif$7 indicat$3 determin$3 control$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:03
S142	17	(head$3 field portion sector)near2(packet block frame set group payload stream)near2(second$3 next another other)near2((count$3 identif$7 indicat$3 determin$3 control$4)near2 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:08
S143	42	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(head$3 field portion sector)with(packet block frame set group payload stream)with(second$3 next another other)with(count$3 identif$7 indicat$3 determin$3 control$4)with(exclude$3 or separate$3 or avoid$3 or discard$3 or remov$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:22
S144	20	(retransmi$5 re-transmi$5 resend$3 re-send$3)with(head$3 field portion sector)with(packet block frame set group payload stream)with(second$3 next another other)with(count$3 identif$7 indicat$3 determin$3 control$4)with(exclud$3 or avoid$3 or discard$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 14:35
S145	11551	370/389.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/26 16:08
S146	2182	370/394.ccls.	US-PGPUB; USPAT	OR	ON	2015/01/26 16:08
S147	23	(head$3 field portion sector)with(packet block frame set group payload stream)with((second$3 next another other)near2 type)with(count$3 identif$7 indicat$3 determin$3 control$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/26 16:10
S148	4	S145 and S147	US-PGPUB; USPAT	OR	ON	2015/01/26 16:10
S149	1	S146 and S147	US-PGPUB; USPAT	OR	ON	2015/01/26 16:10
S150	33	("5524116" | "5663910" | "5898698" | "5983382" | "6098188" | "6775320" | "6778589" | "6337877" | "6496481" | "6707822" | "6778596" | "6826589" | "7200792" | "7164654" | "7174493" | "7519124" | "7600172" | "7657818" | "7764595" | "7782758" | "7831890" | "7844882" | "7836381" | "8074138" | "8149904" | "8276048" | "8335956" | "8407546" | "8468411" | "8495473" |	US-PGPUB; USPAT	OR	ON	2015/01/26 18:15

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 675 of 739

		"8595577" | "8607126" | "8645784" | " 2001/0014962").PN.				
S151	13	("20020087710" | " 20020126675 " | "20020154600 " | "20030067877 " | "200310076870" | " 20040114536 " | "2004/0148552" | " 20040196786 " | "20040203455" | " 20050180323" | " 20060092871 " | "200610236045 " | "20070198898" | " 20070263528 " | "20080212582 " | "20100061376").PN.	US-PGPUB; USPAT	OR	ON	2015/01/26 18:15
S152	46	S150 or S151	US-PGPUB; USPAT	OR	ON	2015/01/26 18:15
S153	28	S152 and (retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/26 18:16
S154	33	("5524116" | "5663910" | "5898698" | "5983382" | "6098188" | "6775320" | "6778589" | "6337877" | "6496481" | "6707822" | "6778596" | "6826589" | "7200792" | "7164654" | "7174493" | "7519124" | "7600172" | "7657818" | "7764595" | "7782758" | "7831890" | "7844882" | "7836381" | "8074138" | "8149904" | "8276048" | "8335956" | "8407546" | "8468411" | "8495473" | "8595577" | "8607126" | "8645784" | " 2001/0014962").PN.	US-PGPUB; USPAT	OR	ON	2015/01/27 10:45
S155	13	("20020087710" | " 20020126675 " | "20020154600 " | "20030067877 " | "200310076870" | " 20040114536 " | "2004/0148552" | " 20040196786 " | "20040203455" | " 20050180323" | " 20060092871 " | "200610236045 " | "20070198898" | " 20070263528 " | "20080212582 " | "20100061376").PN.	US-PGPUB; USPAT	OR	ON	2015/01/27 10:45
S156	46	S154 or S155	US-PGPUB; USPAT	OR	ON	2015/01/27 10:45
S157	28	S156 and (count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)same(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/27 10:46
S158	23	S156 and (count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)with(packet block frame set group payload stream)	US-PGPUB; USPAT	OR	ON	2015/01/27 10:47
S159	10	S156 and (count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)same(packet block frame set group payload stream)same (quality near2 service QoS)	US-PGPUB; USPAT	OR	ON	2015/01/27 10:59
S160	46	("8850089" "4792753" "4807224" "4905225" "4914653" "4970714" "5339313" "5404353" "5430738" "5555266" "5664091" "5875292"	US-PGPUB; USPAT	OR	ON	2015/01/27 14:01

		"5905720" "6072726" "6073180" "6172983" "6278718" "6416471" "6493318" "6701370" "6728878" "6741554" "6763030" "6772375" "6788704" "7149192" "7277390" "7296204" "7346701" "7376426" "7412338" "7450599" "7596091" "7693070" "7701846" "7787368" "7821933" "7849208" "7885264" "7969901" "8023417" "8077601" "7885264" "7969901" "8023417" "8077601" "8151155" "8156407" "8228917" "8291034").pn.				
S161	42	("4766591" "5444856" "5727149" RE36182 "6005851" "6021177" "6185427" "6278921" "6438585" "6477595" "6556582" "6701151" "6765891" "7058387" "7068610" "7099339" "7103313" "7116640" "7221268" "7260399" "7293289" "7328036" "7356614" "7395347" "7403514" "7593428" "7609747" "7639641" "7686520" "7734253" "7839824" "7945206" "8013732" "8024481" "8040917" "8045501" "8060419" "8060681" "8077702" "7945206" "8013732" "8024481" "8040917" "8045501" "8060419" "8060681" "8077702" "8149783" "8160000" "8228924").pn.	US-PGPUB; USPAT	OR	ON	2015/01/27 14:01
S162	8	S160 and (head$3 field portion sector)with(packet block frame set group payload stream)with(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:02
S163	0	S161 and (head$3 field portion sector)with(packet block frame set group payload stream)with(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:02
S164	2	S161 and (head$3 field portion sector)same(packet block frame set group payload stream)same(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:04
S165	49	("5844918" "4799215" "5875292" "4412326" "4551834" "4617657" "4888767" "4989204" "5222061" "5235599" "5267237" "5444718" "5610595" "5740167" "5754754" "5828293" "6161207" "6181700" "6219713" "6219713" "6453438" "6483845" "6587985" "6684354" "6732313" "6785259" "6891799" "6914903" "6918077" "6987730" "7088701" "7099300" "7124333" "7263644" "7356750" "7386872" "7397861" "7400616" "7447969" "7477621" "7484157" "7486700"	US-PGPUB; USPAT	OR	ON	2015/01/27 14:48

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 677 of 739

		"7535840" "7583701" "7633880" "7689644" "7701846" "7710889" "7769014" "7823039").pn.				
S166	28	S165 and (head$3 field portion sector)same(packet block frame set group payload stream)same(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)same(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:48
S167	19	S165 and (head$3 field portion sector)with(packet block frame set group payload stream)with(count$3 identif$7 indicat$3 determin$3 control$4 sequen$4)with(retransmi$5 re-transmi$5 resend$3 re-send$3)	US-PGPUB; USPAT	OR	ON	2015/01/27 14:49
S168	7	"18337261".FMID.	US-PGPUB; USPAT; FPRS	OR	OFF	2015/01/27 15:04
S169	145	(transmi$5 transceiv$3)with(two type different second$3)near(packet block group set package chunk)with((identif$7 indicat$3 determin$3)near header)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:08
S170	533	(transmi$5 transceiv$3)with(two type different second$3)with(packet block group set package chunk)with((identif$7 indicat$3 determin$3)near header)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:09
S171	135339	(Quality near2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:12
S172	1669	((packet adj error adj rate PER)near2 low$3)and((delay late$3)near2 low$3)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:14
S173	0	S170 and S172	US-PGPUB; USPAT	OR	ON	2015/06/03 19:14
S174	396	S171 and S172	US-PGPUB; USPAT	OR	ON	2015/06/03 19:14
S175	7346	(transmi$5 transceiv$3)same(two type different second$3)same(packet block group set package chunk frame)same((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/03 19:17
S176	8	S174 and S175	US-PGPUB; USPAT	OR	ON	2015/06/03 19:17
S177	478	(transmi$5 send$3)near2(two type different second$3)near2(packet block group set package chunk frame)same((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:15
S178	28	(transmi$5 send$3)near2(two type different second$3)near2(packet block group set package chunk frame)near2((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:15
S179	12	("20020154600" | "6754188" | "7483421" | "6005851" | "20040179494" | "20070206621" | "7031259" | "20050036497" | "20020126675" | "20090319854" | "20030009717" | "7826438").PN.	US-PGPUB; USPAT	OR	OFF	2015/06/04 11:16

S180	0	S177 and S179	US-PGPUB; USPAT	OR	ON	2015/06/04 11:17
S181	3	S179 and (transmi$5 send$3)same(two type different second$3)same(packet block group set package chunk frame)same((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:17
S182	63	(Quality near2 Service QOS)same((packet adj error adj rate PER)near2 low$3)and((delay late$3)near2 low$3)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:38
S183	1507	(transmi$5 send$3)with(two type different second$3)with(packet block group set package chunk frame)with((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:38
S184	1	S182 and S183	US-PGPUB; USPAT	OR	ON	2015/06/04 11:39
S185	43	S183 same(Quality near2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/06/04 11:39
S186	24	(transmi$5 send$3)with(two type different second$3)with(packet block group set package chunk frame)with(Quality near2 Service QOS)with((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:00
S187	44	(Quality near2 Service QOS)same((packet adj2 error adj2 rate PER)near2 low$3)same((delay late$3)near2 low$3)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:18
S188	26	((Quality near2 Service QOS)near2 level)same((packet adj2 error adj2 rate PER)near low$3)same((delay late$3)near low$3)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:35
S189	44	((Quality near2 Service QOS)near2 level)and((packet adj2 error adj2 rate PER)near low$3)and((delay late$3)near low$3)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:36
S190	6709	(transmi$5 send$3)with(packet block group set package chunk frame)with((identif$7 indicat$3 determin$3)near2 header)	US-PGPUB; USPAT	OR	ON	2015/06/04 12:36
S191	2	S189 and S190	US-PGPUB; USPAT	OR	ON	2015/06/04 12:37
S192	106584	((transmi$5 send$3 retransmi$5 re-transmi$5 resend$3 re-send$)near2 transceiver)	US-PGPUB; USPAT	OR	ON	2015/12/18 10:31
S193	436	(Quality adj2 Service QOS)and((packet adj2 error adj2 rate PER)near2 low$3)and((delay late$3)near2 low$3)	US-PGPUB; USPAT	OR	ON	2015/12/18 10:38
S195	16748	(header field portion sector)near3((packet block frame set group payload stream)near3 type)with(identif$7 indicat$3 determin$3 control$3)	US-PGPUB; USPAT	OR	ON	2015/12/18 10:44
S197	1058	S192 and S195	US-PGPUB; USPAT	OR	OFF	2015/12/18 10:45
S199	13	S193 and S197	US-PGPUB;	OR	OFF	2015/12/18

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 679 of 739

			USPAT			10:56
S200	37	S192 same S195	US-PGPUB; USPAT	OR	OFF	2015/12/18 10:57
S207	383	(identifier indicator)with(((packet block frame set group payload stream chunk)near2 secon$3)near2 type)	US-PGPUB; USPAT	OR	ON	2015/12/18 11:23
S208	38	S192 and S207	US-PGPUB; USPAT	OR	ON	2015/12/18 11:24
S209	1669	(classifi$6 identif$7 indicat$3 determin$3 control$3)near3(((packet block frame set group payload stream chunk)near2 secon$3)near2 type)	US-PGPUB; USPAT	OR	ON	2015/12/18 11:27
S210	2	S192 same S207	US-PGPUB; USPAT	OR	ON	2015/12/18 11:28
S211	135774	(Quality adj2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/12/18 11:29
S212	67	S192 and S209	US-PGPUB; USPAT	OR	ON	2015/12/18 11:29
S213	15	S211 and S212	US-PGPUB; USPAT	OR	ON	2015/12/18 11:29
S216	10143	S192 and S211	US-PGPUB; USPAT	OR	ON	2015/12/18 11:39
S218	567	(classifi$6 identif$7 indicat$3 determin$3 control$3 "sequence identifier")with(((packet block frame set group payload stream chunk)near2 secon$3)near2 type)with(header field portion sector)	US-PGPUB; USPAT	OR	ON	2015/12/18 11:44
S219	27	S216 and S218	US-PGPUB; USPAT	OR	ON	2015/12/18 11:44
S220	2606	714/748.ccls.	US-PGPUB; USPAT	OR	ON	2015/12/18 11:53
S221	15	S218 and S220	US-PGPUB; USPAT	OR	ON	2015/12/18 11:53
S222	1330	H04L1/1809.cpc.	US-PGPUB; USPAT	OR	ON	2015/12/18 11:55
S223	3711	H04L1/1812.cpc.	US-PGPUB; USPAT	OR	ON	2015/12/18 11:55
S224	2686	H04L1/1887.cpc.	US-PGPUB; USPAT	OR	ON	2015/12/18 11:55
S225	1766	H04L1/1819.cpc.	US-PGPUB; USPAT	OR	ON	2015/12/18 11:56
S226	2331	H04L2001/0093.cpc.	US-PGPUB; USPAT	OR	ON	2015/12/18 11:56
S227	17	S218 and S222	US-PGPUB; USPAT	OR	ON	2015/12/18 11:56
S228	3	S218 and S223	US-PGPUB; USPAT	OR	ON	2015/12/18 11:56
S229	5	S218 and S224	US-PGPUB; USPAT	OR	ON	2015/12/18 11:56
S230	2	S218 and S225	US-PGPUB; USPAT	OR	ON	2015/12/18 11:56
S231	4	S218 and S226	US-PGPUB; USPAT	OR	ON	2015/12/18 11:57
S232	4	(classifi$6 identif$7 indicat$3	EPO; JPO	OR	ON	2015/12/18

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 680 of 739

		determin$3 control$3 "sequence identifier")with(((packet block frame set group payload stream chunk)near2 secon$3)near2 type)with(header field portion sector)				11:59
S233	47	(classifi$6 identif$7 indicat$3 determin$3 control$3 "sequence identifier")with(((packet block frame set group payload stream chunk)near2 secon$3)near2 type)with(header field portion sector)	USOCR; FPRS; DERWENT; IBM_TDB	OR	ON	2015/12/18 12:00
S234	572	((delay late$3)near2 low$3)near3(packet block frame set group payload stream chunk)with(header field portion sector)	US-PGPUB; USPAT	OR	ON	2015/12/18 16:07
S235	106584	((transmi$5 send$3 retransmi$5 re-transmi$5 resend$3 re-send$)near2 transceiver)	US-PGPUB; USPAT	OR	ON	2015/12/18 16:07
S236	135774	(Quality adj2 Service QOS)	US-PGPUB; USPAT	OR	ON	2015/12/18 16:08
S237	20	S234 and S235 and S236	US-PGPUB; USPAT	OR	ON	2015/12/18 16:08
S238	125	(Quality adj2 Service QOS)and((delay late$3)near2 low$3)with(packet block frame set group payload stream chunk)near2(head$3 field portion sector)	US-PGPUB; USPAT	OR	ON	2015/12/18 17:49
S239	24	S235 and S238	US-PGPUB; USPAT	OR	ON	2015/12/18 17:50
S240	37	(packet block frame set group payload stream chunk)with(exclud$3 "not includ$3")near2((classifi$6 identif$7 indicat$3 determin$3 control$3 "sequence identifier")near2 head$3)	US-PGPUB; USPAT	OR	ON	2015/12/18 20:14
S241	147	(packet block frame set group payload stream chunk)with(except exclud$3 "not includ$3")near2((classifi$6 identif$7 indicat$3 determin$3 control$3 "sequence identifier")near3 head$3)	US-PGPUB; USPAT	OR	ON	2015/12/18 20:42
S242	9	S235 and S241	US-PGPUB; USPAT	OR	ON	2015/12/18 20:42
S243	0	S238 and S241	US-PGPUB; USPAT	OR	ON	2015/12/18 20:42
S244	16	("20020154600" | "6754188" | "7483421" | "20050068916" | "20060089833" | "6266337" | "6005851" | "20050068916" | "20020154600" | "7031259" | "7826438" | "20040179494" | "20070206621" | "20070206621" | "20040109455" | "7031259" | "20050036497" | "20020126675" | "20040179494" | "6005851" | "20020126675" | "20090319854" | "20030009717" | "20040109455" | "6754188" | "7483421" | "7826438").PN.	US-PGPUB; USPAT	OR	OFF	2015/12/18 22:07
S245	5482	((packet block frame set group payload	US-PGPUB;	OR	ON	2016/07/21

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 681 of 739

		stream chunk)near2 header)with((identifier identif$7 number "ID")near3 sequence)	USPAT			15:12
S246	228	(first with second$3)with((packet block frame set group payload stream chunk)near2 header)with((identifier identif$7 number "ID")near3 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/21 15:13
S247	25886	(retransmi$5 resend$3)and(Quality adj2 Service QOS)	US-PGPUB; USPAT	OR	ON	2016/07/21 15:16
S248	38	S247 and S246	US-PGPUB; USPAT	OR	ON	2016/07/21 15:16
S249	18	(first with second$3)with((packet block frame set group payload stream chunk)near2 type)same(((identifier identif$7 number "ID")near3 sequence)near5 header)	US-PGPUB; USPAT	OR	ON	2016/07/21 15:24
S250	177	(((packet block frame set group payload stream chunk)near2 second$3)near5 header)with((identifier identif$7 number "ID")near3 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/21 16:15
S251	40	S247 and S250	US-PGPUB; USPAT	OR	ON	2016/07/21 16:19
S252	6	((((packet block frame set group payload stream chunk)near2 second$3)near type)near3 header)with((identifier identif$7 number "ID")near2 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/21 17:48
S253	12	((((packet block frame set group payload stream chunk)near2 second$3)near type)near3 header)same((identifier identif$7 number "ID")near2 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/21 17:49
S254	0	((((packet block frame set group payload stream chunk)near2 second$3)near type)near3 header)and((identifier identif$7 number "ID")near2 sequence)	EPO	OR	ON	2016/07/21 17:50
S255	1	(((packet block frame set group payload stream chunk)near2 second$3)near3 header)and((identifier identif$7 number "ID")near2 sequence)	EPO; JPO	OR	ON	2016/07/21 17:51
S256	1	(((packet block frame set group payload stream chunk)near2 second$3)near3 header)and((flow identifier identif$7 number "ID")near2 sequence)	EPO; JPO	OR	ON	2016/07/21 17:51
S257	353	(second$3 next other another)near3((packet block frame set group payload stream chunk)near5 header)with((number identifier identif$7 "ID")near2 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/21 18:32
S258	57	S247 and S257	US-PGPUB; USPAT	OR	ON	2016/07/21 18:33
S259	14	(second$3 next other another)near3(((packet block frame set group payload stream chunk)near3 type)near5 header)with((number identifier identif$7 "ID")near2 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/21 18:43

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 682 of 739

S260	12	714/748.ccls.and(retransmi$5 resend$3)same((first original primary)with(second$3 next other another))with((packet block frame set group payload stream chunk)near5 header)same((flow identifier identif$7 number "ID")near5 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/21 20:16
S261	2	714/748.ccls.and((first original primary)with(second$3 next other another))with(((packet block frame set group payload stream chunk)near5 type)near5 header)same((flow identifier identif$7 number "ID")near5 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/21 20:18
S262	3	714/$.ccls.and((first original primary)with(second$3 next other another))with(((packet block frame set group payload stream chunk)near5 type)near5 header)same((flow identifier identif$7 number "ID")near5 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/21 20:19
S283	1914	714/776.ccls.	US-PGPUB; USPAT	OR	OFF	2016/07/22 12:09
S284	2627	714/748.ccls.	US-PGPUB; USPAT	OR	OFF	2016/07/22 12:10
S285	1007	714/749.ccls.	US-PGPUB; USPAT	OR	OFF	2016/07/22 12:10
S286	357	714/750.ccls.	US-PGPUB; USPAT	OR	OFF	2016/07/22 12:10
S287	753	714/751.ccls.	US-PGPUB; USPAT	OR	OFF	2016/07/22 12:10
S288	11931	370/389.ccls.	US-PGPUB; USPAT	OR	OFF	2016/07/22 12:11
S289	4160	370/390.ccls.	US-PGPUB; USPAT	OR	OFF	2016/07/22 12:11
S290	291	370/391.ccls.	US-PGPUB; USPAT	OR	OFF	2016/07/22 12:11
S291	10669	370/392.ccls.	US-PGPUB; USPAT	OR	OFF	2016/07/22 12:11
S292	558	((first original primary)and(second$3 next other another))with((packet block frame set group payload stream chunk)near5 header)with((flow identifier identif$7 number "ID")near5 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/22 12:13
S293	13	S292 and S283	US-PGPUB; USPAT	OR	OFF	2016/07/22 12:13
S294	23	S292 and S284	US-PGPUB; USPAT	OR	OFF	2016/07/22 12:13
S295	6	S292 and S285	US-PGPUB; USPAT	OR	OFF	2016/07/22 12:13
S296	1	S292 and S286	US-PGPUB; USPAT	OR	OFF	2016/07/22 12:13
S297	4	S292 and S287	US-PGPUB; USPAT	OR	OFF	2016/07/22 12:13
S298	51	S292 and S288	US-PGPUB; USPAT	OR	OFF	2016/07/22 12:13

