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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4015-6942 / P30138-US2
	Application Number	
Title of Invention	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced	

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.
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Applicant 1

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All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

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☐ **An Address is being provided for the correspondence Information of this application.**

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Application Information:

Title of the Invention	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced		
Attorney Docket Number	4015-6942 / P30138-US2	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	12	Suggested Figure for Publication (if any)	

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☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S. C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in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.

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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(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61/248661	2009-10-05

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. 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(a).

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Application Number	Country	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
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If the Assignee is an Organization check here. ☒

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Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	David Bennett	Date (YYYY-MM-DD)	2010-10-04

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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.**

PUCCH RESOURCE ALLOCATION FOR CARRIER AGGREGATION IN LTE-ADVANCED

RELATED APPLICATION

[001] This application claims the benefit of U.S. Provisional Patent Application 61/248,661 filed October 5, 2009, which is incorporated herein by reference.

TECHNICAL FIELD

[002] The present invention relates generally to carrier aggregation in a mobile communication system and, more particularly, to an efficient resource allocation for the physical uplink control channel for carrier aggregation.

BACKGROUND

[003] Carrier aggregation is one of the new features being discussed for the next generation of Long Term Evolution (LTE) systems, which is being standardized as part of LTE Release 10 (known as LTE-Advanced). LTE Rel 8 currently supports bandwidths up to 20 MHz. In LTE-Advanced, bandwidths up to 100 MHz will be supported. The very high data rates contemplated for LTE-Advanced will require an expansion of the transmission bandwidth. In order to maintain backward compatibility with LTE Rel-8 user terminals, the available spectrum is divided into Rel-8 compatible chunks called component carriers. Carrier aggregation enables the needed bandwidth expansion by allowing user terminals to transmit data over multiple component carriers comprising up to 100 MHz of spectrum. Carrier aggregation also ensures efficient use of a wide carrier for legacy terminals by making it possible for legacy terminals to be scheduled in all parts of the wideband LTE-Advanced carrier.

[004] The number of aggregated component carriers, as well as the bandwidth of the individual component carrier, may be different for Uplink (UL) and Downlink (DL). A

symmetric configuration refers to the case where the number of component carriers in downlink and uplink is the same. An asymmetric configuration refers to the case where the number of component carriers is different. The number of component carriers configured for a geographic cell area may be different from the number of component carriers seen by a terminal. A user terminal, for example, may support more downlink component carriers than uplink component carriers, even though in the geographic cell area the same number of uplink and downlink component carriers is offered by the network.

[005] One consideration for carrier aggregation is how to transmit control signaling from the user terminal on the uplink from the user terminal. Uplink control signaling may include acknowledgement (ACK) signaling for hybrid automatic repeat request (HARQ) protocols, channel state and quality information (CSI, CQI) reporting for downlink scheduling, and scheduling requests (SRs) indicating that the user terminal needs uplink resources for uplink data transmissions. One solution is to transmit the uplink control information on multiple uplink component carriers associated with different downlink component carriers. However, this option is likely to result in higher user terminal power consumption and a dependency on specific user terminal capabilities. It may also create implementation issues due to inter-modulation products, and may lead to generally higher complexity for implementation and testing.

SUMMARY

[006] The invention provides a signaling mechanism for efficient transmission of control information in a communication system using carrier aggregation. The signaling mechanism allows the transmission, on a single uplink component carrier, of control information associated with downlink transmissions on multiple aggregated downlink component carriers. Semi-statically reserved resources for the transmission of control

information on the uplink component carrier may be dynamically shared by user terminals that are assigned multiple downlink component carriers for downlink transmissions. Implicit or explicit resource indication can be used in combination with dynamic resource indication.

[007] One exemplary embodiment of the invention comprises a method implemented by a base station of receiving control information from user terminals. The method comprises scheduling downlink transmissions to said user terminal on one or more downlink component carriers; if the user terminal is scheduled to receive downlink transmissions on a first single downlink component carrier, receiving control information associated with the downlink transmissions to the user terminal on a first set of radio resources on a uplink primary component carrier associated with said first downlink component carrier; and if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier or multiple downlink component carriers, receiving control information associated with the downlink transmissions to the user terminal on a second set of radio resources on the uplink primary component carrier.