S299	8	S292 and S289	US-PGPUB; USPAT	OR	OFF	2016/07/22 12:13
S300	0	S292 and S290	US-PGPUB; USPAT	OR	OFF	2016/07/22 12:14
S301	50	S292 and S291	US-PGPUB; USPAT	OR	OFF	2016/07/22 12:14
S302	53	(second$3 next other another)with((packet block frame set group payload stream chunk)near5 header)with(exclude$3 skip$3 omit$4 without eleminat$3 ((includ$3 compris$3 contain$3 consist$3)near1 "not"))with((flow identifier identif$7 number "ID")near5 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/22 12:28
S303	31	(Quality adj2 Service QOS)and(second$3 next other another)with((packet block frame set group payload stream chunk)near5 header)with(exclude$3 skip$3 omit$4 without eleminat$3 ((includ$3 compris$3 contain$3 consist$3)near1 "not"))with((identifier identif$7 number "ID")near5 sequence)	US-PGPUB; USPAT	OR	ON	2016/07/22 12:34
S304	0	"1020087024792"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/09/26 16:33
S305	6	"10-2008-7024792"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/09/26 16:34

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S263	1	(retransmi$5 resend$3)with(first with second$3)with(((packet block frame set group payload stream chunk)near2 type)near3 header)with((identifier identif$7 number "ID")near3 sequence).clm.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:06
S264	1	(retransmi$5 resend$3)with(first with second$3)with(((packet block frame set group payload stream chunk)near5 type)near5 header)with((identifier identif$7 number "ID")near5 sequence).clm.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:07
S265	1	(retransmi$5 resend$3)same(first with second$3)with(((packet block frame set group payload stream chunk)near5 type)near5 header)with((identifier identif$7 number "ID")near5 sequence).clm.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:07
S266	17	(retransmi$5 resend$3)same((first original primary)with(second$3 next other another))with((packet block frame set group	US-PGPUB; USPAT	OR	ON	2016/07/21 20:10

		payload stream chunk)near5 header)same((flow identifier identif$7 number "ID")near5 sequence).clm.				
S267	2627	714/748.ccls.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:10
S268	1914	714/776.ccls.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:11
S269	1007	714/749.ccls.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:11
S270	1369	H04L1/1809.cpc.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:11
S271	4286	H04L1/1812.cpc.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:11
S272	2957	H04L1/1887.cpc.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:11
S273	1873	H04L1/1819.cpc.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12
S274	2462	H04L2001/0093.cpc.	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12
S275	3	S266 and S267	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12
S276	0	S266 and S268	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12
S277	2	S266 and S269	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12
S278	9	S266 and S270	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12
S279	1	S266 and S271	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12
S280	5	S266 and S272	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12
S281	1	S266 and S273	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12
S282	1	S266 and S274	US-PGPUB; USPAT	OR	ON	2016/07/21 20:12

9/26/2016 5:20:49 PM
C:\Users\oalshack\Documents\EAST\Workspaces\14159125.wsp

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	1	of	2	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	1	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed on June 27, 2016; Docket Nos., 229;** (2 pages)
	2	Documents filed with District Court Proceedings for TQ DELTA, LLC v. 2WIRE, INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01835-RGA; **Includes documents filed on August 2 - Sept. 14, 2016; Docket Nos., 230-236;** (58 pages)
	3	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed on June 27, 2016; Docket Nos., 216;** (2 pages)
	4	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed from August 2 - August 23, 2016; Docket Nos., 217-219;** (9 pages)
	5	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZHONE TECHNOLOGIES INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-01836-RGA; **Includes documents filed from September 16, 2016; Docket Nos., 220;** (2 pages)
	6	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed on June 27, 2016; Docket Nos. 235;** (2 pages)

Examiner Signature	/Osman Alshack/	Date Considered	09/26/2016

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	2	of	2	Attorney Docket Number	6936-57-PUS-CON-3

	7	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ZYXEL COMMUNICATIONS INC. et al.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:13-cv-02013- RGA; **Includes documents filed from August 2, 2016 - September 1, 2016; Docket Nos. 236-239;** (11 pages)
	8	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ADTRAN INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA; **Includes documents filed on June 27, 2016; Docket Nos., 82;** (2 pages)
	9	Documents filed with District Court Proceedings for TQ DELTA, LLC v. ADTRAN INC.; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:14-cv-00954-RGA; **Includes documents filed from Aug. 2 - Sept. 1, 2016; Docket Nos., 83-86;** (11 pages)
	10	Documents filed with District Court Proceedings for ADTRAN INC. v. TQ DELTA, LLC; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:15-cv-00121-RGA; **Includes documents filed on June 27, 2016; Docket Nos., 87;** (2 pages)
	11	Documents filed with District Court Proceedings for ADTRAN INC. v. TQ DELTA, LLC; U.S. District Court, for the District of Delaware (Wilmington); Civil Action No. 1:15-cv-00121-RGA; **Includes documents filed from Aug. 2 - Sept. 1, 2016; Docket Nos., 88-91;** (11 pages)

Examiner Signature	/Osman Alshack/	Date Considered	09/26/2016

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	**Art Unit**
	OSMAN M ALSHACK	2112

CPC						
Symbol					**Type**	**Version**
H04L		1	/	0041	F	2013-01-01
H04L		45	/	00	I	2013-01-01
H03M		13	/	09	I	2013-01-01
H03M		13	/	00	I	2013-01-01
H03M		13	/	2707	I	2013-01-01
H03M		13	/	6513	I	2013-01-01
H03M		13	/	091	I	2013-01-01
H04L		12	/	5601	I	2013-01-01
H04L		47	/	10	I	2013-01-01
H04L		47	/	2433	I	2013-01-01
H04L		47	/	2441	I	2013-01-01
H04L		47	/	32	I	2013-01-01
H04L		2012	/	5647	A	2013-01-01
H04L		1	/	1835	I	2013-01-01
H04L		1	/	1874	I	2013-01-01
H04L		1	/	1809	I	2013-01-01
H04L		45	/	72	I	2013-01-01
H04L		69	/	324	I	2013-01-01
H04L		1	/	0045	I	2013-01-01
H04L		1	/	0057	I	2013-01-01
H04L		1	/	08	I	2013-01-01
H04L		1	/	1607	I	2013-01-01
H04L		49	/	552	I	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
			/					
			/					

/OSMAN M ALSHACK/ Examiner.Art Unit 2112	09/26/2016	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	20	
/ALBERT DECADY/ Supervisory Patent Examiner.Art Unit 2112	09/28/2016	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	**Art Unit**
	OSMAN M ALSHACK	2112

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION										
CLASS	SUBCLASS	CLAIMED					NON-CLAIMED					
		H	0	4	L	1 / 18 (2006.01.01)						
CROSS REFERENCE(S)												
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)											

/OSMAN M ALSHACK/ Examiner.Art Unit 2112	09/26/2016	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	20	
/ALBERT DECADY/ Supervisory Patent Examiner.Art Unit 2112	09/28/2016	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	**Art Unit**
	OSMAN M ALSHACK	2112

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		19		37		55		73		91	4	109		
	2		20		38		56		74		92	5	110		
	3		21		39		57		75		93	6	111		
	4		22		40		58		76		94	7	112		
	5		23		41		59		77		95	8	113		
	6		24		42		60		78		96	9	114		
	7		25		43		61		79		97	10	115		
	8		26		44		62		80		98	11	116		
	9		27		45		63		81		99	12	117		
	10		28		46		64		82		100	13	118		
	11		29		47		65		83		101	14	119		
	12		30		48		66		84		102	15	120		
	13		31		49		67		85		103	16	121		
	14		32		50		68		86		104	17	122		
	15		33		51		69		87		105	18	123		
	16		34		52		70		88	1	106	19	124		
	17		35		53		71		89	2	107	20	125		
	18		36		54		72		90	3	108				

/OSMAN M ALSHACK/ Examiner.Art Unit 2112	09/26/2016	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	20	
/ALBERT DECADY/ Supervisory Patent Examiner.Art Unit 2112	09/28/2016	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 691 of 739

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN ALSHACK	2112

CPC- SEARCHED		
Symbol	Date	Examiner
H04L 1/1809, H04L 1/1812, H04L 1/1887, H04L 1/1819	01/23/2015	O.A
H04L 2001/0093, H04L 45/302, H04L 47/6215	01/23/2015	O.A

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
714	748, 749, 776	01/23/2015	O.A

SEARCH NOTES		
Search Notes	Date	Examiner
East Inventor search	01/23/2015	O.A
East text search	01/23/2015	O.A
East text search updated	06/04/2015	O.A
East text search updated	12/18/2015	O.A
East text search updated	07/21/2016	O.A
East search updated	09/26/2016	O.A

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
US PGPUB East for claims search		07/21/2016	O.A
714	748,749, 776	07/21/2016	O.A
H04L	1/1809, 1/1812, 1/1819, 1/1887, 2001/0093	07/21/2016	O.A

/OSMAN M ALSHACk/ Examiner, Art Unit 2112	

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN M ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015	06/04/2015	12/18/2015	07/21/2016	09/26/2016				
	1	-	-	-	-	-				
	2	-	-	-	-	-				
	3	-	-	-	-	-				
	4	-	-	-	-	-				
	5	-	-	-	-	-				
	6	-	-	-	-	-				
	7	-	-	-	-	-				
	8	-	-	-	-	-				
	9	-	-	-	-	-				
	10	-	-	-	-	-				
	11	-	-	-	-	-				
	12	-	-	-	-	-				
	13	-	-	-	-	-				
	14	-	-	-	-	-				
	15	-	-	-	-	-				
	16	-	-	-	-	-				
	17	-	-	-	-	-				
	18	-	-	-	-	-				
	19	-	-	-	-	-				
	20	-	-	-	-	-				
	21	-	-	-	-	-				
	22	-	-	-	-	-				
	23	-	-	-	-	-				
	24	-	-	-	-	-				
	25	-	-	-	-	-				
	26	-	-	-	-	-				
	27	-	-	-	-	-				
	28	-	-	-	-	-				
	29	-	-	-	-	-				
	30	-	-	-	-	-				
	31	-	-	-	-	-				
	32	-	-	-	-	-				
	33	-	-	-	-	-				
	34	-	-	-	-	-				
	35	-	-	-	-	-				
	36	-	-	-	-	-				

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 693 of 739

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN M ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015	06/04/2015	12/18/2015	07/21/2016	09/26/2016				
	37	-	-	-	-	-				
	38	-	-	-	-	-				
	39	-	-	-	-	-				
	40	-	-	-	-	-				
	41	-	-	-	-	-				
	42	-	-	-	-	-				
	43	-	-	-	-	-				
	44	-	-	-	-	-				
	45	-	-	-	-	-				
	46	-	-	-	-	-				
	47	-	-	-	-	-				
	48	-	-	-	-	-				
	49	-	-	-	-	-				
	50	-	-	-	-	-				
	51	-	-	-	-	-				
	52	-	-	-	-	-				
	53	-	-	-	-	-				
	54	-	-	-	-	-				
	55	-	-	-	-	-				
	56	-	-	-	-	-				
	57	-	-	-	-	-				
	58	-	-	-	-	-				
	59	-	-	-	-	-				
	60	-	-	-	-	-				
	61	-	-	-	-	-				
	62	-	-	-	-	-				
	63	-	-	-	-	-				
	64	-	-	-	-	-				
	65	-	-	-	-	-				
	66	-	-	-	-	-				
	67	-	-	-	-	-				
	68	-	-	-	-	-				
	69	-	-	-	-	-				
	70	-	-	-	-	-				
	71	-	-	-	-	-				
	72	-	-	-	-	-				

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 694 of 739

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	Art Unit
	OSMAN M ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015	06/04/2015	12/18/2015	07/21/2016	09/26/2016				
	73	-	-	-	-	-				
	74	-	-	-	-	-				
	75	-	-	-	-	-				
	76	-	-	-	-	-				
	77	-	-	-	-	-				
	78	-	-	-	-	-				
	79	-	-	-	-	-				
	80	-	-	-	-	-				
	81	-	-	-	-	-				
	82	-	-	-	-	-				
	83	-	-	-	-	-				
	84	-	-	-	-	-				
	85	-	-	-	-	-				
	86	-	-	-	-	-				
	87	-	-	-	-	-				
	88	-	-	-	-	-				
	89	-	-	-	-	-				
	90	-	-	-	-	-				
	91	-	-	-	-	-				
	92	-	-	-	-	-				
	93	-	-	-	-	-				
	94	-	-	-	-	-				
	95	-	-	-	-	-				
	96	-	-	-	-	-				
	97	-	-	-	-	-				
	98	-	-	-	-	-				
	99	-	-	-	-	-				
	100	-	-	-	-	-				
	101	-	-	-	-	-				
	102	-	-	-	-	-				
	103	-	-	-	-	-				
	104	-	-	-	-	-				
	105	-	-	-	-	-				
1	106	✓	✓	✓	=	=				
2	107	✓	✓	✓	=	=				
3	108	✓	✓	✓	=	=				

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14159125	TZANNES, MARCOS C.
	Examiner	**Art Unit**
	OSMAN M ALSHACK	2112

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/23/2015	06/04/2015	12/18/2015	07/21/2016	09/26/2016				
4	109	✓	✓	✓	=	=				
5	110	✓	✓	✓	=	=				
6	111	✓	✓	✓	=	=				
7	112	✓	✓	✓	=	=				
8	113	✓	✓	✓	=	=				
9	114	✓	✓	✓	=	=				
10	115	✓	✓	✓	=	=				
11	116	✓	✓	✓	=	=				
12	117	✓	✓	✓	=	=				
13	118	✓	✓	✓	=	=				
14	119	✓	✓	✓	=	=				
15	120	✓	✓	✓	=	=				
16	121	✓	✓	✓	=	=				
17	122	✓	✓	✓	=	=				
18	123	✓	✓	✓	=	=				
19	124	✓	✓	✓	=	=				
20	125	✓	✓	✓	=	=				

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	14/159,125
				Filing Date	January 20, 2014
				First Named Inventor	Marcos C. Tzannes
				Art Unit	2112
				Examiner Name	ALSHACK, OSMAN M
Sheet	1	of	1	Attorney Docket Number	6936-57-PUS-CON-3

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	1	Official Action (including translation) for Korean Patent Application No. 10-2008-7024792 dated July 26, 2016 (Attorney Ref. No. 6936-57-PKR)

Examiner Signature	/Osman Alshack/	Date Considered	09/26/2016

*EXAMINER: Initial if reference is considered, whether or not citation is in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.A./

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/159,125	01/20/2014	Marcos C. Tzannes	6936-57-PUS-CON-3	3369

62574 7590 10/06/2016

Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

EXAMINER	
ALSHACK, OSMAN M	

ART UNIT	PAPER NUMBER
2112	

NOTIFICATION DATE	DELIVERY MODE
10/06/2016	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jvick@sheridanross.com

Corrected Notice of Allowability	**Application No.** 14/159,125	**Applicant(s)** TZANNES, MARCOS C.	
	Examiner OSMAN M. ALSHACk	**Art Unit** 2112	**AIA (First Inventor to File) Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *09/16/2016*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *106-125*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:
   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 09/16/2016
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☐ Examiner's Amendment/Comment
6. ☒ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/OSMAN M ALSHACk/ Examiner, Art Unit 2112	/ALBERT DECADY/ Supervisory Patent Examiner, Art Unit 2112

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 699 of 739

DETAILED ACTION

1. The present application is being examined under the pre-AIA first to invent provisions.

Status of Claims

2. Claims 106-125 are presented for examination. Claims 1-105 are cancelled.

Allowable Subject Matter

3. Claims 106-125 are allowed.

The documents listed in Form 1449 of IDS concurrently filed on 09/16/2016 were reviewed but found not to have anticipated or rendered obvious the claimed invention as allowed in the previous Notice of Allowance action filed on 08/01/2016.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to OSMAN ALSHACK whose telephone number is (571)272-2069. The examiner can normally be reached on MON-FRI 8:30 AM 5:00 PM EST, also please fax interview request to (571) 273- 2069. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ALBERT DECADY can be reached on 5712723819.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/OSMAN ALSHACK/

Patent Examiner, Art Unit 2112

/ALBERT DECADY/
Supervisory Patent Examiner, Art Unit 2112

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/159,125	11/01/2016	9485055	6936-57-PUS-CON-3	3369

62574 7590 10/12/2016

Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

TQ DELTA, LLC, Austin, TX;
Marcos C. Tzannes, Alamo, CA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT6478922

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	AMENDED AND RESTATED INTELLECTUAL PROPERTY SECURITY AGREEMENT

CONVEYING PARTY DATA

Name	Execution Date
TQ DELTA LLC	12/31/2020

RECEIVING PARTY DATA

Name:	ALTER DOMUS (US) LLC
Street Address:	225 W. WASHINGTON ST., 9TH FLOOR
City:	CHICAGO
State/Country:	ILLINOIS
Postal Code:	60606

PROPERTY NUMBERS Total: 227

Property Type	Number
Patent Number:	5497398
Patent Number:	5631610
Patent Number:	5636246
Patent Number:	5715280
Patent Number:	5751716
Patent Number:	5832030
Patent Number:	6445730
Patent Number:	6731695
Patent Number:	6748016
Patent Number:	6760373
Patent Number:	6801570
Patent Number:	6870888
Patent Number:	6961369
Patent Number:	7180938
Patent Number:	7292627
Patent Number:	7451379
Patent Number:	7453881
Patent Number:	7471721
Patent Number:	7558329
Patent Number:	7570686

Property Type	Number
Patent Number:	7636389
Patent Number:	7656976
Patent Number:	7697598
Patent Number:	7769104
Patent Number:	7796705
Patent Number:	7809028
Patent Number:	7831890
Patent Number:	7835430
Patent Number:	7836381
Patent Number:	7844882
Patent Number:	7889784
Patent Number:	7925958
Patent Number:	7978706
Patent Number:	7978753
Patent Number:	7979778
Patent Number:	8073041
Patent Number:	8090008
Patent Number:	8102909
Patent Number:	8218610
Patent Number:	8238412
Patent Number:	8276048
Patent Number:	8335271
Patent Number:	8335956
Patent Number:	8355427
Patent Number:	8374226
Patent Number:	8391191
Patent Number:	8407546
Patent Number:	8422511
Patent Number:	8432956
Patent Number:	8437382
Patent Number:	8462835
Patent Number:	8468411
Patent Number:	8495473
Patent Number:	8516337
Patent Number:	8594162
Patent Number:	8595577
Patent Number:	8607126
Patent Number:	8611404

Property Type	Number
Patent Number:	8625660
Patent Number:	8634449
Patent Number:	8645784
Patent Number:	8649305
Patent Number:	8718158
Patent Number:	8743931
Patent Number:	8743932
Patent Number:	8750352
Patent Number:	8782498
Patent Number:	8792574
Patent Number:	8793553
Patent Number:	8831031
Patent Number:	8837610
Patent Number:	8913649
Patent Number:	8929423
Patent Number:	8929470
Patent Number:	8937988
Patent Number:	8984366
Patent Number:	9014193
Patent Number:	9014243
Patent Number:	9065886
Patent Number:	9069718
Patent Number:	9094268
Patent Number:	9094348
Patent Number:	9154354
Patent Number:	9191039
Patent Number:	9264533
Patent Number:	9276612
Patent Number:	9286251
Patent Number:	9300324
Patent Number:	9300601
Patent Number:	9319512
Patent Number:	9479637
Patent Number:	9485055
Patent Number:	9485128
Patent Number:	9521003
Patent Number:	9547608
Patent Number:	9621198

Property Type	Number
Patent Number:	9749235
Patent Number:	9755876
Patent Number:	9838531
Patent Number:	9893921
Patent Number:	9894014
Patent Number:	9898220
Patent Number:	9973624
Patent Number:	10044473
Patent Number:	10049003
Patent Number:	10187240
Patent Number:	10264119
Patent Number:	10341261
Patent Number:	10346243
Patent Number:	10409510
Patent Number:	10419059
Patent Number:	10484140
Patent Number:	10498495
Patent Number:	10567112
Patent Number:	10579291
Patent Number:	10623559
Patent Number:	10708104
Patent Number:	10805040
Patent Number:	10833809
Application Number:	09768275
Application Number:	09836295
Application Number:	09882046
Application Number:	10175815
Application Number:	10202688
Application Number:	10597482
Application Number:	10631745
Application Number:	10743946
Application Number:	10778083
Application Number:	10802867
Application Number:	10834193
Application Number:	11058289
Application Number:	11090183
Application Number:	11140246
Application Number:	11200002

Property Type	Number
Application Number:	11242024
Application Number:	11289516
Application Number:	11430251
Application Number:	11434249
Application Number:	11616630
Application Number:	11748806
Application Number:	11972340
Application Number:	12383056
Application Number:	12478577
Application Number:	12615077
Application Number:	12640838
Application Number:	12783733
Application Number:	12783737
Application Number:	12783744
Application Number:	12783755
Application Number:	12783788
Application Number:	12783796
Application Number:	12783801
Application Number:	12783825
Application Number:	12783839
Application Number:	13330943
Application Number:	13467392
Application Number:	14285911
Application Number:	14485937
Application Number:	14577769
Application Number:	14724345
Application Number:	14757630
Application Number:	14865966
Application Number:	14932599
Application Number:	15054499
Application Number:	15077506
Application Number:	15084788
Application Number:	15180274
Application Number:	15298817
Application Number:	15304920
Application Number:	15479866
Application Number:	16428232
Application Number:	16544003

Property Type	Number
Application Number:	16561835
Application Number:	16569144
Application Number:	16781802
Application Number:	17027196
Application Number:	60072447
Application Number:	60090891
Application Number:	60109876
Application Number:	60144562
Application Number:	60164134
Application Number:	60172343
Application Number:	60174865
Application Number:	60177944
Application Number:	60197727
Application Number:	60212233
Application Number:	60224308
Application Number:	60241468
Application Number:	60241664
Application Number:	60278936
Application Number:	60283467
Application Number:	60287968
Application Number:	60293034
Application Number:	60309631
Application Number:	60327440
Application Number:	60400550
Application Number:	60549804
Application Number:	60555982
Application Number:	60613594
Application Number:	60618269
Application Number:	60619618
Application Number:	60792236
Application Number:	60849650
Application Number:	60989542
Application Number:	61011267
Application Number:	61183845
Application Number:	61985168
PCT Number:	US0019247
PCT Number:	US0030958
PCT Number:	US0100418

Property Type	Number
PCT Number:	US0102341
PCT Number:	US0112555
PCT Number:	US0132503
PCT Number:	US0141015
PCT Number:	US0209411
PCT Number:	US0224326
PCT Number:	US0231649
PCT Number:	US0323965
PCT Number:	US0533922
PCT Number:	US0536015
PCT Number:	US9406713
PCT Number:	US9515115
PCT Number:	US9708209
PCT Number:	US9708222
PCT Number:	US9708549
PCT Number:	US9708756
PCT Number:	US9914467

CORRESPONDENCE DATA

Fax Number: (202)887-4288

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 2028874000
Email: dlee@akingump.com
Correspondent Name: DAVID C. LEE
Address Line 1: 2001 K STREET N.W.
Address Line 2: AKIN GUMP STRAUSS HAUER & FELD LLP
Address Line 4: WASHINGTON, D.C. 20006

ATTORNEY DOCKET NUMBER:	697820.0023
NAME OF SUBMITTER:	DAVID C. LEE
SIGNATURE:	/David C. Lee/
DATE SIGNED:	01/04/2021
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 25
source=TQ Delta - A&R IP Security Agreement#page1.tif
source=TQ Delta - A&R IP Security Agreement#page2.tif
source=TQ Delta - A&R IP Security Agreement#page3.tif
source=TQ Delta - A&R IP Security Agreement#page4.tif
source=TQ Delta - A&R IP Security Agreement#page5.tif
source=TQ Delta - A&R IP Security Agreement#page6.tif

source=TQ Delta - A&R IP Security Agreement#page7.tif
source=TQ Delta - A&R IP Security Agreement#page8.tif
source=TQ Delta - A&R IP Security Agreement#page9.tif
source=TQ Delta - A&R IP Security Agreement#page10.tif
source=TQ Delta - A&R IP Security Agreement#page11.tif
source=TQ Delta - A&R IP Security Agreement#page12.tif
source=TQ Delta - A&R IP Security Agreement#page13.tif
source=TQ Delta - A&R IP Security Agreement#page14.tif
source=TQ Delta - A&R IP Security Agreement#page15.tif
source=TQ Delta - A&R IP Security Agreement#page16.tif
source=TQ Delta - A&R IP Security Agreement#page17.tif
source=TQ Delta - A&R IP Security Agreement#page18.tif
source=TQ Delta - A&R IP Security Agreement#page19.tif
source=TQ Delta - A&R IP Security Agreement#page20.tif
source=TQ Delta - A&R IP Security Agreement#page21.tif
source=TQ Delta - A&R IP Security Agreement#page22.tif
source=TQ Delta - A&R IP Security Agreement#page23.tif
source=TQ Delta - A&R IP Security Agreement#page24.tif
source=TQ Delta - A&R IP Security Agreement#page25.tif

AMENDED AND RESTATED INTELLECTUAL PROPERTY SECURITY AGREEMENT

This AMENDED AND RESTATED INTELLECTUAL PROPERTY SECURITY AGREEMENT (as amended, restated, amended and restated, supplemented or otherwise modified from time to time, the "**IP Security Agreement**"), dated as of December 31, 2020, is made by each undersigned grantor (each, a "**Grantor**", and, collectively, the "**Grantors**") in favor of ALTER DOMUS (US) LLC, a Delaware limited liability company, as collateral agent for its own benefit and the benefit of the Lenders (as defined in the Credit Agreement defined below) (in such capacity, together with its successor and assigns in such capacity, the "**Collateral Agent**"). Capitalized terms used herein and not otherwise defined herein shall have the meanings assigned to such terms in the Credit Agreement or the Security Agreement (as defined below), as applicable.

WHEREAS, the Borrower, ALTER DOMUS (US) LLC, as Administrative Agent (as defined therein), the Collateral Agent and the Lenders from time party thereto, are each party to that certain Amended and Restated Credit Agreement, dated as of December 31, 2020 (as amended, restated, amended and restated, supplemented or otherwise modified from time to time, the "**Credit Agreement**"), pursuant to which the Lenders have agreed, among other things, to continue the existing term loan and extend further credit to the Borrower in the form of delayed draw term loans upon the terms and subject to the conditions specified therein;

WHEREAS, in connection with the Credit Agreement, each Grantor has entered into the Amended and Restated Security Agreement, dated as of December 31, 2020 (as amended, restated, amended and restated, supplemented or otherwise modified from time to time, the "**Security Agreement**") in order to induce the Lenders to make and continue to make, as applicable, Loans; and

WHEREAS, under the terms of the Security Agreement, each Grantor has granted to the Collateral Agent, for the ratable benefit of the Credit Parties, a security interest in, among other property, certain intellectual property of such Grantor, and has agreed as a condition thereof to execute this IP Security Agreement for recording with the United States Patent and Trademark Office and the United States Copyright Office, as the case may be.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, each Grantor agrees as follows:

(a) Grant of Security Interest. As security for the prompt and complete payment or performance, as the case may be, in full of the Secured Obligations, each Grantor hereby grants to the Collateral Agent for itself and the ratable benefit of the Credit Parties, a security interest in all of its right, title and interest in and to all of the following personal property, whether now owned by or owing to or hereafter acquired by or arising in favor of such Grantor (collectively, the "**IP Collateral**"):

(i) all Trademark registrations and applications for Trademark registration in the United States Patent and Trademark Office listed on Schedule I hereto;

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 711 of 739

(ii) all issued Patents and pending Patent applications in the United States Patent and Trademark Office listed on Schedule II hereto;

(iii) all Copyright registrations and pending applications for Copyright registration in the United States Copyright Office listed on Schedule III; and

(iv) all Proceeds and products of any and all of the foregoing and all supporting obligations, collateral security and guarantees given by any Person with respect to any of the foregoing;

provided, however, that notwithstanding any of the other provisions herein (and notwithstanding any recording of the Collateral Agent's Lien made in the United States Patent and Trademark Office, United States Copyright Office, or other registry office in any other jurisdiction), this Short-Form IP Security Agreement shall not constitute a grant of a security interest in any Trademark applications filed in the United States Patent and Trademark Office on the basis of such Grantor's "intent-to-use" such trademark, unless and until acceptable evidence of use of the Trademark has been filed with and accepted by the United States Patent and Trademark Office pursuant to Section 1(c) or Section 1(d) of the Lanham Act (15 U.S.C. 1051, et seq.), to the extent that granting a lien in such Trademark application prior to such filing would adversely affect the enforceability or validity of such Trademark application.

(b) Security for Secured Obligations. The grant of a security interest in the IP Collateral by each Grantor under this IP Security Agreement secures the payment of all Secured Obligations of such Grantor now or hereafter existing under or in respect of the Loan Documents, whether direct or indirect, absolute or contingent, and whether for principal, reimbursement obligations, interest, premiums, penalties, fees, indemnifications, contract causes of action, costs, expenses or otherwise, subject to the terms and provisions thereof.

(c) Recordation. This IP Security Agreement has been executed and delivered by each Grantor for the purpose of recording the grant of security interest herein with the United States Patent and Trademark Office and the United States Copyright Office, as the case may be. Each Grantor authorizes and requests that the Register of Copyrights, the Commissioner for Patents and the Commissioner for Trademarks and any other applicable government officer record this IP Security Agreement.

(d) Execution in Counterparts. This IP Security Agreement may be executed in any number of counterparts, each of which when so executed shall be deemed to be an original and all of which taken together shall constitute one and the same agreement.

(e) Grants, Rights and Remedies. This IP Security Agreement has been entered into in conjunction with the provisions of the Security Agreement. The Grantor does hereby acknowledge and confirm that the grant of the security interest hereunder to, and the rights and remedies of, the Collateral Agent with respect to the Collateral are more fully set forth in the Security Agreement, the terms and provisions of which are incorporated herein by reference as if fully set forth herein. In the event of any conflict between the terms of this IP Security Agreement and the terms of the Security Agreement, the terms of the Security Agreement shall govern.

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 712 of 739

(f) Governing Law. THIS IP SECURITY AGREEMENT SHALL BE GOVERNED BY, AND CONSTRUED IN ACCORDANCE WITH, THE LAW OF THE STATE OF NEW YORK.

(g) General. Sections 10.04, 10.14(b) and 10.15 of the Credit Agreement are hereby incorporated by reference into this IP Security Agreement *mutatis mutandis* and shall apply hereto.

(h) Severability. In case any one or more of the provisions contained in this IP Security Agreement should be held invalid, illegal or unenforceable in any respect, the validity, legality and enforceability of the remaining provisions contained herein and in the Security Agreement shall not in any way be affected or impaired thereby (it being understood that the invalidity of a particular provision in a particular jurisdiction shall not in and of itself affect the validity of such provision in any other jurisdiction). The parties hereto shall endeavor in good-faith negotiations to replace the invalid, illegal or unenforceable provisions with valid provisions the economic effect of which comes as close as possible to that of the invalid, illegal or unenforceable provisions.

(i) Amendment and Restatement. This IP Security Agreement is an amendment and restatement but not a novation of that certain Intellectual Property Security Agreement, dated as of October 5, 2018, in favor of the Collateral Agent (as amended, modified or supplemented prior to the date hereof, the "**Original IP Security Agreement**"). All Liens and security interests securing payment of the Secured Obligations under the Original IP Security Agreement are hereby collectively, renewed, extended, ratified and brought forward as security for the payment and performance of the Secured Obligations. Each Grantor hereby (i) reaffirms each Lien, pledge and security interest granted to the Collateral Agent under or in connection with the Original IP Security Agreement, (ii) agrees that after giving effect to this IP Security Agreement such Liens, pledges and security interests shall continue in full force and effect, and (iii) agrees that such Liens, pledges and security interests continue to secure the full and prompt payment and performance of all of the Secured Obligations.

[Remainder of Page Intentionally Blank]

IPR2022-00833
CommScope, Inc. Exhibit 1002
Page 713 of 739

IN WITNESS WHEREOF, each Grantor has caused this IP Security Agreement to be duly executed and delivered by its officer thereunto duly authorized as of the date first above written.

TQ DELTA LLC, as Grantor

By: TQCAP GP, LLC, its manager

By: TECHQUITY CAPITAL MANAGEMENT, LLC, its sole member

By: _____
Name: Abha Divine
Title: Managing Director

ACCEPTED AND AGREED
as of the date first above written.

ALTER DOMUS (US) LLC,
as Collateral Agent

By: _____
Name: Jon Kirschmeier
Title: Associate Counsel

Schedule I

Trademarks

UNITED STATES TRADEMARKS:
Registrations / Applications:

OWNER	REGISTRATION/ APPLICATION NUMBER	TRADEMARK
TQ Delta LLC	5110447	TQ DELTA

Schedule II

Patents

(see attached)

TQ DELTA, LLC
Privileged and Confidential / Attorney Client Communication

Reference #	Title	Country ID	Status	Serial #	Filed Date	Publication #	Patent #	Issue Date	Expiration Date
6936-2-CON-2	Systems and Methods for Establishing a Diagnostic Transmission Mode and Communicating Over the Same	US	ISSUED	10/619,691	7/16/03	US 2004-0202237 A1	7,570,686	8/4/09	10/1/22
6936-2-CON-2-1	Multicarrier Modulation Messaging for Frequency Domain Received Idle Channel Noise Information	US	ISSUED	12/477,742	6/3/09	US 2009-0238254 A1	7,835,430	11/16/10	1/8/21
6936-2-CON-2-1-1	Multicarrier Modulation Messaging for Power Level Per Subchannel Information	US	EXPIRED	12/779,660	5/13/10	US 2010-0226418 A1	8,238,412	8/7/12	4/7/20
6936-2-CON-2-1-2	Multicarrier Modulation Messaging for SNR Per Subchannel During Showtime Information	US	ISSUED	12/779,708	5/13/10	US 2010-0220775 A1	7,889,784	2/15/11	1/8/21
6936-2-CON-2-1-3	Systems and Methods for Establishing a Diagnostic Transmission Mode and Communicating Over the Same	US	ISSUED	13/004,254	1/11/11	US 2011-0103443 A1	8,634,449	1/21/14	7/4/21
6936-2-CON-2-1-4	Multicarrier Modulation Messaging for Power Level Per Subchannel Information	US	ISSUED	13/476,310	5/21/12	US 2012-0230476 A1	8,432,956	4/30/13	1/8/21
6936-2-CON-2-1-5	Systems and Methods for a Transceiver to Transmit or Receive Test Information Over a Communication Channel Using Multicarrier Modulation	US	ISSUED	13/873,892	4/30/13	US 2013-0243049 A1	8,743,931	6/3/14	1/8/21
6936-2-CON-2-1-6	Systems and Methods for Establishing a Diagnostic Transmission Mode and Communicating Over the Same	US	ISSUED	14/153,282	1/13/14	US 2014-0126616 A1	8,929,423	1/6/15	1/8/21
8303-2-CON-2-1-7	Systems and Methods for Establishing a Diagnostic Transmission Mode and Communicating Over the Same	US	ISSUED	14/282,254	5/20/14	US 2014-0254645 A1	9,319,512	4/19/16	1/8/21
8303-2-CON-2-1-8	Systems and Methods for Establishing a Diagnostic Transmission Mode and Communicating Over the Same	US	ABANDONED	14/577,769	12/19/14	US 2015-0103936 A1			2/16/16
8303-2-CON-2-1-9	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	US	ISSUED	14/818,731	8/5/15	US 2015-0341488 A1	9,264,533	2/16/16	1/8/21
8303-2-CON-2-1-10	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	US	ISSUED	14/991,431	1/8/16	US 2016-0127537 A1	9,479,637	10/25/16	1/8/21
6936-2-CON-2-1-11	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	US	ISSUED	15/016,432	2/5/16	US 2016-0165042 A1	9,973,624	5/15/18	1/8/21
6936-2-CON-2-1-12	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	US	ISSUED	15/098,932	4/14/16	US 2016-0227026 A1	10,264,119	4/16/19	1/8/21
6936-2-CON-2-1-13	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	US	ISSUED	15/295,602	10/17/16	US 2017-0034343 A1	9,838,531	12/5/17	1/8/21
6936-2-CON-2-1-14	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	US	ISSUED	15/958,878	4/20/18	US 2018-0249001 A1	10,623,559	4/14/20	1/8/21
6936-2-PAU-4-DIV	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	AU	ISSUED	2008203520	1/8/01	AU 2008203520	2008203520	11/5/09	1/8/21
6936-2-PAU-4-DIV-2	Diagnostic Methods and Systems for Multicarrier Modems	AU	ABANDONED	2009222537	1/8/01	AU 2009222537	2009222537	12/22/11	1/4/17
6936-2-PAU-4-DIV-3	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	AU	ABANDONED	2011247879	1/8/01		2011247879	9/18/14	1/4/17
6936-2-PAU-4-DIV-4	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	AU	ABANDONED	2014208320	1/8/01		2014208320	3/12/15	1/4/17
8303-2-PAU-4-DIV-5	DIAGNOSTIC METHODS AND SYSTEMS FOR MULTICARRIER MODEMS	AU	ABANDONED	2015200087	1/8/01				2/28/17
8303-2-PAU-4-DIV-6	DIAGNOSTIC METHODS AND SYSTEMS FOR MULTICARRIER MODEMS	AU	ABANDONED	2017201226	1/8/01		2017201226	9/7/17	12/6/19
8303-2-PAU-4-DIV-7	DIAGNOSTIC METHODS AND SYSTEMS FOR MULTICARRIER MODEMS	AU	ABANDONED	2017210489	1/8/01				12/6/19
6936-2-PCA	Diagnostic Methods and Systems for Multicarrier Modems	CA	ISSUED	2,394,491	1/8/01	CA 2394491	2,394,491	3/29/11	1/8/21
6936-2-PCA-DIV	Diagnostic Methods and Systems for Multicarrier Modems	CA	ABANDONED	2,726,826	1/8/01	CA 2726826	2,726,826	11/20/12	12/23/16
6936-2-PCA-DIV-2	Diagnostic Methods and Systems for Multicarrier Modems	CA	EXPIRED	2,788,662	1/8/01		2,788,662	1/3/17	1/8/20
6936-2-PCA-DIV-3	Diagnostic Methods and Systems for Multicarrier Modems	CA	ISSUED	2,948,960	1/8/01		2,948,960	6/23/20	1/8/21
6936-2-PCT	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	WO	NAT PHASE	PCT/US01/00418	1/8/01	WO 2001/52516			

6936-2-PEP-5	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	EP	ISSUED	06022008.4	1/8/01	1755253	1755253	7/13/11	1/8/21
6936-2-PEP-5-BE	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	BE	ISSUED	06022008.4	1/8/01	N/A	1755253	7/13/11	1/8/21
6936-2-PEP-5-CH	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	CH	ISSUED	06022008.4	1/8/01	N/A	1755253	7/13/11	1/8/21
6936-2-PEP-5-DE	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	DE	ISSUED	06022008.4	1/8/01	N/A	1755253	7/13/11	1/8/21
6936-2-PEP-5-ES	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	ES	ISSUED	06022008.4	1/8/01	N/A	1755253	7/13/11	1/8/21
6936-2-PEP-5-FR	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	FR	ISSUED	06022008.4	1/8/01	N/A	1755253	7/13/11	1/8/21
6936-2-PEP-5-GB	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	GB	ISSUED	06022008.4	1/8/01	N/A	1755253	7/13/11	1/8/21
6936-2-PEP-5-GR	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	GR	ABANDONED	06022008.4	1/8/01	N/A	1755253	7/13/11	12/6/19
6936-2-PEP-5-HK	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	HK	ABANDONED	07108499.2	1/8/01	HK 1100379			8/4/11
6936-2-PEP-5-IE	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	IE	ISSUED	06022008.4	1/8/01	N/A	1755253	7/13/11	1/8/21
6936-2-PEP-5-IT	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	IT	ISSUED	06022008.4	1/8/01	N/A	1755253	7/13/11	1/8/21
6936-2-PEP-5-NL	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	NL	ISSUED	06022008.4	1/8/01	N/A	1755253	7/13/11	1/8/21
6936-2-PEP-5-DIV-1	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	EP	ISSUED	10011985.8	1/8/01	2276182	2276182	2/26/20	1/8/21
6936-2-PEP-5-DIV-1-DE	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	DE	ISSUED	10011985.8	1/8/01	2276182	60151242.1	2/26/20	1/8/21
6936-2-PEP-5-DIV-1-FR	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	FR	ISSUED	10011985.8	1/8/01		2276182	2/26/20	1/8/21
6936-2-PEP-5-DIV-1-GB	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	GB	ISSUED	10011985.8	1/8/01		2276182	2/26/20	1/8/21
6936-2-PEP-5-DIV-1-HK	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	HK	ABANDONED	11101591.8	1/8/01	HK 1147612			12/5/19
6936-2-PEP-5-DIV-2	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	EP	ABANDONED	10011983.3	1/8/01	2293459			12/12/19
6936-2-PEP-5-DIV-2-HK	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	HK	ABANDONED	11103980.3	1/8/01	HK 1149982			12/12/19
6936-2-PEP-5-DIV-3	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	EP	ISSUED	10011984.1	1/8/01	2317684	2317684	2/26/20	1/8/21
6936-2-PEP-5-DIV-3-DE	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	DE	ISSUED	10011984.1	1/8/01	2317684	60151241.3	2/26/20	1/8/21
6936-2-PEP-5-DIV-3-FR	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	FR	ISSUED	10011984.1	1/8/01		2317684	2/26/20	1/8/21
6936-2-PEP-5-DIV-3-GB	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	GB	ISSUED	10011984.1	1/8/01		2317684	2/26/20	1/8/21
6936-2-PEP-5-DIV-3-HK	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	HK	ABANDONED	11106469.6	1/8/01	1152597			11/11/19