[008] Another exemplary embodiment of the invention comprises a base station for transmitting data to one or more user terminals. The base station comprises a transmitter to transmit user data on one or more downlink component carriers to a user terminal; and a controller to schedule downlink transmissions to the user terminal. The controller is configured to schedule downlink transmissions to the user terminal on one or more downlink component carriers; if the user terminal is scheduled to receive downlink transmissions on a first single downlink component carrier, receive control information associated with the downlink transmissions to the user terminal on a first set of radio resources on a uplink primary component carrier associated with said first downlink component carrier; and, if the user terminal is scheduled to receive downlink

transmissions on a second single downlink component carrier or multiple downlink component carriers, receive control information associated with the downlink transmissions to the user terminal on a second set of radio resources on the uplink primary component carrier..

[009] Another exemplary embodiment of the invention comprises a method of transmitting control information implemented by a user terminal in a mobile communication network. The method comprises receiving an assignment of radio resources for downlink transmissions from a base station; transmitting control information associated with the downlink transmissions on a first set of radio resources on an uplink component carrier if an assignment of single downlink component carrier for the downlink transmission is received; and transmitting control information associated with the downlink transmissions on a second set of radio resources on the uplink component carrier if an assignment of multiple downlink component carriers for the downlink transmission is received.

[010] Another exemplary embodiment of the invention comprises a user terminal configured to send control information associated with downlink transmissions on one or more downlink component carriers. The user terminal comprises a receiver to receive downlink transmissions from a base station; a transmitter to transmit control information associated with the downlink transmission to a base station; and a controller to select radio resources for transmission of control information associated with the downlink transmissions. The controller is configured to select a first set of radio resources on an uplink component carrier if an assignment of a single downlink component carrier for the downlink transmission is received; and select a second set of radio resources on the uplink component carrier if an assignment of multiple downlink component carriers for the downlink transmission is received.

[011] Another exemplary embodiment of the invention comprises an alternate method of transmitting control information implemented by a user terminal in a mobile communication network. The method comprises receiving an assignment of radio resources for a downlink transmissions from a base station; transmitting control information associated with the downlink transmission on a first set of radio resources on an uplink component carrier if an assignment of a first downlink component carrier for the downlink transmission is received; and transmitting control information associated with the downlink transmission on a second set of radio resources on the uplink component carrier if an assignment of a second downlink component carrier for the downlink transmission is received.

[012] Another exemplary embodiment of the invention comprises a user terminal configured to send control information associated with downlink transmissions on one or more downlink component carriers. The user terminal comprises a receiver to receive downlink transmissions from a base station; a transmitter to transmit control information associated with the downlink transmission to a base station; and a controller to select radio resources for transmission of control information associated with the downlink transmission. The controller is configured to select a first set of radio resources on an uplink component carrier if an assignment of a first downlink component carrier for the downlink transmission is received; and select a second set of radio resources on the uplink component carrier if an assignment of a second downlink component carrier for the downlink transmission is received.

BRIEF DESCRIPTION OF THE DRAWINGS

[013] Fig. 1 illustrates an exemplary OFDM communication system.

[014] Fig. 2 illustrates an exemplary time-frequency grid for an OFDM system.

[015] Fig. 3 illustrates an exemplary time-domain structure for an OFDM system.

[016] Fig. 4 illustrates uplink L1/L2 control signaling transmission on PUCCH.

[017] Fig. 5 illustrates the PUCCH format 1 using a normal cyclic prefix.

[018] Fig. 6 illustrates the PUCCH format 2 using a normal cyclic prefix.

[019] Fig. 7 illustrates an exemplary allocation of resource blocks for PUCCH.

[020] Fig. 8 illustrates the concept of carrier aggregation.

[021] Fig. 9 illustrates an exemplary method implemented by a base station of receiving control information from user terminals scheduled on a single carrier and multiple carriers.

[022] Fig. 10 illustrates an exemplary method implemented by a user terminal of signaling control information to a base station.

[023] Fig. 11 illustrates another exemplary method implemented by a user terminal of signaling control information to a base station.

[024] Fig. 12 illustrates an exemplary base station with a controller for controlling downlink transmissions by the base station to one or more user terminals and associated transmissions of uplink control information by the user terminals

[025] Fig. 13 illustrates an exemplary user terminal with a controller for controlling transmission of uplink control information to a base station.