6936-2-PEP-5-DIV-3-NL	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	NL	ISSUED	10011984.1	1/8/01		2317684	2/26/20	1/8/21
6936-2-PEP-5-DIV-4	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	EP	ISSUED	10011982.5	1/8/01	2270996	2270996	3/7/18	1/8/21
6936-2-PEP-5-DIV-4-DE	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	DE	ISSUED	10011982.5	1/8/01		2270996	3/7/18	1/8/21
6936-2-PEP-5-DIV-4-FR	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	FR	ISSUED	10011982.5	1/8/01		2270996	3/7/18	1/8/21
6936-2-PEP-5-DIV-4-GB	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	GB	ISSUED	10011982.5	1/8/01		2270996	3/7/18	1/8/21
6936-2-PEP-5-DIV-4-HK	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	HK	ISSUED	11101590.0	1/8/01	HK 1147611	HK 1147611	9/21/18	1/8/21
6936-2-PEP-5-DIV-5	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	EP	ABANDONED	18159847.5	1/8/01	3349386			12/12/19
6936-2-PEP-5-DIV-5-HK	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	HK	ABANDONED	18113502.4	1/8/01	1254420			1/14/20
6936-2-PJP	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	JP	ABANDONED	2001-552611	1/8/01	JP 2003/520504			7/13/11
6936-2-PJP-DIV	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	JP	ISSUED	2008-191051	1/8/01	2009-027721	4722972	4/15/11	1/8/21
6936-2-PJP-DIV-2	SYSTEMS AND METHODS FOR ESTABLISHING A DIAGNOSTIC TRANSMISSION MODE AND COMMUNICATING OVER THE SAME	JP	ABANDONED	2011-012155	1/8/01	2011-151808			6/21/13
6936-2-PROV-1	MULTICARRIER MODULATION SYSTEM WITH REMOTE DIAGNOSTIC TRANSMISSION MODE	US	EXPIRED	60/174,865	1/7/00	N/A			1/7/01
6936-2-PROV-2	CHARACTERIAZTION OF TRANSMISSION LINES USING BROADBAND SIGNALS IN A MULTI-CARRIER DSL SYSTEM	US	EXPIRED	60/224,308	8/10/00	N/A			8/10/01
6936-16	SYSTEMS AND METHODS FOR MULTI-PAIR ATM OVER DSL	US	ISSUED	10/264,258	10/4/02	US 2003-0091053 A1	7,453,881	11/18/08	7/24/25
6936-16-CON	SYSTEMS AND METHODS FOR MULTI-PAIR OVER DSL	US	ISSUED	12/247,741	10/8/08	US 2009-0028158 A1	7,809,028	10/5/10	10/4/22
6936-16-CON-2	Combining Multiple DSL Tansceivers for a High Data Rate Connection	US	ISSUED	12/769,277	4/28/10	US 2010-0208737 A1	7,978,706	7/12/11	10/4/22
6936-16-CON-3	Systems and Methods for Multi-Pair ATM Over DSL	US	ISSUED	12/783,777	5/20/10	US 2010-0290471 A1	8,422,511	4/16/13	10/4/22
6936-16-CON-4	Systems and Methods for Multi-Pair ATM Over DSL	US	ISSUED	13/863,058	4/15/13	US 2013-0223453	8,831,031	9/9/14	10/4/22
6936-16-CON-5	BONDING DEVICE AND METHOD	US	ISSUED	14/465,502	8/21/14	US 2014-0362863 A1	9,014,193	4/21/15	10/4/22
6936-16-CON-6	BONDING DEVICE AND METHOD	US	ISSUED	14/682,435	4/9/15	US 2015-0215239 A1	9,300,601	3/29/16	10/4/22
6936-16-CON-7	BONDING DEVICE AND METHOD	US	ISSUED	15/057,741	3/1/16	US 2016-0182406 A1	9,894,014	2/13/18	10/4/22
6936-16-CON-8	BONDING DEVICE AND METHOD	US	ISSUED	15/882,619	1/29/18	US 2018-0152395 A1	10,341,261	7/2/19	10/4/22
6936-16-PCA	SYSTEMS AND METHODS FOR MULTI-PAIR ATM OVER DSL	CA	ISSUED	2,461,320	10/4/02	CA 2461320	2,461,320	10/25/11	10/4/22
6936-16-PCT	SYSTEMS AND METHODS FOR MULTI-PAIR ATM OVER DSL	WO	NAT PHASE	PCT/US02/31649	10/4/02	WO 2003/032555			
6936-16-PEP	SYSTEMS AND METHODS FOR MULTI-PAIR ATM OVER DSL	EP	ISSUED	02778433.9	10/4/02	1433277	1433277	7/25/12	10/4/22
6936-16-PEPBE	SYSTEMS AND METHODS FOR MULTI-PAIR ATM OVER DSL	BE	ISSUED	02778433.9	10/4/02		1433277	7/25/12	10/4/22
6936-16-PEPDE	SYSTEMS AND METHODS FOR MULTI-PAIR ATM OVER DSL	DE	ISSUED	02778433.9	10/4/02		1433277	7/25/12	10/4/22
6936-16-PEPFR	SYSTEMS AND METHODS FOR MULTI-PAIR ATM OVER DSL	FR	ISSUED	02778433.9	10/4/02		1433277	7/25/12	10/4/22
6936-16-PEPGB	SYSTEMS AND METHODS FOR MULTI-PAIR ATM OVER DSL	GB	ISSUED	02778433.9	10/4/02		1433277	7/25/12	10/4/22
6936-16-PEP-DIV	SYSTEMS AND METHODS FOR MULTI-PAIR ATM OVER DSL	EP	ISSUED	12002728.9	10/4/02	2506508	2506508	5/2/18	10/4/22
6936-16-PEP-DIV-DE	SYSTEMS AND METHODS FOR MULTI-PAIR ATM OVER DSL	DE	ISSUED	12002728.9	10/4/02		2506508	5/2/18	10/4/22
6936-16-PEP-DIV-FR	SYSTEMS AND METHODS FOR MULTI-PAIR ATM OVER DSL	FR	ISSUED	12002728.9	10/4/02		2506508	5/2/18	10/4/22
6936-16-PEP-DIV-GB	SYSTEMS AND METHODS FOR MULTI-PAIR ATM OVER DSL	GB	ISSUED	12002728.9	10/4/02		2506508	5/2/18	10/4/22
6936-16-PEP-DIV-2	SYSTEMS AND METHODS FOR MULTI-PAIR ATM OVER DSL	EP	ISSUED	18170134.3	10/4/02	3386128	3386128	7/24/19	10/4/22
6936-16-PEP-DIV-2-DE	SYSTEMS AND METHODS FOR MULTI-PAIR ATM OVER DSL	DE	ISSUED	18170134.3	10/4/02	3386128	DE60249960.7	7/24/19	10/4/22
6936-16-PEP-DIV-2-FR	SYSTEMS AND METHODS FOR MULTI-PAIR ATM OVER DSL	FR	ISSUED	18170134.3	10/4/02		3386128	7/24/19	10/4/22
6936-16-PEP-DIV-2-GB	SYSTEMS AND METHODS FOR MULTI-PAIR ATM OVER DSL	GB	ISSUED	18170134.3	10/4/02		3386128	7/24/19	10/4/22

6936-16-PEP-DIV-2-NL	SYSTEMS AND METHODS FOR MULTI-PAIR ATM OVER DSL	NL	ISSUED	18170134.3	10/4/02		3386128	7/24/19	10/4/22
6936-16-PROV	MULIT-PAIR ATM OVER DSL	US	EXPIRED	60/327,440	10/5/01	N/A			10/5/02
6936-54	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	US	ISSUED	11/246,163	10/11/05	US 2006-0088054 A1	7,831,890	11/9/10	11/7/28
6936-54-CON	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	US	ISSUED	12/761,586	4/16/10	US 2010-0228924 A1	7,844,882	11/30/10	10/11/25
6936-54-CON-2	Computer Readable Medium with Instructions for Resource Sharing in a Telecommunications Environment	US	ISSUED	12/853,020	8/9/10	US 2010-0306628 A1	7,836,381	11/16/10	10/11/25
6936-54-CON-3	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	US	ISSUED	12/901,699	10/11/10	US 2011-0029844 A1	8,276,048	9/25/12	10/11/25
6936-54-CON-4	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	US	ISSUED	13/567,261	8/6/12	US 2012-0297148 A1	8,495,473	7/23/13	10/11/25
6936-54-CON-5	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	US	ISSUED	13/942,938	7/16/13	US 2013-0308689 A1	8,607,126	12/10/13	10/11/25
6936-54-CON-6	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	US	ISSUED	14/081,469	11/15/13	US 2014-0075128 A1	9,069,718	6/30/15	10/11/25
6936-54-CON-7	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	US	ISSUED	14/730,874	6/4/15	US 2015-0268863 A1	9,286,251	3/15/16	10/11/25
6936-54-CON-8	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	US	ISSUED	15/046,821	2/18/16	US 2016-0179389 A1	9,547,608	1/17/17	10/11/25
6936-54-CON-9	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	US	ISSUED	15/372,841	12/8/16	US 2017-0090811 A1	9,898,220	2/20/18	10/11/25
6936-54-CON-10	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	US	ISSUED	15/874,277	1/18/18	US 2018-0157436 A1	10,409,510	9/10/19	10/11/25
6936-54-CON-10-DIV	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	US	ISSUED	16/261,109	1/29/19	US 2019-0155530 A1	10,579,291	3/3/20	10/11/25
6936-54-CON-11	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	US	PUBLISHED	16/544,003	8/19/19	US 2019-0369891 A1			10/11/25
6936-54-PAU	Resource Sharing in a Telecommunications Environment	AU	ABANDONED	2005296086	10/11/05	AU 2005296086			4/6/11
6936-54-PAU-DIV	Resource Sharing in a Telecommunications Environment	AU	ABANDONED	2011201250	10/11/05	AU 2011201250			2/25/15
6936-54-PAU-DIV-2	Resource Sharing in a Telecommunications Environment	AU	ISSUED	2015200618	10/11/05		2015200618	11/12/15	10/11/25
6936-54-PCA	Resource Sharing in a Telecommunications Environment	CA	ISSUED	2,580,280	10/11/05	CA 2580280	2,580,280	3/10/15	10/11/25
6936-54-PCA-DIV	Resource Sharing in a Telecommunications Environment	CA	ABANDONED	2,869,452	10/11/05		2,869,452	1/19/16	9/25/17
6936-54-PCA-DIV-2	Resource Sharing in a Telecommunications Environment	CA	ABANDONED	2,909,150	10/11/05		2,909,150	11/7/17	9/4/20
6936-54-PCA-DIV-3	Resource Sharing in a Telecommunications Environment	CA	ISSUED	2,980,607	10/11/05		2,980,607	4/7/20	10/11/25
6936-54-PCN	Resource Sharing in a Telecommunications Environment	CN	ABANDONED	200580032703.1	10/11/05	CN101057438A			7/14/15
6936-54-PCN-DIV	Resource Sharing in a Telecommunications Environment	CN	ISSUED	201510413116.2	10/11/05	104993912	ZL201510413116.2	12/3/19	10/11/25
6936-54-PCT	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	WO	NAT PHASE	PCT/US05/36015	10/11/05	WO 2006/044227 A1			
6936-54-PEP	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	EP	ISSUED	05807443.6	10/11/05	EP 1832028	1832028	1/31/18	10/11/25
6936-54-PEPDE	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	DE	ISSUED	05807443.6	10/11/05		1832028	1/31/18	10/11/25
6936-54-PEPFR	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	FR	ISSUED	05807443.6	10/11/05		1832028	1/31/18	10/11/25
6936-54-PEPGB	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	GB	ISSUED	05807443.6	10/11/05		1832028	1/31/18	10/11/25
6936-54-PEPHK	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	HK	ISSUED	07110121.4	10/11/05	HK 1102043	HK 1102043	7/6/18	10/11/25
6936-54-PEP-DIV	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	EP	PUBLISHED	18153945.3	10/11/05	3340511			10/11/25
6936-54-PEP-DIV-HK	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	HK	PUBLISHED	18113503.3	10/11/05	1254421			10/11/25
6936-54-PIN	Resource Sharing in a Telecommunications Environment	IN	ABANDONED	1208/KOLNP/2007	10/11/05	IN 1208/KOLNP/2007			10/12/24
6936-54-PJP	Resource Sharing in a Telecommunications Environment	JP	ISSUED	2007-535818	10/11/05	2008-516533	4889646	12/22/11	10/11/25
6936-54-PJP-DIV	Resource Sharing in a Telecommunications Environment	JP	ABANDONED	2008-264540	10/11/05	2009-065692	4976359	4/20/12	2/21/17
6936-54-PKR	Method and System for Allocating Shared Memory in a Transceiver	KR	ISSUED	10-2007-7008270	10/11/05	10-2007-0065369	10-1160717	6/21/12	10/11/25
6936-54-PKR-DIV	Method for Allocating Memory in a Transceiver	KR	ABANDONED	10-2010-7022463	10/11/05	10-2010/0116234	10-1160765	6/21/12	3/10/17
6936-54-PROV	RESOURCE SHARING IN A TELECOMMUNICATIONS ENVIRONMENT	US	EXPIRED	60/618,269	10/12/04	N/A			10/12/05

6936-47	SYSTEM AND METHOD FOR SCRAMBLING THE PHASE OF THE CARRIERS IN A MULTICARRIER COMMUNICATIONS SYSTEM	US	ISSUED	09/710,310	11/9/00	N/A	6,961,369	11/1/05	7/28/23
6936-47-CON	SYSTEM AND METHOD FOR SCRAMBLING THE PHASE OF THE CARRIERS IN A MULTICARRIER COMMUNICATIONS SYSTEM	US	EXPIRED	11/211,535	8/26/05	US 2006-0002454 A1	7,292,627	11/6/07	11/9/20
6936-47-CON-2	System and Method for Scrambling the Phase of the Carriers in a Multicarrier Communications System	US	EXPIRED	11/863,581	9/28/07	US 2008-0069253 A1	7,471,721	12/30/08	11/9/20
6936-47-CON-3	System and Method for Scrambling the Phase of the Carriers in a Multicarrier Communications System	US	EXPIRED	12/255,713	10/22/08	US 2009-0110105 A1	7,769,104	8/3/10	11/9/20
6936-47-CON-4	System and Method for Scrambling the Phase of the Carriers in a Multicarrier Communications System	US	EXPIRED	12/783,725	5/20/10	US 2010-0290507 A1	8,090,008	1/3/12	11/9/20
6936-47-CON-5	System and Method for Scrambling the Phase of the Carriers in a Multicarrier Communications System	US	EXPIRED	13/303,417	11/23/11	US 2012-0069878 A1	8,718,158	5/6/14	11/18/20
6936-47-CON-6	System and Method for Scrambling the Phase of the Carriers in a Multicarrier Communications System	US	EXPIRED	14/256,677	4/18/14	US 2014-0226737 A1	8,929,470	1/6/15	11/9/20
6936-47-CON-7	System and Method for Scrambling the Phase of the Carriers in a Multicarrier Communications System	US	EXPIRED	14/540,332	11/13/14	US 2015-0071385 A1	9,755,876	9/5/17	11/9/20
6936-47-CON-8	System and Method for Scrambling the Phase of the Carriers in a Multicarrier Communications System	US	EXPIRED	15/693,914	9/1/17	US 2018-0013599 A1	10,187,240	1/22/19	11/9/20
6936-47-CON-DIV	System and Method for Descrambling the Phase of the Carriers in a Multicarrier Communications System	US	ISSUED	11/860,080	9/24/07		8,073,041	12/6/11	11/5/23
6936-47-CON-DIV-CON	System and method for descrambling the phase of carriers in a multicarrier communications system	US	EXPIRED	13/284,549	10/28/11	US 2012-0044977 A1	8,218,610	7/10/12	11/9/20
6936-47-CON-DIV-CON-2	System and Method for Descrambling the Phase of Carriers in a Multicarrier Communications System	US	EXPIRED	13/439,605	4/4/12	US 2012-0195353 A1	8,355,427	1/15/13	11/9/20
6936-47-CON-DIV-CON-3	System and Method for Scrambling Using a Bit Scrambler and a Phase Scrambler	US	EXPIRED	13/718,016	12/18/12	US 2013-0136160-A1	9,014,243	4/21/15	11/9/20
6936-47-CON-DIV-CON-4	SYSTEM AND METHOD FOR SCRAMBLING USING A BIT SCRAMBLER AND A PHASE SCRAMBLER	US	EXPIRED	14/684,737	4/13/15	US 2015-0222467 A1	9,485,128	11/1/16	11/9/20
6936-47-CON-DIV-CON-5	SYSTEM AND METHOD FOR SCRAMBLING USING A BIT SCRAMBLER AND A PHASE SCRAMBLER	US	PUBLISHED	15/298,817	10/20/16	US 2017-0041173 A1			11/9/20
6936-47-PAU	SYSTEM AND METHOD FOR SCRAMBLING THE PHASE OF THE CARRIERS IN A MULTICARRIER COMMUNICATIONS SYSTEM	AU	ABANDONED	15964/01	11/9/00	AU 1596401			11/9/20
6936-47-PCA	SYSTEM AND METHOD FOR SCRAMBLING THE PHASE OF THE CARRIERS IN A MULTICARRIER COMMUNICATIONS SYSTEM	CA	ABANDONED	2,387,812	11/9/00	CA2387812			11/9/20
6936-47-PCT	SYSTEM AND METHOD FOR SCRAMBLING THE PHASE OF THE CARRIERS IN A MULTICARRIER COMMUNICATIONS SYSTEM	WO	NAT PHASE	PCT/US00/030958	11/9/00	WO 2001/035591			
6936-47-PEP	SYSTEM AND METHOD FOR SCRAMBLING THE PHASE OF THE CARRIERS IN A MULTICARRIER COMMUNICATIONS SYSTEM	EP	ABANDONED	00978507.2	11/9/00	EP 1228615			11/9/20
6936-47-PJP	SYSTEM AND METHOD FOR SCRAMBLING THE PHASE OF THE CARRIERS IN A MULTICARRIER COMMUNICATIONS SYSTEM	JP	ABANDONED	2001-537217	11/9/00	2003-514444A			11/9/20
6936-47-PJP-DIV	System and Method for Scrambling the Phase of the Carriers in a Multicarrier Communications System	JP	ABANDONED	2006-345675	11/9/00	JP 2007/129755			11/9/20
6936-47-PKR	SYSTEM AND METHOD FOR SCRAMBLING THE PHASE OF THE CARRIERS IN A MULTICARRIER COMMUNICATIONS SYSTEM	KR	ABANDONED	2002-7005830	11/9/00	10-2002-0049025			11/9/20
6936-47-PROV	SYSTEM AND METHOD FOR SCRAMBLING THE PHASE OF THE CARRIERS IN A MULTICARRIER COMMUNICATIONS SYSTEM	US	EXPIRED	60/164,134	11/9/99	N/A			11/9/00
6936-53	CRC COUNTER NORMALIZATION	US	ISSUED	11/232,899	9/23/05	US 2006-0069980 A1	7,451,379	11/11/08	3/8/27
6936-53-CON	CRC COUNTER NORMALIZATION	US	ISSUED	12/236,902	9/24/08	US 2009-0019346	7,925,958	4/12/11	5/4/26
6936-53-CON-2	CRC COUNTER NORMALIZATION	US	ISSUED	12/783,771	5/20/10	US 2010-0293444 A1	7,979,778	7/12/11	9/23/25
6936-53-CON-3	CRC COUNTER NORMALIZATION	US	ISSUED	13/156,098	6/8/11	US 2011-0239087 A1	8,516,337	8/20/13	9/23/25
6936-53-CON-4	CRC COUNTER NORMALIZATION	US	ISSUED	13/968,880	8/16/13	US 2013-0339828 A1	8,793,553	7/29/14	9/23/25
6936-53-CON-5	CRC COUNTER NORMALIZATION	US	ISSUED	14/338,503	7/23/14	US 2014-0337683 A1	8,984,366	3/17/15	9/23/25
6936-53-CON-6	CRC COUNTER NORMALIZATION	US	ISSUED	14/638,889	3/4/15	US 2015-0180508 A1	9,300,324	3/29/16	9/23/25
6936-53-CON-7	CRC COUNTER NORMALIZATION	US	ISSUED	15/062,522	3/7/16	US 2016-0188403 A1	10,049,003	8/14/18	9/23/25
6936-53-CON-8	CRC COUNTER NORMALIZATION	US	ISSUED	16/037,825	7/17/18	US 2018-0341544 A1	10,346,243	7/9/19	9/23/25
6936-53-CON-9	CRC COUNTER NORMALIZATION	US	PUBLISHED	16/428,232	5/31/19	US 2019-0286514 A1			9/23/25
6936-53-PAU	CRC COUNTER NORMALIZATION	AU	ISSUED	2005289753	9/23/05	AU 2005289753	2005289753	3/19/09	9/23/25
6936-53-PAU-DIV	CRC COUNTER NORMALIZATION	AU	ABANDONED	2009200784	9/23/05	AU 2009200784			6/27/11
6936-53-PCA	CRC COUNTER NORMALIZATION	CA	ISSUED	2,550,263	9/23/05	CA 2550263	2,550,263	11/2/10	9/23/25

6936-53-PCA-DIV	CRC COUNTER NORMALIZATION	CA	ABANDONED	2,711,718	9/23/05	CA 2711718	2,711,718	3/24/15	7/28/20
6936-53-PCA-DIV-2	CRC COUNTER NORMALIZATION	CA	ABANDONED	2,876,137	9/23/05		2,876,137	9/13/16	9/12/18
6936-53-PCA-DIV-3	CRC COUNTER NORMALIZATION	CA	ABANDONED	2,935,980	9/23/05		2,935,980	1/8/19	7/28/20
6936-53-PCA-DIV-4	CRC COUNTER NORMALIZATION	CA	ABANDONED	3,023,907	9/23/05		3,023,907	6/4/19	7/28/20
6936-53-PCN	CRC COUNTER NORMALIZATION	CN	ISSUED	200580008869.X	9/23/05	CN1934817A	200580008869.X	5/16/12	9/23/25
6936-53-PCN-DIV	CRC COUNTER NORMALIZATION	CN	ABANDONED	201210063701.0	9/23/05	CN 102624488	201210063701.0	11/25/15	7/25/17
6936-53-PCN-DIV-HK	A Method and a system for Cyclic Redundancy Checksum (CRC) Anomaly Counter Normalization, and a Module Performing the Method	HK	ABANDONED	13101408.9	9/23/05	HK1174752			3/22/16
6936-53-PCT	CRC COUNTER NORMALIZATION	WO	NAT PHASE	PCT/US05/033922	9/23/05	WO 2006/036723 A1			
6936-53-PEP	CRC COUNTER NORMALIZATION	EP	ISSUED	05799765.2	9/23/05	1792430	1792430	7/20/11	9/23/25
6936-53-PEPBE	CRC COUNTER NORMALIZATION	BE	ABANDONED	05799765.2	9/23/05	N/A	1792430	7/20/11	8/4/20
6936-53-PEPCH	CRC COUNTER NORMALIZATION	CH	ABANDONED	05799765.2	9/23/05	N/A	1792430	7/20/11	8/4/20
6936-53-PEPDE	CRC COUNTER NORMALIZATION	DE	ISSUED	05799765.2	9/23/05	N/A	1792430	7/20/11	9/23/25
6936-53-PEPDK	CRC COUNTER NORMALIZATION	DK	ABANDONED	05799765.2	9/23/05	N/A	1792430	7/20/11	8/4/20
6936-53-PEPFR	CRC COUNTER NORMALIZATION	FR	ISSUED	05799765.2	9/23/05	N/A	1792430	7/20/11	9/23/25
6936-53-PEPGB	CRC COUNTER NORMALIZATION	GB	ABANDONED	05799765.2	9/23/05	N/A	1792430	7/20/11	8/6/19
6936-53-PEPHK	CRC COUNTER NORMALIZATION	HK	ABANDONED	07110654.9	9/23/05	HK 1102488			8/4/11
6936-53-PEPIE	CRC COUNTER NORMALIZATION	IE	ABANDONED	05799765.2	9/23/05	N/A	1792430	7/20/11	8/4/20
6936-53-PEPNL	CRC COUNTER NORMALIZATION	NL	ISSUED	05799765.2	9/23/05	N/A	1792430	7/20/11	9/23/25
6936-53-PEPSE	CRC COUNTER NORMALIZATION	SE	ABANDONED	05799765.2	9/23/05	N/A	1792430	7/20/11	8/4/20
6936-53-PEP-DIV	CRC COUNTER NORMALIZATION	EP	ISSUED	11005906.0	9/23/05	EP2381610A1	2381610	12/21/16	9/23/25
6936-53-PEP-DIV-DE	CRC COUNTER NORMALIZATION	DE	ISSUED	11005906.0	9/23/05		2381610	12/21/16	9/23/25
6936-53-PEP-DIV-FR	CRC COUNTER NORMALIZATION	FR	ISSUED	11005906.0	9/23/05		2381610	12/21/16	9/23/25
6936-53-PEP-DIV-GB	CRC COUNTER NORMALIZATION	GB	ISSUED	11005906.0	9/23/05		2381610	12/21/16	9/23/25
6936-53-PEP-DIV-2	CRC COUNTER NORMALIZATION	EP	ISSUED	16020487.1	9/23/05	3176973	3176973	6/17/20	9/23/25
6936-53-PEP-DIV-2-DE	CRC COUNTER NORMALIZATION	DE	ISSUED	16020487.1	9/23/05		3176973	6/17/20	9/23/25
6936-53-PEP-DIV-2-FR	CRC COUNTER NORMALIZATION	FR	ISSUED	16020487.1	9/23/05		3176973	6/17/20	9/23/25
6936-53-PEP-DIV-2-GB	CRC COUNTER NORMALIZATION	GB	ISSUED	16020487.1	9/23/05		3176973	6/17/20	9/23/25
6936-53-PIN	CRC COUNTER NORMALIZATION	IN	ABANDONED	1601/KOLNP/2006	9/23/05	IN 1601/KOLNP/2006			9/23/25
6936-53-PJP	CRC COUNTER NORMALIZATION	JP	ABANDONED	2006-551651	9/23/05	2007-519382			10/12/11
6936-53-PJP-DIV	CRC COUNTER NORMALIZATION	JP	ABANDONED	2006-345676	9/23/05	JP 2007/151145			10/12/11
6936-53-PJP-DIV-2	CRC COUNTER NORMALIZATION	JP	ISSUED	2010-042193	9/23/05	2010-178353	5237317	4/5/13	9/23/25
6936-53-PJP-DIV-3	CRC COUNTER NORMALIZATION	JP	ISSUED	2012-194723	9/23/05	2013-009417	5823936	10/16/15	9/23/25
6936-53-PJP-DIV-4	CRC COUNTER NORMALIZATION	JP	ISSUED	2015-105633	9/23/05	2015-167401	6215254	9/29/17	9/23/25
6936-53-PJP-DIV-5	CRC COUNTER NORMALIZATION	JP	ISSUED	2016-162059	9/23/05	2016-220241	6335230	5/11/18	9/23/25
6936-53-PKR	CRC COUNTER NORMALIZATION	KR	ISSUED	10-2006-7011697	9/23/05	10-2007-0072425	10-0955190	4/20/10	9/23/25
6936-53-PKR-DIV	CRC COUNTER NORMALIZATION	KR	ABANDONED	10-2010-7005285	9/23/05	10-2010/0035665			9/23/25
6936-53-PKR-DIV-2	CRC COUNTER NORMALIZATION	KR	ABANDONED	10-2010-7024190	9/23/05	10-2010-0120722			9/23/25
6936-53-PROV	CRC COUNTER NORMALIZATION METHOD AND SYSTEM	US	EXPIRED	60/613,594	9/25/04	N/A			9/25/05
6936-52-PCA	Impulse Noise Management	CA	ISSUED	2,555,757	3/3/05	CA 2555757	2,555,757	1/20/15	3/3/25
6936-52-PCA-REI	Impulse Noise Management	CA	ISSUED	2,555,757R	3/3/05		2,555,757	3/27/18	3/3/25
6936-52-PCN	On-Line Impulse Noise Protection (INP) Adaptation	CN	ABANDONED	200580006738.8	3/3/05	CN1926794A			11/10/11
6936-52-PCT	ON-LINE IMPULSE NOISE PROTECTION (INP) ADAPTATION	WO	NAT PHASE	PCT/US05/06842	3/3/05	WO 2005/086405 A3			
6936-52-PEP	Impulse Noise Management	EP	ABANDONED	05724394.1	3/3/05	EP 1721403			3/3/25
6936-52-PEPHK	ON-LINE IMPULSE NOISE PROTECTION (INP) ADAPTATION	HK	ABANDONED	07105041.1	3/3/05	HK 1097672			8/23/12
6936-52-PEP-DIV	Impulse Noise Management	EP	ABANDONED	10006702.4	3/3/05	2228936			3/7/11
6936-52-PEP-DIV-HK	Impulse Noise Management	HK	ABANDONED	10110020.1	3/3/05	HK 1143672			8/23/12
6936-52-PIN	ON-LINE IMPULSE NOISE PROTECTION (INP) ADAPTATION	IN	ABANDONED	2155/KOLNP/2006	7/31/06	IN 2137/KOLNP/2006			7/31/26
6936-52-PROV	ON-LINE IMPULSE NOISE PROTECTION (INP) ADAPTATION	US	EXPIRED	60/549,804	3/3/04	N/A			3/3/05
6936-52-PROV-2	IMPULSE NOISE PROTECTION (INP) TRAINING	US	EXPIRED	60/555,982	3/24/04	N/A			3/24/05
6936-52-PUS	Impulse Noise Management	US	ABANDONED	10/597,482	7/27/06	US 2008-0232444 A1			10/14/11
6936-52-PUS-CON	Impulse Noise Management	US	ISSUED	12/769,193	4/28/10	US 2010-0220771 A1	8,462,835	6/11/13	3/3/25
6936-52-PUS-CON-2	Impulse Noise Management	US	ISSUED	13/914,852	6/11/13	US 2013-0272355 A1	8,594,162	11/26/13	3/3/25
6936-52-PUS-CON-3	Impulse Noise Management	US	ISSUED	14/075,077	11/8/13	US 2014-0064343 A1	8,743,932	6/3/14	3/3/25
6936-52-PUS-CON-4	Impulse Noise Management	US	ABANDONED	14/285,911	5/23/14	US 2014-0254643 A1			2/11/16
6936-52-PUS-CON-5	IMPULSE NOISE MANAGEMENT	US	ABANDONED	14/757,630	12/23/15	US 2016-0127079 A1			9/10/18
6936-52-PUS-CON-6	IMPULSE NOISE MANAGEMENT	US	ISSUED	16/126,027	9/10/18	US 2019-0007164 A1	10,567,112	2/18/20	3/3/25
6936-52-PUS-CON-6-DIV	IMPULSE NOISE MANAGEMENT	US	ISSUED	16/448,939	6/21/19	US 2019-0312667 A1	10,805,040	10/13/20	3/3/25
6936-52-PUS-CON-7	IMPULSE NOISE MANAGEMENT	US	PUBLISHED	16/781,802	2/4/20	US 2020-0177304 A1			3/3/25
6936-28	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	US	EXPIRED	09/581,400	6/13/00	N/A	6,445,730	9/3/02	1/26/19
6936-28-CON	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	US	ABANDONED	10/175,815	6/21/02	US 2002-0150152			5/17/04
6936-28-CON-1	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	US	ABANDONED	10/778,083	2/17/04	US 2004-0160906			5/30/05
6936-28-CON-2	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	US	ABANDONED	11/090,183	3/28/05	US 2005-0185726 A1			3/12/06
6936-28-CON-3	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	US	ABANDONED	11/289,516	11/30/05	US 2006-0078060 A1			

6936-28-CON-4	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	US	EXPIRED	11/425,507	6/21/06	US 2006-0233273 A1	7,697,598	4/13/10	1/26/19
6936-28-CON-5	Multicarrier Transmission System with Low Power Sleep Mode and Rapid-on Capability	US	ABANDONED	12/615,946	11/10/09	US 2010-0054312 A1	7,978,753	7/12/11	12/12/18
6936-28-CON-6	Multicarrier Transmission System with Low Power Sleep Mode and Rapid-On Capability	US	EXPIRED	13/152,558	6/3/11	US 2011-0235691 A1	8,437,382	5/7/13	1/26/19
6936-28-CON-7	Multicarrier Transmission System with Low Power Sleep Mode and Rapid-On Capability	US	EXPIRED	13/887,889	5/6/13	US 2013-0243051-A1	8,611,404	12/17/13	1/26/19
6936-28-CON-8	Multicarrier Transmission System with Low Power Sleep Mode and Rapid-On Capability	US	EXPIRED	14/092,248	11/27/13	US 2014-0086287 A1	8,750,352	6/10/14	1/26/19
6936-28-CON-9	Multicarrier Transmission System with Low Power Sleep Mode and Rapid-On Capability	US	ABANDONED	14/295,981	6/4/14	US 2014-0286379 A1	9,094,268	7/28/15	12/12/18
6936-28-CON-10	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	US	EXPIRED	14/798,014	7/13/15	US 2015-0326404 A1	9,521,003	12/13/16	1/26/19
6936-28-CON-11	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	US	ABANDONED	15/180,274	6/13/16	US 2016-0286493 A1			11/19/18
6936-28-PAU	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	AU	EXPIRED	23409/99	1/26/99	AU 2340999	764933	12/18/03	1/26/19
6936-28-PAU-2	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	AU	ABANDONED	2003266426	12/4/03	AU 2003266429			3/10/05
6936-28-PCA	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	CA	EXPIRED	2,357,551	1/26/99	CA 2357551	2,357,551	9/30/08	1/26/19
6936-28-PCA-DIV	Multicarrier Transmission System With Low Power Sleep Mode and Rapid-On Capability	CA	ABANDONED	2,633,064	1/26/99	CA 2633064	2,633,064	4/2/13	12/23/16
6936-28-PCA-DIV-2	Multicarrier Transmission System With Low Power Sleep Mode and Rapid-On Capability	CA	EXPIRED	2,800,005	1/26/99		2,800,005	3/14/17	1/26/19
6936-28-PCT	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	WO	NAT PHASE	PCT/US99/01539	1/26/99	WO 2000/045559			
6936-28-PEP	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	EP	EXPIRED	99903370.7	1/26/99	1145518	1145518	11/24/04	1/26/19
6936-28-PEPGB	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	GB	EXPIRED	99903370.7	1/26/99	N/A	1145518	11/24/04	1/26/19
6936-28-PEP-2	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	EP	EXPIRED	04022871.0	1/26/99	1524812	1524812	10/31/07	1/26/19
6936-28-PEP-2-DE	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	DE	EXPIRED	04022871.0	1/26/99	N/A	1524812	10/31/07	1/26/19
6936-28-PEP-2-FR	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	FR	EXPIRED	04022871.0	1/26/99	N/A	1524812	10/31/07	1/26/19
6936-28-PEP-2-GB	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	GB	EXPIRED	04022871.0	1/26/99	N/A	1524812	10/31/07	1/26/19
6936-28-PEP-3	Multicarrier Transmission System with Low Power Sleep Mode and Rapid-on-Capability	EP	EXPIRED	07021150.3	1/26/99	1901512	1901512	11/23/11	1/26/19
6936-28-PEP-3-DE	Multicarrier Transmission System with Low Power Sleep Mode and Rapid-on-Capability	DE	EXPIRED	07021150.3	1/26/99	N/A	1901512	11/23/11	1/26/19
6936-28-PEP-3-FR	Multicarrier Transmission System with Low Power Sleep Mode and Rapid-on-Capability	FR	EXPIRED	07021150.3	1/26/99	N/A	1901512	11/23/11	1/26/19
6936-28-PEP-3-GB	Multicarrier Transmission System with Low Power Sleep Mode and Rapid-on-Capability	GB	EXPIRED	07021150.3	1/26/99	N/A	1901512	11/23/11	1/26/19
6936-28-PEP-3-HK	Multicarrier Transmission System with Low Power Sleep Mode and Rapid-on-Capability	HK	ABANDONED	08110349.9	1/26/99	HK 1117978			7/28/11
6936-28-PEP-3-DIV-1	Multicarrier Transmission System with Low Power Sleep Mode and Rapid-on-Capability	EP	EXPIRED	10011996.5	1/26/99	2302857	2302857	9/2/15	1/26/19
6936-28-PEP-3-DIV-1-DE	Multicarrier Transmission System with Low Power Sleep Mode and Rapid-on-Capability	DE	EXPIRED	10011996.5	1/26/99		2302857	9/2/15	1/26/19
6936-28-PEP-3-DIV-1-FR	Multicarrier Transmission System with Low Power Sleep Mode and Rapid-on-Capability	FR	EXPIRED	10011996.5	1/26/99		2302857	9/2/15	1/26/19
6936-28-PEP-3-DIV-1-GB	Multicarrier Transmission System with Low Power Sleep Mode and Rapid-on-Capability	GB	EXPIRED	10011996.5	1/26/99		2302857	9/2/15	1/26/19
6936-28-PEP-3-DIV-2	Multicarrier Transmission System with Low Power Sleep Mode and Rapid-on-Capability	EP	EXPIRED	10012013.8	1/26/99	2330749	2330749	4/30/14	1/26/19
6936-28-PEP-3-DIV-2-DE	Multicarrier Transmission System with Low Power Sleep Mode and Rapid-on-Capability	DE	EXPIRED	10012013.8	1/26/99		2330749	4/30/14	1/26/19
6936-28-PEP-3-DIV-2-FR	Multicarrier Transmission System with Low Power Sleep Mode and Rapid-on-Capability	FR	EXPIRED	10012013.8	1/26/99		2330749	4/30/14	1/26/19

6936-28-PEP-3-DIV-2-GB	Multicarrier Transmission System with Low Power Sleep Mode and Rapid-on-Capability	GB	EXPIRED	10012013.8	1/26/99		2330749	4/30/14	1/26/19
6936-28-PJP	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	JP	EXPIRED	2000-596705	1/26/99	2003-518341	4282907	3/27/09	1/26/19
6936-28-PJP-DIV	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	JP	ABANDONED	2008-323651	1/26/99	N/A			1/26/19
6936-28-PKR	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	KR	ABANDONED	7009402/2001	1/26/99	10-2001-0108132			5/15/06
6936-28-PROV	MULTICARRIER TRANSMISSION SYSTEM WITH LOW POWER SLEEP MODE AND RAPID-ON CAPABILITY	US	EXPIRED	60/072,447	1/26/98	N/A			1/26/99
6936-55-PAU	Initialization in the Presence of Impulse Noise	AU	ISSUED	2005295758	10/14/05	AU 2005295758	2005295758	7/9/10	10/14/25
6936-55-PAU-2	Initialization in the Presence of Impulse Noise	AU	ABANDONED	2010202626	10/14/05	AU 2010202626			6/27/11
6936-55-PCA	DMT Symbol Repetition in the Presence of Impluse Noise	CA	ISSUED	2,582,106	10/14/05	2,582,106	2,582,106	4/28/15	10/14/25
6936-55-PCA-DIV	DMT Symbol Repetition in the Presence of Impluse Noise	CA	ABANDONED	2,881,036	10/14/05		2,881,036	12/22/15	9/8/20
6936-55-PCA-DIV-2	DMT Symbol Repetition in the Presence of Impluse Noise	CA	ABANDONED	2,906,478	10/14/05		2,906,478	1/8/19	10/14/25
6936-55-PCN	Initialization in the Presence of Impulse Noise	CN	ISSUED	200580034464.3	10/14/05	CN101040480A	200580034464.3	8/31/11	10/14/25
6936-55-PCN-HK	DMT Symbol Repetition in the Presence of Impulse Noise	HK	ISSUED	08102934.7	10/14/05	HK 1108783	HK1108783	12/16/11	10/14/25
6936-55-PCT	DMT Symbol Repetition in the Presence of Impluse Noise	WO	NAT PHASE	PCT/US05/36815	10/14/05	WO 2006/044533 A1			
6936-55-PEP	DMT SYMBOL REPETITION IN THE PRESENCE OF IMPULSE NOISE	EP	ISSUED	05810124.7	10/14/05	1800427	1800427	6/20/12	10/14/25
6936-55-PEPBE	Initialization in the Presence of Impulse Noise	BE	ISSUED	05810124.7	10/14/05		1800427	6/20/12	10/14/25
6936-55-PEPCH	Initialization in the Presence of Impulse Noise	CH	ABANDONED	05810124.7	10/14/05		1800427	6/20/12	9/8/20
6936-55-PEPDE	Initialization in the Presence of Impulse Noise	DE	ISSUED	05810124.7	10/14/05		1800427	6/20/12	10/14/25
6936-55-PEPDK	Initialization in the Presence of Impulse Noise	DK	ABANDONED	05810124.7	10/14/05		1800427	6/20/12	10/14/25
6936-55-PEPES	Initialization in the Presence of Impulse Noise	ES	ISSUED	05810124.7	10/14/05		1800427	6/20/12	10/14/25
6936-55-PEPFR	Initialization in the Presence of Impulse Noise	FR	ISSUED	05810124.7	10/14/05		1800427	6/20/12	10/14/25
6936-55-PEPGB	Initialization in the Presence of Impulse Noise	GB	ISSUED	05810124.7	10/14/05		1800427	6/20/12	10/14/25
6936-55-PEPHK	Initialization in the Presence of Impulse Noise	HK	ISSUED	07112380.6	10/14/05	HK 1103889	1103889	12/28/12	10/14/25
6936-55-PEPIT	Initialization in the Presence of Impulse Noise	IT	ISSUED	05810124.7	10/14/05		1800427	6/20/12	10/14/25
6936-55-PEPNL	Initialization in the Presence of Impulse Noise	NL	ISSUED	05810124.7	10/14/05		1800427	6/20/12	10/14/25
6936-55-PEPSE	Initialization in the Presence of Impulse Noise	SE	ABANDONED	05810124.7	10/14/05		1800427	6/20/12	10/14/25
6936-55-PEP-DIV	Initialization in the Presence of Impulse Noise	EP	ISSUED	11000980.0	10/14/05	2312784	2312784	2/1/17	10/14/25
6936-55-PEP-DIV-DE	Initialization in the Presence of Impulse Noise	DE	ISSUED	11000980.0	10/14/05		2312784	2/1/17	10/14/25
6936-55-PEP-DIV-FR	Initialization in the Presence of Impulse Noise	FR	ISSUED	11000980.0	10/14/05		2312784	2/1/17	10/14/25
6936-55-PEP-DIV-GB	Initialization in the Presence of Impulse Noise	GB	ISSUED	11000980.0	10/14/05		2312784	2/1/17	10/14/25
6936-55-PEP-DIV-2	Initialization in the Presence of Impulse Noise	EP	PUBLISHED	17020039.8	10/14/05	3220567			10/14/25
6936-55-PEP-DIV-2-HK	Initialization in the Presence of Impulse Noise	HK	PUBLISHED	18100419.3	10/14/15	1241167			10/14/35
6936-55-PIN	Initialization in the Presence of Impulse Noise	IN	ABANDONED	1209/KOLNP/2007	10/14/05	IN 1209/KOLNP/2007			10/15/24
6936-55-PJP	DMT Symbol Repetition in the Presense of Impulse Noise	JP	ABANDONED	2007-536883	10/14/05	2008-517535			4/15/13
6936-55-PJP-DIV	DMT Symbol Repetition in the Presense of Impulse Noise	JP	ABANDONED	2008-264567	10/14/05	2009-081862			4/15/13
6936-55-PKR	DMT SYMBOL REPETITION IN THE PRESENCE OF IMPULSE NOISE	KR	ISSUED	10-2007-7008275	10/14/05	10-2007-0061867	10-1272404	5/31/13	10/14/25
6936-55-PKR-DIV	DMT Symbol Repetition in the Presence of Impulse Noise	KR	ISSUED	10-2010-7022479	10/14/05	10-2010/0121542	10-1314976	9/27/13	10/14/25
6936-55-PKR-DIV-2	DMT Symbol Repetition in the Presence of Impulse Noise	KR	ABANDONED	10-2012-7021605	10/14/05				4/16/13
6936-55-PROV	XDSL INITIALIZATION IN THE PRESENCE OF IMPULSE NOISE	US	EXPIRED	60/619,618	10/15/04	N/A			10/15/05
6936-55-PUS	DMT Symbol Repetition in the Presence of Impulse Noise	US	ISSUED	11/575,598	3/20/07	US 2007-0217491 A1	7,796,705	9/14/10	8/22/27
6936-55-PUS-CON	Impulse Noise Protection During Initialization	US	ISSUED	12/769,747	4/29/10	US 2010-0208842 A1	8,913,649	12/16/14	10/14/25
6936-55-PUS-CON-2	DMT Symbol Repetition in the Presence of Impulse Noise	US	ISSUED	14/559,156	12/3/14	US 2015-0146821 A1	9,621,198	4/11/17	10/14/25
6936-55-PUS-CON-3	DMT SYMBOL REPETITION IN THE PRESENCE OF IMPULSE NOISE	US	ABANDONED	15/479,866	4/5/17	US 2017-0214487 A1			9/12/19
6936-55-PUS-CON-4	DMT SYMBOL REPETITION IN THE PRESENCE OF IMPULSE NOISE	US	PUBLISHED	16/569,144	9/12/19	US 2020-0007268 A1			10/14/25
6936-57-PAU	Packet Retransmission and Memory Sharing	AU	ABANDONED	2007257055	4/12/07	AU 2007257055			4/12/27
6936-57-PBR	Packet Retransmission and Memory Sharing	BR	ISSUED	PI-0709871-5	4/12/07	BR PI0709871	PI 0709871-5	10/15/19	10/15/29
6936-57-PCA	Packet Retransmission and Memory Sharing	CA	ISSUED	2,647,589	4/12/07	CA 2647589	2,647,589	8/21/18	4/12/27