DETAILED DESCRIPTION

[026] Referring now to the drawings, Fig. 1 illustrates an exemplary mobile communication network 10 for providing wireless communication services to user terminals 100. Three user terminals 100 are shown in Fig. 1. The user terminals 100 may comprise, for example, cellular telephones, personal digital assistants, smart phones, laptop computers, handheld computers, or other devices with wireless communication capabilities. The mobile communication network 10 comprises a plurality of geographic cell areas or sectors 12. Each geographic cell area or sector 12

is served by a base station 20, which is referred to in LTE as a NodeB or Enhanced NodeB (eNodeB). A single base station 20 may provide service in multiple geographic cell areas or sectors 12. The user terminals 100 receive signals from a serving base station 20 on one or more downlink (DL) channels, and transmit signals to the base station 20 on one or more uplink (UL) channels.

[027] For illustrative purposes, an exemplary embodiment of the present invention will be described in the context of a Long-Term Evolution (LTE) system. Those skilled in the art will appreciate, however, that the present invention is more generally applicable to other wireless communication systems, including Wideband Code-Division Multiple Access (WCDMA) and WiMax (IEEE 802.16) systems.

[028] LTE uses Orthogonal Frequency Division Multiplexing (OFDM) in the downlink and Discrete Fourier Transform (DFT) spread OFDM in the uplink. The basic LTE downlink physical resource can be viewed as a time-frequency grid. Fig. 2 illustrates a portion of an exemplary OFDM time-frequency grid 50 for LTE. Generally speaking, the time-frequency grid 50 is divided into one millisecond subframes. Each subframe includes a number of OFDM symbols. For a normal cyclic prefix (CP) length, suitable for use in situations where multipath dispersion is not expected to be extremely severe, a subframe comprises fourteen OFDM symbols. A subframe comprises twelve OFDM symbols if an extended cyclic prefix is used. In the frequency domain, the physical resources are divided into adjacent subcarriers with a spacing of 15 kHz. The number of subcarriers varies according to the allocated system bandwidth. The smallest element of the time-frequency grid 50 is a resource element. A resource element comprises one OFDM subcarrier during one OFDM symbol interval.

[029] In LTE systems, data is transmitted to the user terminals over a downlink transport channel known as the Physical Downlink Shared Channel (PDSCH). The PDSCH is a time and frequency multiplexed channel shared by a plurality of user

terminals. As shown in Fig. 3, the downlink transmissions are organized into 10 ms radio frames. Each radio frame comprises ten equally-sized subframes. For purposes of scheduling users to receive downlink transmissions, the downlink time-frequency resources are allocated in units called resource blocks (RBs). Each resource block spans twelve subcarriers (which may be adjacent or distributed across the frequency spectrum) and one 0.5 ms slot (one half of one subframe). The term "resource block pair" refers to two consecutive resource blocks occupying an entire one millisecond subframe.

[030] The base station 20 dynamically schedules downlink transmissions to the user terminals based on channel state and quality information (CSI, CQI) reports from the user terminals on the Physical Uplink Control Channel (PUCCH) or Physical Uplink Shared Channel (PUSCH). The CQI and CSI reports indicate the instantaneous channel conditions as seen by the receiver. In each subframe, the base station 20 transmits downlink control information (DCI) identifying the user terminals that have been scheduled to receive data (hereinafter the scheduled terminals) in the current downlink subframe and the resource blocks on which the data is being transmitted to the scheduled terminals. The DCI is typically transmitted on the Physical Downlink Control Channel (PDCCH) in the first 1, 2, or 3 OFDM symbols in each subframe.

[031] Hybrid Automatic Repeat Request (HARQ) is used to mitigate errors that occur during transmission of data on the downlink. When the base station 20 indicates that a user terminal 100 is scheduled to receive a transmission on the PDSCH, the user terminal 100 decodes the PDSCH and transmits an acknowledgement (ACK/NACK message to base station 20 on the PUCCH or PUSCH. The acknowledgement message informs the base station 20 whether the data packet was correctly received by the user terminal 100. The acknowledgement message could be either a positive acknowledgement (ACK) indicating a successful decoding or a negative

acknowledgement (NACK) message indicating a decoding failure. Based on the acknowledgement message received from the user terminal 100, base station 20 determines whether to transmit new data (ACK received) or to retransmit the previous data (NACK received).

[032] For uplink transmissions, the user terminals transmit scheduling requests (SRs) to the base station 20 on the PUCCH when the user terminals have data to send but no valid uplink grant. The base stations 20 allocate uplink resources responsive to the scheduling requests and transmit a scheduling grant to the user terminal 100 on the PDCCH. When the data is received, the base station 20 transmits ACK/NACK signaling to the user terminal 100 on the Physical Hybrid Automatic Repeat Request Indicator Channel. (PHICH) to indicate whether the data is received correctly.

[033] If the user terminal 100 has not been assigned an uplink resource for data transmission, the L1/L2 control information (CQI reports, ACK/NACKs, and SRs) is transmitted in uplink resources (resource blocks) specifically assigned for uplink transmission of L1/L2 control information on the Physical Uplink Control Channel (PUCCH). As illustrated in Fig. 4, these resources are located at the edges of the total available cell bandwidth. Each PUCCH resource comprises of one resource block (twelve subcarriers) within each of the two slots of an uplink subframe. Frequency hopping is used to provide frequency diversity. The frequency of the resource blocks alternate at the slot boundary, with one resource block at the upper part of the spectrum within the first slot of a subframe and an equally sized resource block at the lower part of the spectrum during the second slot of the subframe, or vice versa. If more resources are needed for the uplink L1/L2 control signaling, e.g., in case of very large overall transmission bandwidth supporting a large number of users, additional resources blocks can be assigned adjacent the previously assigned resource blocks.

[034] The reasons for locating the PUCCH resources at the edges of the overall available spectrum are two-fold. First, the allocation maximizes the frequency diversity, particularly when frequency hopping is employed. Second, the allocation avoids fragmentation of the uplink spectrum, which would make it impossible to assign very wide transmission bandwidths to a single user terminal 100 and still retain the single-carrier property of the uplink transmission.

[035] The bandwidth of one resource block during one subframe is too large for the control signaling needs of a single user terminal 100. Therefore, to efficiently exploit the resources set aside for control signaling, multiple user terminals can share the same resource block. This is done by assigning the different terminals different orthogonal phase rotations of a cell-specific length-12 frequency-domain sequence. A linear phase rotation in the frequency domain is equivalent to applying a cyclic shift in the time domain. Thus, although the term "phase rotation" is used herein, the term cyclic shift is sometimes used with an implicit reference to the time domain.

[036] The resource used by a PUCCH is therefore not only specified in the time-frequency domain by the resource-block pair, but also by the phase rotation applied. Similarly to the case of reference signals, there are up to twelve different phase rotations specified in the LTE standard, providing up to twelve different orthogonal sequences from each cell-specific sequence. However, in the case of frequency-selective channels, not all the twelve phase rotations can be used if orthogonality is to be maintained. Typically, up to six rotations are considered usable in a cell.

[037] There are two message formats defined for transmission of control information on the PUCCH, each capable of carrying a different number of bits. A user terminal 100 uses PUCCH format 1 to transmit HARQ acknowledgements and scheduling requests. For CQI reporting, the user terminal 100 uses PUCCH format 2.

[038] Hybrid-ARQ acknowledgements are used to acknowledge the reception of one (or two in case of spatial multiplexing) transport blocks in the downlink. Scheduling requests are used to request resources for uplink data transmission. A scheduling request is transmitted only when the user terminal 100 is requesting resources, otherwise the user terminal 100 stays silent in order to save battery resources and not create unnecessary interference. For scheduling requests, no explicit information bit is transmitted. Instead, the user terminal requests uplink resources by the presence (or absence) of energy on the corresponding PUCCH. Although HARQ acknowledgements and scheduling requests serve different purposes, they share the same PUCCH format. This format is referred to as PUCCH format 1 in the specifications

[039] Fig. 5 illustrates the structure of a PUCCH format 1 message. The PUCCH format 1 uses the same structure in each of the two slots of a subframe. For transmission of a HARQ acknowledgement, the single HARQ acknowledgement bit is used to generate a BPSK symbol (in case of downlink spatial multiplexing the two acknowledgement bits are used to generate a QPSK symbol). For a scheduling request, on the other hand, the BPSK/QPSK symbol is replaced by a constellation point treated as negative acknowledgement at the base station 20. The modulation symbol is then used to generate the signal to be transmitted in each of the two PUCCH slots.