6936-57-PCA-DIV	Packet Retransmission and Memory Sharing	CA	PENDING	3,011,163	4/12/07				4/12/27
6936-57-PCN	Packet Retransmission and Memory Sharing	CN	ABANDONED	200780012891.0	4/12/07	CN101421992A			4/16/13
6936-57-PCN-HK	Packet Retransmission and Memory Sharing	HK	ABANDONED	09109954.6	4/12/07	HK 1133132			4/16/13
6936-57-PCO	Packet Retransmission and Memory Sharing	CO	ABANDONED	08-109.377	4/12/07	08-109.377			4/12/27
6936-57-PCT	Packet Retransmission and Memory Sharing	WO	NAT PHASE	PCT/US07/66522	4/12/07	WO 2007/143277			
6936-57-PEP	Packet Retransmission and Memory Sharing	EP	ISSUED	07811844.5	4/12/07	2005674	2005674	9/28/16	4/12/27
6936-57-PEP-DE	Packet Retransmission and Memory Sharing	DE	ISSUED	07811844.5	4/12/07		2005674	9/28/16	4/12/27
6936-57-PEP-FR	Packet Retransmission and Memory Sharing	FR	ISSUED	07811844.5	4/12/07		2005674	9/28/16	4/12/27
6936-57-PEP-GB	Packet Retransmission and Memory Sharing	GB	ISSUED	07811844.5	4/12/07		2005674	9/28/16	4/12/27
6936-57-PEP-DIV	Packet Retransmission and Memory Sharing	EP	ISSUED	10000017.3	4/12/07	2178254	2178254	2/8/17	4/12/27
6936-57-PEP-DIV-DE	Packet Retransmission and Memory Sharing	DE	ISSUED	10000017.3	4/12/07		2178254	2/8/17	4/12/27
6936-57-PEP-DIV-FR	Packet Retransmission and Memory Sharing	FR	ISSUED	10000017.3	4/12/07		2178254	2/8/17	4/12/27
6936-57-PEP-DIV-GB	Packet Retransmission and Memory Sharing	GB	ISSUED	10000017.3	4/12/07		2178254	2/8/17	4/12/27
6936-57-PEP-DIV-HK	Packet Retransmission and Memory Sharing	HK	ABANDONED	10104429.1	4/12/07	HK 1136723			10/26/16
6936-57-PEP-DIV-2	Packet Retransmission and Memory Sharing	EP	ISSUED	10000016.5	4/12/07	2173071	2173071	6/26/13	4/12/27
6936-57-PEP-DIV-2-BE	Packet Retransmission and Memory Sharing	BE	ABANDONED	10000016.5	4/12/07		2173071	6/26/13	1/13/17
6936-57-PEP-DIV-2-DE	Packet Retransmission and Memory Sharing	DE	ABANDONED	10000016.5	4/12/07		2173071	6/26/13	1/13/17
6936-57-PEP-DIV-2-FR	Packet Retransmission and Memory Sharing	FR	ABANDONED	10000016.5	4/12/07		2173071	6/26/13	1/13/17
6936-57-PEP-DIV-2-GB	Packet Retransmission and Memory Sharing	GB	ABANDONED	10000016.5	4/12/07		2173071	6/26/13	1/13/17
6936-57-PEP-DIV-2-HK	Packet Retransmission and Memory Sharing	HK	ABANDONED	10103698.7	4/12/07	HK 1135537	1135537	11/15/13	1/13/17
6936-57-PEP-DIV-3	Packet Retransmission and Memory Sharing	EP	ISSUED	17020026.5	4/12/07	3190756	3190756	10/31/18	4/12/27
6936-57-PEP-DIV-3-DE	Packet Retransmission and Memory Sharing	DE	ISSUED	17020026.5	4/12/07		3190756	10/31/18	4/12/27
6936-57-PEP-DIV-3-FR	Packet Retransmission and Memory Sharing	FR	ISSUED	17020026.5	4/12/07		3190756	10/31/18	4/12/27
6936-57-PEP-DIV-3-GB	Packet Retransmission and Memory Sharing	GB	ISSUED	17020026.5	4/12/07		3190756	10/31/18	4/12/27
6936-57-PEP-DIV-4	Packet Retransmission and Memory Sharing	EP	PUBLISHED	17020525.6	4/12/07	3301871			4/12/27
6936-57-PEP-DIV-4-HK	Packet Retransmission and Memory Sharing	HK	PENDING	18110134.6	4/12/07				4/12/27
6936-57-PIN	Packet Retransmission and Memory Sharing	IN	ABANDONED	4084/KOLNP/2008	4/12/07	IN 4084/KOLNP/2008			4/12/27
6936-57-PJP	6936and Memory Sharing	JP	ABANDONED	2009-505623	4/12/07	2009-533973			2/27/12
6936-57-PJP-DIV	Packet Retransmission and Memory Sharing	JP	ABANDONED	2010-017356	4/12/07	2010-136427			10/2/12
6936-57-PJP-DIV-2	Packet Retransmission and Memory Sharing	JP	ISSUED	2012-042978	4/12/07	2012-151863	5486621	2/28/14	4/12/27
6936-57-PJP-DIV-3	Packet Retransmission and Memory Sharing	JP	ISSUED	2013-246257	4/12/07	2014-090433	5948307	6/10/16	4/12/27
6936-57-PKR	Packet Retransmission and Memory Sharing	KR	ISSUED	10-2008-7024792	4/12/07	10-2008-0108127	10-1736999	5/11/17	4/12/27
6936-57-PKR-DIV	Packet Retransmission and Memory Sharing	KR	ABANDONED	10-2014-7005299	4/12/07				6/20/16
6936-57-PKR-DIV-2	Packet Retransmission and Memory Sharing	KR	ABANDONED	10-2017-7012757	4/12/07				1/12/18
6936-57-PKR-DIV-3	Packet Retransmission and Memory Sharing	KR	ISSUED	10-2017-7036067	4/12/07		10-1952812	2/21/19	4/12/27
6936-57-PKR-DIV-4	Packet Retransmission and Memory Sharing	KR	ISSUED	10-2019-7005116	4/12/07		10-2151398	8/28/20	4/12/27
6936-57-PMX	Packet Retransmission and Memory Sharing	MX	ISSUED	MX/a/2008/012505	4/12/07	MX 2008012505	301471	7/18/12	4/12/27
6936-57-PMX-DIV	Packet Retransmission and Memory Sharing	MX	ABANDONED	MX/a/2011/005751	4/12/07				4/12/27
6936-57-PROV	XDSL PACKET RETRANSMISSION MECHANISM	US	EXPIRED	60/792,236	4/12/06	N/A			4/12/07
6936-57-PUS	Packet Retransmission and Memory Sharing	US	ISSUED	12/295,828	10/2/08	US 2009-0300450 A1	8,335,956	12/18/12	10/11/25
6936-57-PUS-CON	Packet Retransmission and Memory Sharing	US	ISSUED	12/783,758	5/20/10	US 2011-0002331 A1	8,407,546	3/26/13	7/23/28
6936-57-PUS-CON-2	Packet Retransmission and Memory Sharing	US	ISSUED	13/766,059	2/13/13	US 2013-0163592 A1	8,645,784	2/4/14	4/12/27
6936-57-PUS-CON-3	Packet Retransmission and Memory Sharing	US	ISSUED	14/159,125	1/20/14	US 2014-0133491 A1	9,485,055	11/1/16	4/12/27
6936-57-PUS-CON-4	PACKET RETRANSMISSION AND MEMORY SHARING	US	ISSUED	15/298,526	10/20/16	US 2017-0041224 A1	10,044,473	8/7/18	4/12/27
6936-57-PUS-CON-5	PACKET RETRANSMISSION AND MEMORY SHARING	US	ISSUED	16/046,494	7/26/18	US 2018-0331790 A1	10,484,140	11/19/19	10/11/25
6936-57-PUS-CON-6	PACKET RETRANSMISSION AND MEMORY SHARING	US	PUBLISHED	16/561,835	9/5/19	US 2019-0393991 A1			4/12/27
6936-57-PUS-DIV	Packet Retransmission	US	ISSUED	12/760,728	4/15/10	US 2010-0205501 A1	8,595,577	11/26/13	8/28/27
6936-57-PUS-DIV-CON	Packet Retransmission	US	ISSUED	12/783,765	5/20/10	US 2010-0332935 A1	8,468,411	6/18/13	10/11/25
6936-57-PUS-DIV-CON-2	Packet Retransmission	US	ISSUED	14/075,194	11/8/13	US 2014-0068366 A1	9,094,348	7/28/15	4/12/27
6936-57-PUS-DIV-CON-3	Packet Retransmission	US	ISSUED	14/742,334	6/17/15	US 2015-0312001 A1	9,749,235	8/29/17	4/12/27

6936-57-PUS-DIV-CON-4	Packet Retransmission	US	ISSUED	15/678,870	8/16/17	US 2017-0373971 A1	10,498,495	12/3/19	4/12/27
6936-57-PUS-DIV-CON-5	TECHNIQUES FOR PACKET AND MESSAGE COMMUNICATION IN A MULTICARRIER TRANSCEIVER ENVIRONMENT	US	ISSUED	16/701,343	12/3/19	US 2020-0106558 A1	10,833,809	11/10/20	4/12/27
6936-57-PUS-DIV-CON-6	PACKET RETRANSMISSION	US	PENDING	17/027,196	9/21/20				4/12/27
6936-59-PROV	xDSL Packet Retransmission Mechanism With Examples	US	EXPIRED	60/849,650	10/5/06	N/A			10/5/07
6936-26	SYSTEMS AND METHODS FOR A MULTICARRIER MODULATION SYSTEM WITH A VARIABLE MARGIN	US	ABANDONED	09/836,295	4/18/01	US 2002-0009155			10/4/05
6936-26-CON	SYSTEMS AND METHODS FOR A MULTICARRIER MODULATION SYSTEM WITH A VARIABLE MARGIN	US	ABANDONED	11/242,024	10/4/05	US 2006-0018395 A1			4/18/21
6936-26-CON-2	Systems and Methods for a Multicarrier Modulation System with a Variable Margin	US	ABANDONED	11/972,340	1/10/08	US 2008-0107204 A1			7/27/11
6936-26-CON-3	Systems and Methods for a Multicarrier Modulation System with a Variable Margin	US	ISSUED	12/694,143	1/26/10	US 2010-0128810 A1	8,374,226	2/12/13	7/3/21
6936-26-CON-4	Systems and Methods for a Multicarrier Modulation System with a Variable Margin	US	ABANDONED	13/467,392	5/9/12	US 2012-0219047 A1			4/18/21
6936-26-CON-5	Systems and Methods for a Multicarrier Modulation System with a Variable Margin	US	ISSUED	13/764,529	2/11/13	US 2013-0148708 A1	8,625,660	1/7/14	4/18/21
6936-26-CON-6	Systems and Methods for a Multicarrier Modulation System with a Variable Margin	US	ISSUED	14/079,285	11/13/13	US 2014-0072062 A1	8,937,988	1/20/15	4/18/21
6936-26-CON-7	Systems and Methods for a Multicarrier Modulation System with a Variable Margin	US	ISSUED	14/591,612	1/7/15	US 2015-0117557 A1	9,154,354	10/6/15	4/18/21
6936-26-CON-8	SYSTEMS AND METHODS FOR A MULTICARRIER MODULATION SYSTEM WITH A VARIABLE MARGIN	US	ABANDONED	14/865,966	9/25/15	US 2016-0013962 A1			12/13/16
6936-26-CON-9	SYSTEMS AND METHODS FOR A MULTICARRIER MODULATION SYSTEM WITH A VARIABLE MARGIN	US	ISSUED	15/348,372	11/10/16	US 2017-0078129 A1	9,893,921	2/13/18	4/18/21
6936-26-CON-10	SYSTEMS AND METHODS FOR A MULTICARRIER MODULATION SYSTEM WITH A VARIABLE MARGIN	US	ISSUED	15/886,295	2/1/18	US 2018-0159711 A1	10,708,104	7/7/20	4/18/21
6936-26-PAU	MULTICARRIER MODULATION SYSTEM WITH VARIABLE MARGIN TO ACCOUNT FOR TIME VARYING IMPAIRMENTS	AU	ABANDONED	2001257081	4/18/01	N/A			
6936-26-PAU-CON	Data Allocation with Variable SNR Margins	AU	ISSUED	2007200448	4/18/01	AU 2007200448	2007200448	8/6/09	4/18/21
6936-26-PAU-CON-2	Data Allocation with Variable SNR Margins	AU	ABANDONED	2009202880	4/18/05	AU 2009202880			10/18/11
6936-26-PCA	MULTICARRIER MODULATION SYSTEM WITH VARIABLE MARGIN TO ACCOUNT FOR TIME VARYING IMPAIRMENTS	CA	ISSUED	2,406,151	4/18/01	CA 2405151	2,406,151	4/13/10	4/18/21
6936-26-PCA-2	DATA ALLOCATION WITH VARIABLE SNR MARGINS	CA	ABANDONED	2,689,952	4/18/01	CA 689952			2/24/11
6936-26-PCT	MULTICARRIER MODULATION SYSTEM WITH VARIABLE MARGIN TO ACCOUNT FOR TIME VARYING IMPAIRMENTS	WO	NAT PHASE	PCT/US01/12555	4/18/01	WO 2001/080510			
6936-26-PEP	MULTICARRIER MODULATION SYSTEM WITH VARIABLE MARGIN TO ACCOUNT FOR TIME VARYING IMPAIRMENTS	EP	ABANDONED	01930554.9	4/18/01	EP 1275229	1275229	3/21/07	4/18/21
6936-26-PEPBE	Data Allocation With Variable SNR Margins	BE	ABANDONED	01930554.9	4/18/01	N/A	1275229	3/21/07	4/18/21
6936-26-PEPDE	Data Allocation With Variable SNR Margins	DE	ABANDONED	01930554.9	4/18/01	N/A	1275229	3/21/07	4/18/21
6936-26-PEPFR	Data Allocation With Variable SNR Margins	FR	ABANDONED	01930554.9	4/18/01	N/A	1275229	3/21/07	4/18/21
6936-26-PEPGB	Data Allocation With Variable SNR Margins	GB	ABANDONED	01930554.9	4/18/01	N/A	1275229	3/21/07	4/18/21
6936-26-PEP-DIV	Data Allocation With Variable SNR Margins	EP	ISSUED	07005676.7	4/18/01	1830535	1830535	6/15/11	4/18/21
6936-26-PEP-DIV-BE	Data Allocation With Variable SNR Margins	BE	ISSUED	07005676.7	4/18/01	N/A	1830535	9/5/07	4/18/21
6936-26-PEP-DIV-DE	Data Allocation With Variable SNR Margins	DE	ISSUED	07005676.7	4/18/01		1830535	6/15/11	4/18/21
6936-26-PEP-DIV-FR	Data Allocation With Variable SNR Margins	FR	ISSUED	07005676.7	4/18/01	N/A	1830535	9/5/07	4/18/21
6936-26-PEP-DIV-GB	Data Allocation With Variable SNR Margins	GB	ISSUED	07005676.7	4/18/01	N/A	1830535	9/5/07	4/18/21
6936-26-PEP-DIV-2	MULTICARRIER MODULATION SYSTEM WITH VARIABLE MARGIN TO ACCOUNT FOR TIME VARYING IMPAIRMENTS	EP	ABANDONED	10011998.1	4/18/01	2267963			4/18/21
6936-26-PJP	MULTICARRIER MODULATION SYSTEM WITH VARIABLE MARGIN TO ACCOUNT FOR TIME VARYING IMPAIRMENTS	JP	ABANDONED	2001-576639	4/18/01	2004-501535			4/18/21
6936-26-PKR	MULTICARRIER MODULATION SYSTEM WITH VARIABLE MARGIN TO ACCOUNT FOR TIME VARYING IMPAIRMENTS	KR	ABANDONED	2002-7013983	4/18/01	10-2002-087990			4/18/21
6936-26-PROV	MULTICARRIER MODULATION SYSTEM WITH VARIABLE MARGIN TO ACCOUNT FOR TIME VARYING IMPAIRMENTS	US	EXPIRED	60/197,727	4/18/00	N/A			4/18/01

6936-7-CON	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	US	ABANDONED	10/202,688	7/25/02	US 2003-0007509			7/13/06
6936-7-PAU	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	AU	EXPIRED	48339/99	6/25/99	AU 4833999	750898	11/21/02	6/25/19
6936-7-PAU-2	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	AU	EXPIRED	2002301627	6/25/99	AU 2002301627	2002301627	8/6/04	6/25/19
6936-7-PAU-3	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	AU	ABANDONED	2004203322	6/25/99	AU 2004203322	2004203322	10/11/07	5/4/17
6936-7-PAU-4	Multicarrier Communication With Variable Overhead Rate	AU	ABANDONED	2007202930	6/25/99	AU 2007202930			6/25/19
6936-7-PAU-4-DIV	Multicarrier Communication With Variable Overhead Rate	AU	ABANDONED	2010249199	6/25/99	AU 2010249199			6/25/19
6936-7-PCA	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	CA	ABANDONED	2,335,865	6/25/99	CA 2335865	2,335,865	12/16/08	3/10/17
6936-7-PCA-DIV	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	CA	EXPIRED	2,641,978	6/25/99	CA 2641978	2,641,978	1/6/15	6/25/19
6936-7-PCA-DIV-2	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	CA	EXPIRED	2,867,539	6/25/99		2,867,539	3/14/17	6/25/19
6936-7-PCT	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	WO	NAT PHASE	PCT/US99/14467	6/25/99	WO 2000/001127			
6936-7-PEP-2	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	EP	EXPIRED	04012683.1	6/25/99	1453268	1453268	3/8/06	6/25/19
6936-7-PEPAT-2	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	AT	EXPIRED	04012683.1	6/25/99	N/A	1453268	3/8/06	6/25/19
6936-7-PEPBE-2	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	BE	EXPIRED	04012683.1	6/25/99	N/A	1453268	3/8/06	6/25/19
6936-7-PEPCH-2	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	CH	EXPIRED	04012683.1	6/25/99	N/A	1453268	3/8/06	6/25/19
6936-7-PEPDE-2	Multicarrier Communication With Variable Overhead Rate	DE	EXPIRED	04012683.1	6/25/99	N/A	1453268	3/8/06	6/25/19
6936-7-PEPES-2	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	ES	EXPIRED	04012683.1	6/25/99	N/A	1453268	3/8/06	6/25/19
6936-7-PEPFI-2	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	FI	EXPIRED	04012683.1	6/25/99	N/A	1453268	3/8/06	6/25/19
6936-7-PEPFR-2	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	FR	EXPIRED	04012683.1	6/25/99	N/A	1453268	3/8/06	6/25/19
6936-7-PEPGB-2	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	GB	EXPIRED	04012683.1	6/25/99	N/A	1453268	3/8/06	6/25/19
6936-7-PEPGR-2	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	GR	EXPIRED	04012683.1	6/25/99	N/A	1453268	3/8/06	6/25/19
6936-7-PEPHK-2	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	HK	EXPIRED	05101665.7	6/25/99	HK 1068080	HK1068080	5/6/06	6/25/19
6936-7-PEPIE-2	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	IE	EXPIRED	04012683.1	6/25/99	N/A	1453268	3/8/06	6/25/19
6936-7-PEPIT-2	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	IT	EXPIRED	04012683.1	6/25/99	N/A	1453268	3/8/06	6/25/19
6936-7-PEPNL-2	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	NL	EXPIRED	04012683.1	6/25/99	N/A	1453268	3/8/06	6/25/19
6936-7-PEPSE-2	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	SE	EXPIRED	04012683.1	6/25/99	N/A	1453268	3/8/06	6/25/19
6936-7-PEP-3	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	EP	EXPIRED	06004566.3	6/25/99	EP 1667392	1667392	1/10/18	6/25/19
6936-7-PEP-3-DE	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	DE	EXPIRED	06004566.3	6/25/99		1667392	1/10/18	6/25/19
6936-7-PEP-3-FR	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	FR	EXPIRED	06004566.3	6/25/99		1667392	1/10/18	6/25/19
6936-7-PEP-3-GB	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	GB	EXPIRED	06004566.3	6/25/99		1667392	1/10/18	6/25/19
6936-7-PEP-3-HK	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	HK	EXPIRED	06112790.1	6/25/99	1091070	HK1091070	6/22/18	6/25/19
6936-7-PEP-3-DIV-1	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	EP	EXPIRED	10011974.2	6/25/99	2278765	2278765	11/7/18	6/25/19
6936-7-PEP-3-DIV-1-AT	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	AT	EXPIRED	10011974.2	6/25/99		2278765	11/7/18	6/25/19
6936-7-PEP-3-DIV-1-BE	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	BE	EXPIRED	10011974.2	6/25/99		2278765	11/7/18	6/25/19
6936-7-PEP-3-DIV-1-CH	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	CH	EXPIRED	10011974.2	6/25/99		2278765	11/7/18	6/25/19
6936-7-PEP-3-DIV-1-DE	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	DE	EXPIRED	10011974.2	6/25/99	2278765	DE 699 45 900.1	11/7/18	6/25/19
6936-7-PEP-3-DIV-1-ES	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	ES	EXPIRED	10011974.2	6/25/99		2278765	11/7/18	6/25/19
6936-7-PEP-3-DIV-1-FI	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	FI	EXPIRED	10011974.2	6/25/99		2278765	11/7/18	6/25/19
6936-7-PEP-3-DIV-1-FR	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	FR	EXPIRED	10011974.2	6/25/99		2278765	11/7/18	6/25/19
6936-7-PEP-3-DIV-1-GB	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	GB	EXPIRED	10011974.2	6/25/99		2278765	11/7/18	6/25/19
6936-7-PEP-3-DIV-1-GR	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	GR	EXPIRED	10011974.2	6/25/99		2278765	11/7/18	6/25/19
6936-7-PEP-3-DIV-1-IE	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	IE	EXPIRED	10011974.2	6/25/99		2278765	11/7/18	6/25/19
6936-7-PEP-3-DIV-1-IT	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	IT	EXPIRED	10011974.2	6/25/99		2278765	11/7/18	6/25/19
6936-7-PEP-3-DIV-1-NL	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	NL	EXPIRED	10011974.2	6/25/99		2278765	11/7/18	6/25/19
6936-7-PEP-3-DIV-1-SE	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	SE	EXPIRED	10011974.2	6/25/99		2278765	11/7/18	6/25/19
6936-7-PEP-3-DIV-2	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	EP	EXPIRED	10011980.9	6/25/99	2278766	2278766	11/7/18	6/25/19
6936-7-PEP-3-DIV-2-DE	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	DE	EXPIRED	10011980.9	6/25/99	2278766	DE 699 45 902.8	11/7/18	6/25/19
6936-7-PEP-3-DIV-2-FR	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	FR	EXPIRED	10011980.9	6/25/99		2278766	11/7/18	6/25/19
6936-7-PEP-3-DIV-2-GB	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	GB	EXPIRED	10011980.9	6/25/99		2278766	11/7/18	6/25/19

6936-7-PEP-3-DIV-3	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	EP	EXPIRED	10011981.7	6/25/99	2278767	2278767	11/7/18	6/25/19
6936-7-PEP-3-DIV-3-DE	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	DE	EXPIRED	10011981.7	6/25/99	2278767	DE 699 45 903.6	11/7/18	6/25/19
6936-7-PEP-3-DIV-3-FR	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	FR	EXPIRED	10011981.7	6/25/99		2278767	11/7/18	6/25/19
6936-7-PEP-3-DIV-3-GB	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	GB	EXPIRED	10011981.7	6/25/99		2278767	11/7/18	6/25/19
6936-7-PKR	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	KR	ABANDONED	2000-7014830	6/25/99	10-2001-0053220	10-0955169	4/20/10	3/10/17
6936-7-PKR-2	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	KR	EXPIRED	10-2010-7002843	6/25/99	10-2010-0031635	10-1006609	12/30/10	6/25/19
6936-7-PKR-3	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	KR	ABANDONED	10-2010-7021589	6/25/99	10-2010-0121683			6/25/19
6936-7-PROV	MULTICARRIER COMMUNICATION WITH VARIABLE OVERHEAD RATE	US	EXPIRED	60/090,891	6/26/98	N/A			6/26/99
6936-3	SYSTEM AND METHOD FOR THE APPLICATION OF AN LMS METHOD TO UPDATING AN ECHO CANCELLER IN AN ADSL MODEM	US	ABANDONED	09/768,275	1/25/01	US 2001-0040875			8/25/05
6936-3-CON	SYSTEM AND METHOD FOR THE APPLICATION OF AN LMS METHOD TO UPDATING AN ECHO CANCELLER IN AN ADSL MODEM	US	ABANDONED	11/058,289	2/16/05	US 2005-0141441 A1			5/9/06
6936-3-CON-2	SYSTEM AND METHOD FOR THE APPLICATION OF AN LMS METHOD TO UPDATING AN ECHO CANCELLER IN AN ADSL MODEM	US	ABANDONED	11/430,251	5/9/06	US 2006-0215587 A1			12/10/10
6936-3-CON-3	SYSTEM AND METHOD FOR THE APPLICATION ON AN LMS METHOD TO UPDATING AN ECHO CANCELLER IN AN ADSL MODEM	US	ISSUED	12/783,740	5/20/10	US 2010-0296663 A1	8,391,191	3/5/13	1/29/21
6936-3-CON-4	SYSTEM AND METHOD FOR THE APPLICATION OF AN LMS METHOD TO UPDATING AN ECHO CANCELLER IN AN ADSL MODEM	US	ABANDONED	12/783,744	5/20/10	N/A			2/18/11
6936-3-CON-5	SYSTEM AND METHOD FOR THE APPLICATION OF AN LMS METHOD TO UPDATING AN ECHO CANCELLER IN AN ADSL MODEM	US	ISSUED	13/772,516	2/21/13	US 2013-0163749 A1	8,649,305	2/11/14	1/25/21
6936-3-CON-6	System and Method for the Application of an LMS Method to Updating an Echo Canceller in an ADSL Modem	US	ISSUED	14/164,632	1/27/14	US 2014-0140499 A1	9,065,886	6/23/15	1/25/21
6936-3-CON-7	SYSTEM AND METHOD FOR THE APPLICATION OF AN LMS METHOD TO UPDATING AN ECHO CANCELLER IN A MULTICARRIER TRANSCEIVER	US	ABANDONED	14/724,345	5/28/15	US 2015-0288808 A1			11/4/16
6936-3-PAU	SYSTEM AND METHOD FOR THE APPLICATION OF AN LMS METHOD TO UPDATING AN ECHO CANCELLER COEFFICIENTS IN AN ADSL MODEM	AU	ABANDONED	32943/01	1/25/01	AU 3294301	783527	2/16/06	1/4/17
6936-3-PCA	System and Method for the Application of an LMS Method to Updating an Echo Canceller in an ADSL Modem	CA	ABANDONED	2,396,162	1/25/01	CA 2396162			4/25/12
6936-3-PCT	APPLICATION OF LMS METHOD TO UPDATING ECHO CANCELLER COEFFICIENTS IN ADSL MODEM	WO	NAT PHASE	PCT/US01/02341	1/25/01	WO 2001/056184			
6936-3-PEP	APPLICATION OF LMS METHOD TO UPDATING ECHO CANCELLER COEFFICIENTS IN ADSL MODEM	EP	ABANDONED	01905022.8	1/25/01	EP 1250766	1250766	9/17/08	12/12/19
6936-3-PEP-BE	APPLICATION OF LMS METHOD TO UPDATING ECHO CANCELLER COEFFICIENTS IN ADSL MODEM	BE	ABANDONED	01905022.8	1/25/01	N/A	1250766	9/17/08	12/12/19
6936-3-PEP-DE	APPLICATION OF LMS METHOD TO UPDATING ECHO CANCELLER COEFFICIENTS IN ADSL MODEM	DE	ABANDONED	01905022.8	1/25/01	N/A	1250766	9/17/08	12/12/19
6936-3-PEP-FR	APPLICATION OF LMS METHOD TO UPDATING ECHO CANCELLER COEFFICIENTS IN ADSL MODEM	FR	ABANDONED	01905022.8	1/25/01	N/A	1250766	9/17/08	12/12/19
6936-3-PEP-GB	APPLICATION OF LMS METHOD TO UPDATING ECHO CANCELLER COEFFICIENTS IN ADSL MODEM	GB	ABANDONED	01905022.8	1/25/01	N/A	1250766	9/17/08	12/12/19
6936-3-PEP-DIV	System and Method for the Application of an LMS Method to Updating an Echo Canceller in an ADSL Modem	EP	ABANDONED	08015818.1	1/25/01	1 995 884			1/25/21
6936-3-PEP-DIV-2	System and Method for the Application of an LMS Method to Updating an Echo Canceller in an ADSL Modem	EP	ABANDONED	10011999.9	1/25/01	2267913			1/25/21
6936-3-PJP	APPLICATION OF LMS METHOD TO UPDATING ECHO CANCELLER COEFFICIENTS IN ADSL MODEM	JP	ABANDONED	2001-555226	1/25/01	JP 2003-521194			1/25/21
6936-3-PKR	APPLICATION OF LMS METHOD TO UPDATING ECHO CANCELLER COEFFICIENTS IN ADSL MODEM	KR	ABANDONED	2002-7009465	1/25/01	10-2002-0069265			1/25/21
6936-3-PKR-DIV	APPLICATION OF LMS METHOD TO UPDATING ECHO CANCELLER COEFFICIENTS IN ADSL MODEM	KR	ABANDONED	10-2010-7006184	1/25/01	10-2010-0034063			1/25/21
6936-3-PROV	APPLICATION OF LMS METHOD TO UPDATING ECHO CANCELLER COEFFICIENTS IN ADSL MODEM	US	EXPIRED	60/177,944	1/25/00	N/A			1/25/01

6936-14	SYSTEMS AND METHODS FOR MULTICARRIER MODULATION USING MULTI-TAP FREQUENCY-DOMAIN EQUALIZER AND DECISION FEEDBACK	US	ISSUED	10/211,425	8/2/02	US 2003-0067865	6,760,373	7/6/04	8/2/22
6936-14-CON	SYSTEMS AND METHODS FOR MULTICARRIER MODULATION USING MULTI-TAP FREQUENCY-DOMAIN EQUALIZER AND DECISION FEEDBACK	US	ABANDONED	10/834,193	4/29/04	US 2004-0202259			8/2/22
6936-14-CON-2	Systems and Methods for Multicarrier Modulation Using Multi-Tap Frequency-Domain Equalizer and Decision Feedback	US	ISSUED	11/964,409	12/26/07	US 2008-0101452 A1	7,656,976	2/2/10	8/2/22
6936-14-CON-3	SYSTEMS AND METHODS FOR MULTICARRIER MODULATION USING MULTI-TAP FREQUENCY-DOMAIN EQUALIZER AND DECISION FEEDBACK	US	ABANDONED	12/640,838	12/17/09	US 2010-0098149 A1			9/23/11
6936-14-CON-4	SYSTEMS AND METHODS FOR MULTICARRIER MODULATION USING MULTI-TAP FREQUENCY-DOMAIN EQUALIZER AND DECISION FEEDBACK	US	ABANDONED	12/783,796	5/20/10	US 2010-0296570 A1			3/2/11
6936-14-CON-5	SYSTEMS AND METHODS FOR MULTICARRIER MODULATION USING MULTI-TAP FREQUENCY-DOMAIN EQUALIZER AND DECISION FEEDBACK	US	ABANDONED	12/783,801	5/20/10	N/A			2/18/11
6936-14-PCT	SYSTEMS AND METHOD FOR MULTICARRIER MODULATION USING MULTI-TAP FREQUENCY-DOMAIN EQUALIZER AND DECISION FEEDBACK	WO	NAT PHASE	PCT/US02/24326	8/2/02	WO 2003/012990			
6936-14-PROV	MULTICARRIER MODULATION METHOD USING MULTI-TAP FREQUENCY-DOMAIN EQULIZATION AND DECISION FEED BACK	US	EXPIRED	60/309,631	8/2/01	N/A			8/2/02
6936-19	MULTI-CARRIER TRANSCEIVER	US	EXPIRED	08/105,796	8/12/93	N/A	5,497,398	3/5/96	8/12/13
6936-19-PCT	MULTI-CARRIER TRANSCEIVER	WO	NAT PHASE	PCT/US94/06713	6/13/94	WO 1995/005711			
6936-21	SYSTEMS AND METHODS FOR IMPLEMENTING RECEIVER TRANSPARENT Q-MODE	US	ISSUED	10/106,329	3/27/02	US 2002/0196861	6,731,695	5/4/04	3/27/21
6936-21-CON	SYSTEMS AND METHODS FOR IMPLEMENTING RECEIVER TRANSPARENT Q-MODE	US	ABANDONED	10/802,867	3/18/04	US 2004-0184552 A1			11/10/05
6936-21-CON-2	SYSTEMS AND METHODS FOR IMPLEMENTING RECEIVER TRANSPARENT Q-MODE	US	ABANDONED	11/200,002	8/10/05	US 2006-0039490 A1			8/7/06
6936-21-CON-3	SYSTEMS AND METHODS FOR IMPLEMENTING RECEIVER TRANSPARENT Q-MODE	US	ABANDONED	11/434,249	5/16/06	US 2006-0203927 A1			3/27/22
6936-21-CON-4	SYSTEMS AND METHODS FOR IMPLEMENTING RECEIVER TRANSPARENT Q-MODE	US	ISSUED	11/674,871	2/14/07	US 2007-0147540 A1	7,558,329	7/7/09	3/27/22
6936-21-CON-5	Systems and Methods for Implementing Receiver Transparent Q-Mode	US	ABANDONED	12/478,577	6/4/09	US 2009-0290620 A1			7/25/11
6936-21-CON-6	Systems and Methods for Implementing Receiver Transparent Q-Mode	US	ISSUED	12/783,749	5/20/10	US 2010-0290558 A1	8,335,271	12/18/12	3/27/22
6936-21-CON-7	Systems and Methods for Implementing Receiver Transparent Q-Mode	US	ABANDONED	12/783,755	5/20/10	US 2010-0296604 A1			3/27/22
6936-21-CON-8	Systems and Methods for Implementing Receiver Transparent Q-Mode	US	ISSUED	13/693,394	12/4/12	US 2013-0094609 A1	8,792,574	7/29/14	3/27/22
6936-21-CON-9	RANDOMIZATION USING AN XOR SCRAMBLER IN MULTICARRIER COMMUNICATIONS	US	ISSUED	14/308,934	6/19/14	US 2014-0294116 A1	9,191,039	11/17/15	3/27/22
6936-21-CON-10	SYSTEMS AND METHODS FOR IMPLEMENTING RECEIVER TRANSPARENT Q-MODE	US	ABANDONED	14/932,599	11/4/15	US 2016-0056857 A1			11/14/17
6936-21-CON-11	SYSTEMS AND METHODS FOR IMPLEMENTING RECEIVER TRANSPARENT Q-MODE	US	ISSUED	15/812,705	11/14/17	US 2018-0069590 A1	10,419,059	9/17/19	3/27/22
6936-21-PAU	RECEIVER TRANSPARENT Q-MODE	AU	ABANDONED	2002248711	3/27/02	AU 2002248711			1/4/05
6936-21-PCA	RECEIVER TRANSPARENT Q-MODE	CA	ABANDONED	2,439,804	3/27/02	CA 2439804			
6936-21-PCT	RECEIVER TRANSPARENT Q-MODE	WO	NAT PHASE	PCT/US02/09411	3/27/02	WO02/078244			
6936-21-PEP	RECEIVER TRANSPARENT Q-MODE	EP	ABANDONED	02717728.6	3/27/02	EP 1374469			11/2/04
6936-21-PJP	RECEIVER TRANSPARENT Q-MODE	JP	ABANDONED	2002-576356	3/27/02	JP 2004-538676			3/10/05
6936-21-PKR	RECEIVER TRANSPARENT Q-MODE	KR	ABANDONED	2003-7012442	3/27/02	10-2004-0004562			
6936-21-PROV-1	RECEIVER TRANSPARENT Q-MODE	US	EXPIRED	60/278,936	3/27/01	N/A			3/27/02
6936-21-PROV-2	RECEIVER TRANSPARENT Q-MODE WITH ON-LINE RECONFIGURATION	US	EXPIRED	60/283,467	4/12/01	N/A			4/12/02
6936-21-PROV-3	RECEIVER TRANSPARENT Q-MODE WITH ON-LINE RECONFIGURATION AND SCRAMBLING	US	EXPIRED	60/287,968	5/1/01	N/A			5/1/02
6936-21-PROV-4	RECEIVER TRANSPARENT Q-MODE WITH ON-LINE RECONFIGURATION, SCRAMBLING AND Q-MODE SYMBOL DISTORTION	US	EXPIRED	60/293,034	5/23/01	N/A			5/23/02
6936-22	MULTI-CARRIER TRANSMISSION SYSTEM ADAPTED FOR PACKET DATA TRANSFER	US	EXPIRED	08/670,245	6/19/96	N/A	5,751,716	5/12/98	6/19/16
6936-22-PCT	MULTI-CARRIER TRANSMISSION SYSTEM ADAPTED FOR PACKET DATA TRANSFER	WO	NAT PHASE	PCT/US97/08756	5/17/97	WO 1997/049208			
6936-22-PEP	MULTI-CARRIER TRANSMISSION SYSTEM ADAPTED FOR PACKET DATA TRANSFER	EP	ABANDONED	97925713.6	5/17/97	N/A			9/5/00

6936-23	SYSTEMS AND METHODS THAT PROVIDE FREQUENCY DOMAIN SUPPLEMENTAL TRAINING OF THE TIME DOMAIN EQUALIZER FOR DMT	US	ISSUED	09/982,065	10/19/01	US 2002-0057734	7,180,938	2/20/07	10/14/23
6936-23-CON	Systems and Methods That Provide Frequency Domain Supplemental Training of the Time Domain Equalizer for DMT	US	ABANDONED	11/616,630	12/27/06	US 2007-0104262			10/19/21
6936-23-CON-2	Systems and Methods That Provide Frequency Domain Supplemental Training of the Time Domain Equalizer for DMT	US	ABANDONED	12/013,874	1/14/08	US 2008-0107164 A1	7,636,389	12/22/09	3/14/17
6936-23-CON-3	Systems and Methods That Provide Frequency Domain Supplemental Training of the Time Domain Equalizer for DMT	US	ABANDONED	12/615,077	11/9/09	US 2010-0054321 A1			2/28/11
6936-23-CON-4	Systems and Methods That Provide Frequency Domain Supplemental Training of the Time Domain Equalizer for DMT	US	ISSUED	12/783,783	5/20/10	US 2010-0290514 A1	8,102,909	1/24/12	10/19/21
6936-23-CON-5	Systems and Methods That Provide Frequency Domain Supplemental Training of the Time Domain Equalizer for DMT	US	ABANDONED	12/783,788	5/20/10	N/A			2/17/11
6936-23-CON-6	Systems and Methods That Provide Frequency Domain Supplemental Training of the Time Domain Equalizer for DMT	US	ABANDONED	13/330,943	12/20/11	US 2012-0087399 A1			9/19/13
6936-23-PCT	SYSTEMS AND METHODS THAT PROVIDE FREQUENCY DOMAIN SUPPLEMENTAL TRAINING OF THE TIME DOMAIN EQUALIZER FOR DMT	WO	NAT PHASE	PCT/US01/32503	10/19/01	WO 2002/033926			
6936-23-PROV	FREQUENCY DOMAIN SUPPLEMENTAL TRAINING OF THE TIME DOMAIN EQUALIZER FOR DMT	US	EXPIRED	60/241,664	10/19/00	N/A			10/19/01
6936-24	MULTICARRIER TRANSMISSION SYSTEM	US	EXPIRED	08/340,747	11/16/94	N/A	5,636,246	6/3/97	11/16/14
6936-24-PAU	MULTICARRIER TRANSMISSION SYSTEM	AU	EXPIRED	41666/96	11/17/95	AU 4166696	708318	11/11/99	11/17/15
6936-24-PCT	MULTICARRIER TRANSMISSION SYSTEM	WO	NAT PHASE	PCT/US95/15115	11/17/95	WO 1997/026711			
6936-24-PGB	MULTICARRIER TRANSMISSION SYSTEM	GB	EXPIRED	9709849.5	11/17/95	GB 2320401	2320401	4/12/00	11/17/15
6936-25	BIT ALLOCATION AMONG CARRIERS IN MULTICARRIER COMMUNICATIONS	US	EXPIRED	09/600,971	7/20/00	N/A	6,870,888	3/22/05	11/23/19
6936-25-PAU	ALLOCATION OF COMMUNICATION BITS AMONG CARRIERS IN MULTICARRIER COMMUNICATIONS	AU	ABANDONED	18292/00	11/23/99	AU 1829200	754597	3/6/03	11/22/16
6936-25-PAU-2	ALLOCATION OF COMMUNICATION BITS AMONG CARRIERS IN MULTICARRIER COMMUNICATIONS	AU	ABANDONED	2002302029	11/18/02	AU 2002302029			11/19/03
6936-25-PCA	ALLOCATION OF COMMUNICATION BITS AMONG CARRIERS IN MULTICARRIER COMMUNICATIONS	CA	ABANDONED	2,350,916	11/23/99	CA 2350916	2,350,916	11/20/07	9/25/17
6936-25-PCA-DIV	Bit Allocation Among Carriers In Multicarrier Communications	CA	EXPIRED	2,599,805	11/23/99	CA 2599805	2,599,805	9/29/09	11/23/19
6936-25-PCT	ALLOCATION OF COMMUNICATION BITS AMONG CARRIERS IN MULTICARRIER COMMUNICATIONS	WO	NAT PHASE	PCT/US99/27798	11/23/99	WO 2000/031940			
6936-25-PEP	ALLOCATION OF COMMUNICATION BITS AMONG CARRIERS IN MULTICARRIER COMMUNICATIONS	EP	EXPIRED	99961782.2	11/23/99	1133858	1133858	6/30/04	11/23/19
6936-25-PEPGB	ALLOCATION OF COMMUNICATION BITS AMONG CARRIERS IN MULTICARRIER COMMUNICATIONS	GB	EXPIRED	99961782.2	11/23/99	N/A	1133858	6/30/04	11/23/19
6936-25-PEP-2	ALLOCATION OF COMMUNICATION BITS AMONG CARRIERS IN MULTICARRIER COMMUNICATIONS	EP	ABANDONED	04012682.3	11/23/99	1453267			11/23/19
6936-25-PEP-2-DIV-1	ALLOCATION OF COMMUNICATION BITS AMONG CARRIERS IN MULTICARRIER COMMUNICATIONS	EP	ABANDONED	10011993.2	11/23/99	2264932			11/23/19
6936-25-PJP	ALLOCATION OF COMMUNICATION BITS AMONG CARRIERS IN MULTICARRIER COMMUNICATIONS	JP	ABANDONED	2000-584658	11/23/99	2002-531010			11/23/19
6936-25-PJP-DIV	ALLOCATION OF COMMUNICATION BITS AMONG CARRIERS IN MULTICARRIER COMMUNICATIONS	JP	ABANDONED	2010-56580	11/23/99	2010-141931			11/23/19
6936-25-PKR	ALLOCATION OF COMMUNICATION BITS AMONG CARRIERS IN MULTICARRIER COMMUNICATIONS	KR	ABANDONED	2001-7006580	11/23/99	10-2001-0101081			11/23/19
6936-25-PROV	ALLOCATION OF COMMUNICATION BITS AMONG CARRIERS IN MULTICARRIER COMMUNICATIONS	US	EXPIRED	60/109,876	11/25/98	N/A			11/25/99
6936-30	MULTI-TAP FREQUENCY DOMAIN EQUALIZATION WITH DECISION FEEDBACK AND TRELLIS DECODING	US	ABANDONED	10/631,745	8/1/03	US 2004-0096008 A1			8/1/23
6936-30-DIV	MULTI-TAP FREQUENCY DOMAIN EQUALIZATION WITH DECISION FEEDBACK AND TRELLIS DECODING	US	ABANDONED	11/748,806	5/15/07	US 2007-0211812			6/20/11
6936-30-DIV-CON	MULTI-TAP FREQUENCY DOMAIN EQUALIZATION WITH DECISION FEEDBACK AND TRELLIS DECODING	US	ABANDONED	12/783,733	5/20/10	US 2010-0293442 A1			2/25/13
6936-30-DIV-CON-2	MULTI-TAP FREQUENCY DOMAIN EQUALIZATION WITH DECISION FEEDBACK AND TRELLIS DECODING	US	ABANDONED	12/783,737	5/20/10	US 2010-0299582 A1			2/25/13

6936-30-PCT	COMBINED MULTI-TAP FREQUENCY DOMAIN EQUALIZATION WITH DECISION FEEDBACK AND TRELLIS DECODING	WO	NAT PHASE	PCT/US03/23965	8/1/03	WO 2004/014032 A3			
6936-30-PROV	COMBINED MULTI-TAP FREQUENCY DOMAIN EQUALIZATION WITH DECISION FEEDBACK AND TRELLIS DECODING	US	EXPIRED	60/400,550	8/1/02	N/A			8/1/03
6936-36	A SYSTEM AND METHOD FOR TRANSMITTING MESSAGES BETWEEN TRANSCEIVERS USING ELECTROMAGNETICALLY COUPLED SIGNALS	US	ISSUED	09/616,954	7/14/00	N/A	6,748,016	6/8/04	7/5/22
6936-36-CON	SYSTEM AND METHOD FOR TRANSMITTING MESSAGES BETWEEN TRANSCEIVERS USING ELECTROMAGNETICALLY COUPLED SIGNALS	US	ABANDONED	10/743,946	12/24/03	US 2004-0136463 A1			8/27/04
6936-36-PAU	A SYSTEM AND METHOD FOR TRANSMITTING MESSAGES BETWEEN TRANSCEIVERS USING ELECTROMAGNETICALLY COUPLED SIGNALS	AU	ABANDONED	59347/00	7/14/00				1/13/05
6936-36-PCA	A SYSTEM AND METHOD FOR TRANSMITTING MESSAGES BETWEEN TRANSCEIVERS USING ELECTROMAGNETICALLY COUPLED SIGNALS	CA	ABANDONED	2378046	7/14/00				1/13/05
6936-36-PCT	A SYSTEM AND METHOD FOR TRANSMITTING MESSAGES BETWEEN TRANSCEIVERS USING ELECTROMAGNETICALLY COUPLED SIGNALS	WO	NAT PHASE	PCT/US00/19247	7/14/00				
6936-36-PEP	A SYSTEM AND METHOD FOR TRANSMITTING MESSAGES BETWEEN TRANSCEIVERS USING ELECTROMAGNETICALLY COUPLED SIGNALS	EP	ABANDONED	00945396.0	7/14/00				1/13/05
6936-36-PJP	A SYSTEM AND METHOD FOR TRANSMITTING MESSAGES BETWEEN TRANSCEIVERS USING ELECTROMAGNETICALLY COUPLED SIGNALS	JP	ABANDONED	2001-511007	7/14/00				1/13/05
6936-36-PKR	A SYSTEM AND METHOD FOR TRANSMITTING MESSAGES BETWEEN TRANSCEIVERS USING ELECTROMAGNETICALLY COUPLED SIGNALS	KR	ABANDONED	7000562/2002	7/14/00				1/13/05
6936-36-PROV	A SYSTEM AND METHOD FOR TRANSMITTING MESSAGES BETWEEN TRANSCEIVERS USING ELECTROMAGNETICALLY COUPLED SIGNALS	US	EXPIRED	60/144,562	7/16/99	N/A			7/16/00
6936-41	MULTI-CARRIER TRANSMISSION SYSTEM UTILIZING CHANNELS WITH DIFFERENT ERROR RATES	US	EXPIRED	08/661,974	6/12/96	N/A	5,832,030	11/3/98	6/12/16
6936-41-PCT	MULTI-CARRIER TRANSMISSION SYSTEM UTILIZING CHANNELS WITH DIFFERENT ERROR RATES	WO	NAT PHASE	PCT/US97/08222	5/17/97	WO 1997/48204			
6936-45	SINGLE SIDE-BAND MODULATION SYSTEM FOR USE IN DIGITALLY IMPLEMENTED MULTICARRIER TRANSMISSION SYSTEMS	US	EXPIRED	08/591,831	1/25/96	N/A	5,631,610	5/20/97	1/25/16
6936-45-PAU	SINGLE SIDE-BAND MODULATION SYSTEM FOR USE IN DIGITALLY IMPLEMENTED MULTICARRIER TRANSMISSION SYSTEMS	AU	EXPIRED	31342/97	5/17/97	AU 3134297	738201	1/3/02	5/17/17
6936-45-PCA	SINGLE SIDE-BAND MODULATION SYSTEM FOR USE IN DIGITALLY IMPLEMENTED MULTICARRIER TRANSMISSION SYSTEMS	CA	ABANDONED	2289537	5/17/97				7/12/04
6936-45-PCT	SINGLE SIDE-BAND MODULATION SYSTEM FOR USE IN DIGITALLY IMPLEMENTED MULTICARRIER TRANSMISSION SYSTEMS	WO	NAT PHASE	PCT/US97/08549	5/17/97	WO 1998/053552			
6936-45-PEP	SINGLE SIDE-BAND MODULATION SYSTEM FOR USE IN DIGITALLY IMPLEMENTED MULTICARRIER TRANSMISSION SYSTEMS	EP	ABANDONED	97926623.6	5/17/97				3/27/03
6936-45-PJP	SINGLE SIDE-BAND MODULATION SYSTEM FOR USE IN DIGITALLY IMPLEMENTED MULTICARRIER TRANSMISSION SYSTEMS	JP	ABANDONED	10-550313	5/17/97				5/6/04
6936-46	METHOD FOR PARTIALLY MODULATING AND DEMODULATING DATA IN A MULTICARRIER TRANSMISSION SYSTEM	US	EXPIRED	08/668,575	6/20/96	N/A	5,715,280	2/3/98	6/20/16
6936-46-PAU	METHOD FOR PARTIALLY MODULATING AND DEMODULATING DATA IN A MULTICARRIER TRANSMISSION SYSTEM	AU	EXPIRED	30673/97	5/17/97	AU 3067397	743020	5/2/02	5/17/17
6936-46-PCA	METHOD FOR PARTIALLY MODULATING AND DEMODULATING DATA IN A MULTICARRIER TRANSMISSION SYSTEM	CA	ABANDONED	2289529	5/17/97				6/17/03

6936-46-PCT	METHOD FOR PARTIALLY MODULATING AND DEMODULATING DATA IN A MULTICARRIER TRANSMISSION SYSTEM	WO	NAT PHASE	PCT/US97/08209	5/17/97	WO 1998/053572			
6936-46-PEP	METHOD FOR PARTIALLY MODULATING AND DEMODULATING DATA IN A MULTICARRIER TRANSMISSION SYSTEM	EP	ABANDONED	97925573.4	5/17/97				4/16/03
6936-46-PJP	METHOD FOR PARTIALLY MODULATING AND DEMODULATING DATA IN A MULTICARRIER TRANSMISSION SYSTEM	JP	ABANDONED	10-550306	5/17/97				5/13/04
6936-48	INTELLIGENT RATE OPTION DETERMINATION METHOD APPLIED TO ADSL TRANSCEIVER	US	ISSUED	09/738,785	12/15/00	US 2001-0030998 A1	6,801,570	10/5/04	12/15/20
6936-48-PROV	INTELLIGENT RATE OPTION DETERMINATION METHOD APPLIED TO ADSL TRANSCEIVER	US	EXPIRED	60/172,343	12/16/99	N/A			12/16/00
6936-50	SYSTEMS AND METHODS FOR LDPC CODED MODULATION	US	ABANDONED	09/882,046	6/18/01	US 2002-0042899			5/31/05
6936-50-DIV	SYSTEMS AND METHODS FOR LDPC CODED MODULATION	US	ABANDONED	11/140,246	5/31/05	US 2005-0229088 A1			6/18/21
6936-50-DIV-2	SYSTEMS AND METHODS FOR LDPC CODED MODULATION	US	ABANDONED	12/383,056	3/19/09	US 2009-0183048 A1			4/20/16
6936-50-DIV-2-CON	SYSTEMS AND METHODS FOR LDPC CODED MODULATION	US	ABANDONED	12/783,825	5/20/10	US 2010-0299573 A1			5/30/11
6936-50-DIV-2-CON-2	Systems and Methods for LDPC Coded Modulation	US	ABANDONED	12/783,839	5/20/10	US 2010-0299574 A1			6/1/11
6936-50-DIV-3	SYSTEMS AND METHODS FOR LDPC CODED MODULATION	US	ABANDONED	15/077,506	3/22/16	US 2016-0204901 A1			1/13/17
6936-50-PAU	SYSTEMS AND METHODS FOR LDPC CODED MODULATION	AU	ABANDONED	2001267096	6/18/01	AU 2001267096			3/28/06
6936-50-PCA	SYSTEMS AND METHODS FOR LDPC CODED MODULATION	CA	ABANDONED	2,409,179	6/18/01	CA 2409179			2/24/11
6936-50-PCT	SYSTEMS AND METHODS FOR LDPC CODED MODULATION	WO	NAT PHASE	PCT/US01/41015	6/18/01	WO 2001/097387			
6936-50-PEP	SYSTEMS AND METHODS FOR LDPC CODED MODULATION	EP	ABANDONED	01944712.7	6/18/01	EP 1290802			
6936-50-PJP	SYSTEMS AND METHODS FOR LDPC CODED MODULATION	JP	ABANDONED	2002-511477	6/18/01	2004-503979			10/27/11
6936-50-PKR	SYSTEMS AND METHODS FOR LDPC CODED MODULATION	KR	ABANDONED	2002-7017148	6/18/01	10-2003-0036227			6/18/21
6936-50-PKR-DIV	SYSTEMS AND METHODS FOR LDPC CODED MODULATION	KR	ABANDONED	10-2010-7006498	6/18/01	10-2010-0069063			6/18/21
6936-50-PROV	LDPC CODED MODULATION	US	EXPIRED	60/212,233	6/16/00	N/A			6/16/01
6936-50-PROV-2	LOW DENSITY PARITY CHECK (LDPC) CODED MODULATION FOR ADSL	US	EXPIRED	60/241,468	10/18/00	N/A			10/18/01
6936-60-PCA	Stable Low Power Mode for Multicarrier Transceivers	CA	ABANDONED	2,706,362	11/21/08	CA 2706362			12/21/16
6936-60-PCN	Stable Low Power Mode for Multicarrier Transceivers	CN	ABANDONED	200880117277.5	11/21/08	CN101868951A	ZL200880117277.5	9/7/16	9/20/17
6936-60-PCN-DIV	Stable Low Power Mode for Multicarrier Transceivers	CN	ABANDONED	201310088357.5	11/21/08	CN103227767	ZL201310088357.5	4/12/17	9/20/17
6936-60-PCN-HK	Stable Low Power Mode for Multicarrier Transceivers	HK	ABANDONED	10110838.3	11/21/08	HK1144345			12/12/16
6936-60-PCT	Stable Low Power Mode for Multicarrier Transceivers	WO	NAT PHASE	PCT/US08/84322	11/21/08	WO 2009/067653			
6936-60-PEP	Stable Low Power Mode for Multicarrier Transceivers	EP	ABANDONED	08852660.3	11/21/08	EP 2223489	2223489	4/20/16	7/6/17
6936-60-PEP-DE	Stable Low Power Mode for Multicarrier Transceivers	DE	ABANDONED	08852660.3	11/21/08		2223489	4/20/16	7/6/17
6936-60-PEP-FR	Stable Low Power Mode for Multicarrier Transceivers	FR	ABANDONED	08852660.3	11/21/08		2223489	4/20/16	7/6/17
6936-60-PEP-GB	Stable Low Power Mode for Multicarrier Transceivers	GB	ABANDONED	08852660.3	11/21/08		2223489	4/20/16	7/6/17
6936-60-PEPHK	Stable Low Power Mode for Multicarrier Transceivers	HK	ABANDONED	10109672.4	11/21/08	HK 1143261			2/11/16
6936-60-PIN	Stable Low Power Mode for Multicarrier Transceivers	IN	ABANDONED	1800/KOLNP/2010	11/21/08				11/21/28
6936-60-PJP	Stable Low Power Mode for Multicarrier Transceivers	JP	ABANDONED	2010-535086	11/21/08	2011-504709			11/21/28
6936-60-PROV	Stable Low Power Mode for Multicarrier Transceivers	US	EXPIRED	60/989,542	11/21/07	N/A			11/21/08
6936-60-PUS	Stable Low Power Mode for Multicarrier Transceivers	US	ISSUED	12/739,330	8/12/10	US 2010-0296555 A1	8,837,610	9/16/14	6/24/29
6936-60-PUS-CON	Stable Low Power Mode for Multicarrier Transceivers	US	ABANDONED	14/485,937	9/15/14	US 2015-0003504 A1			5/10/16
6936-60-PUS-CON-2	STABLE LOW POWER MODE FOR MULTICARRIER TRANSCEIVERS	US	ABANDONED	15/084,788	3/30/16	US 2016-0212275 A1			6/7/17
6936-61-PROV	Stable Low Power Mode for Multicarrier Transceivers (Second Edition)	US	EXPIRED	61/011,267	1/16/08	N/A			1/16/09
6936-84-PCT	Reed-Solomon Erasure Decoding with Error Detection for Retransmission	WO	NAT PHASE	PCT/US10/37195	6/3/10	WO 2010/141677			
6936-84-PROV	Reed-Solomon Erasure Decoding with Error Detection for Retransmission	US	EXPIRED	61/183,845	6/3/09	N/A			6/3/10
6936-84-PUS	Reed-Solomon Erasure Decoding with Error Detection for Retransmission	US	ISSUED	13/322,170	2/8/12	US 2012-0144259 A1	8,782,498	7/15/14	11/15/30
6936-84-PUS-CON	Reed-Solomon Erasure Decoding with Error Detection for Retransmission	US	ISSUED	14/328,237	7/10/14	US 2014-0325306 A1	9,276,612	3/1/16	6/3/30
6936-84-PUS-CON-2	REED-SOLOMON ERASURE DECODING WITH ERROR DETECTION FOR RETRANSMISSION	US	ABANDONED	15/054,499	2/26/16	US 2016-0182089 A1			5/9/18
6936-85-PCA	Low Power Mode with Legacy Compatibility	CA	PENDING	2,944,006	4/28/15				4/28/35
6936-85-PCT	Low Power Mode with Legacy Compatibility	WO	NAT PHASE	PCT/US15/27983	4/28/15	WO 2015/168117			

6936-85-PEP	Low Power Mode with Legacy Compatibility	EP	ISSUED	15721495.8	4/28/15	3138206	3138206	6/10/20	4/28/35
6936-85-PEPDE	Low Power Mode with Legacy Compatibility	DE	ISSUED	15721495.8	4/28/15		3138206	6/10/20	4/28/35
6936-85-PEPFR	Low Power Mode with Legacy Compatibility	FR	ISSUED	15721495.8	4/28/15		3138206	6/10/20	4/28/35
6936-85-PEPGB	Low Power Mode with Legacy Compatibility	GB	ISSUED	15721495.8	4/28/15		3138206	6/10/20	4/28/35
6936-85-PEPNL	Low Power Mode with Legacy Compatibility	NL	ISSUED	15721495.8	4/28/15		3138206	6/10/20	4/28/35
6936-85-PEP-DIV	Low Power Mode with Legacy Compatibility	EP	ABANDONED	20178740.5	4/28/15				9/30/20
6936-85-PJP	Low Power Mode with Legacy Compatibility	JP	ISSUED	2016-563176	4/28/15	2017-516391	6592006	9/27/19	4/28/35
6936-85-PKR	Low Power Mode with Legacy Compatibility	KR	PENDING	10-2016-7029583	4/28/15				4/28/35
6936-85-PROV	Low Power Mode with Legacy Compatibility	US	EXPIRED	61/985,168	4/28/14				4/28/15
6936-85-PUS	LOW POWER MODE WITH LEGACY COMPATIBILITY	US	PUBLISHED	15/304,920	10/18/16	US 2017-0187512 A1			4/28/35

Schedule III

Copyrights

None

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas - Marshall Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
2:21-cv-310	8/13/2021	Eastern District of Texas - Marshall Division

PLAINTIFF	DEFENDANT
TQ Delta, LLC	CommScope Holding Company, Inc., et al.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	See Attachment A		
2			
3			
4			
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

Print Save As... Reset

NOTICE OF FILING OF PATENTS ATTACHMENT A

NOTICE OF FILING OF PATENTS		
PATENT NUMBER	**DATE OF PATENT**	**HOLDER OF PATENT**
U.S. Patent No. 7,453,881	November 18, 2008	TQ Delta, LLC
U.S. Patent No. 7,570,686	August 4, 2009	TQ Delta, LLC
U.S. Patent No. 7,844,882	November 30, 2010	TQ Delta, LLC
U.S. Patent No. 8,090,008	January 3, 2012	TQ Delta, LLC
U.S. Patent No. 8,276,048	September 25, 2012	TQ Delta, LLC
U.S. Patent No. 8,462,835	June 11, 2013	TQ Delta, LLC
U.S. Patent No. 8,468,411	June 18, 2013	TQ Delta, LLC
U.S. Patent No. 8,937,988	January 20, 2015	TQ Delta, LLC
U.S. Patent No. 9,094,348	July 28, 2015	TQ Delta, LLC
U.S. Patent No. 9,154,354	October 6, 2015	TQ Delta, LLC
U.S. Patent No. 9,485,055	November 1, 2016	TQ Delta, LLC
U.S. Patent No. 10,567,112	February 18, 2020	TQ Delta, LLC
U.S. Patent No. 10,833,809	November 10, 2020	TQ Delta, LLC

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas - Marshall Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
2:21-cv-309	8/13/2021	Eastern District of Texas - Marshall Division

PLAINTIFF	DEFENDANT
TQ DELTA, LLC	NOKIA CORP., NOKIA SOLUTIONS AND NETWORKS OY, and NOKIA OF AMERICA CORP.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	See Attachment A		
2			
3			
4			
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading		
	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1			
2			
3			
4			
5			

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

Print Save As... Reset

NOTICE OF FILING OF PATENTS ATTACHMENT A

NOTICE OF FILING OF PATENTS		
PATENT NUMBER	**DATE OF PATENT**	**HOLDER OF PATENT**
U.S. Patent No. 7,570,686	August 4, 2009	TQ Delta, LLC
U.S. Patent No. 7,844,882	November 30, 2010	TQ Delta, LLC
U.S. Patent No. 8,090,008	January 3, 2012	TQ Delta, LLC
U.S. Patent No. 8,468,411	June 18, 2013	TQ Delta, LLC
U.S. Patent No. 8,495,473	July 23, 2013	TQ Delta, LLC
U.S. Patent No. 8,594,162	November 26, 2013	TQ Delta, LLC
U.S. Patent No. 8,595,577	November 26, 2013	TQ Delta, LLC
U.S. Patent No. 8,937,988	January 20, 2015	TQ Delta, LLC
U.S. Patent No. 9,014,193	April 21, 2015	TQ Delta, LLC
U.S. Patent No. 9,094,348	July 28, 2015	TQ Delta, LLC
U.S. Patent No. 9,154,354	October 6, 2015	TQ Delta, LLC
U.S. Patent No. 9,300,601	March 29, 2016	TQ Delta, LLC
U.S. Patent No. 9,485,055	November 1, 2016	TQ Delta, LLC
U.S. Patent No. 9,547,608	January 17, 2017	TQ Delta, LLC
U.S. Patent No. 9,894,014	February 13, 2008	TQ Delta, LLC
U.S. Patent No. 10,044,473	August 7, 2018	TQ Delta, LLC
U.S. Patent No. 10,409,510	September 19, 2019	TQ Delta, LLC
U.S. Patent No. 10,567,112	February 18, 2020	TQ Delta, LLC
U.S. Patent No. 10,833,809	November 10, 2020	TQ Delta, LLC