[040] A PUCCH format 1 resource, used for either a HARQ acknowledgement or a scheduling request, is represented by a single scalar resource index. From the index, the phase rotation and the orthogonal cover sequence is derived. For HARQ transmission, the resource index to use for transmission of the HARQ acknowledgement is given implicitly by the DCI transmitted on the PDCCH to schedule the downlink transmission to the user terminal 100. Thus, the resources to use for an uplink HARQ acknowledgement vary dynamically and depend on the DCI used to schedule the user terminal 100 in each subframe.

[041] In addition to dynamic scheduling based on the DCI transmitted by the base station on the PDCCH, it is also possible to semi-persistently schedule a user terminal 100 according to a specific pattern. In this case the configuration information indicating the semi-persistent scheduling pattern includes information on the PUCCH index to use for the HARQ acknowledgements. The configuration information also informs the user terminal 100 which PUCCH resources to use for transmission of scheduling requests.

[042] The PUCCH resources are split into two parts: a semi-static part and a dynamic part. The semi-static part of the PUCCH resources is used for scheduling requests and HARQ acknowledgements from semi-persistent users. The amount of resources used for the semi-static part of PUCCH 1 resources does not vary dynamically. The dynamic part is used for dynamically scheduled user terminals. As the number of dynamically scheduled terminals varies, the amount of resources used for the dynamic PUCCHs varies.

[043] Channel-status reports are used to provide the base station 20 with an estimate of the channel conditions as seen by the user terminal 100 in order to aid channel-dependent scheduling. A channel-status report consists of multiple bits per subframe. PUCCH format 1, which is capable of at most two bits of information per subframe, can not be used for this purpose. Transmission of channel-status reports on the PUCCH is instead handled by PUCCH format 2, which is capable of multiple information bits per subframe.

[044] PUCCH format 2, illustrated for normal cyclic prefix in Fig. 6, is based on a phase rotation of the same cell-specific sequence as format 1. Similarly to format 1, a format 2 resource can be represented by an index from which the phase rotation and other quantities necessary are derived. The PUCCH format 2 resources are semi-statically configured.

[045] Both PUCCH format 1 and format 2 signaling messages are transmitted on a resource-block pair with one resource block in each slot. The resource-block pair is determined from the PUCCH resource index. Thus, the resource-block number to use in the first and second slot of a subframe can be expressed as

RBnumber(i) = f(PUCCH index, i)

where i is the slot number (0 or 1) within the subframe and f a function found in the specification.

[046] Multiple resource-block pairs can be used to increase the control-signaling capacity. When one resource-block pair is full, the next PUCCH resource index is mapped to the next resource-block pair in sequence. The mapping is done such that PUCCH format 2 (channel-status reports) is transmitted closest to the edges of the uplink cell bandwidth with the semi-static part of PUCCH format 1 next and finally the dynamic part of PUCCH format 1 in the innermost part of the bandwidth as shown in Fig. 7.

[047] Three semi-statically parameters are used to determine the resources to use for the different PUCCH formats:

- $N_{RB}^{(2)}$, provided as part of the system information, controls on which resource-block pair the mapping of PUCCH format 1 starts
- $N_{PUCCH}^{(1)}$ controls the split between the semi-static and dynamic part of PUCCH format 1
- $N_{CS}^{(1)}$ controls the mix of format 1 and format 2 in one resource block. In most cases, the configuration is done such that the two PUCCH formats are mapped to separate sets of resource blocks, but there is also a possibility to have the border between format 1 and 2 within a resource block.

[048] In order to support bandwidths greater than 20MHz, carrier aggregation will be supported in LTE Rel 10. To maintain backward compatibility with Rel 8 user terminals 100, the available spectrum is divided into Rel-8 compatible component carriers (e.g., 20 Mhz component carriers) as shown in Fig. 8. A user terminal 100 can obtain bandwidth up to 100 MHz by transmitting on multiple component carriers. The use of multiple component carriers for data transmission is known as carrier aggregation.

[049] The number of aggregated component carriers as well as the bandwidth of the individual component carrier may be different for Uplink (UL) and Downlink (DL). A symmetric configuration refers to the case where the number of component carriers in DL and UL are the same. An asymmetric configuration refers to the case where the number of component carriers is different for the UL and DL. The number of component carriers configured for a geographic cell area 12 may be different from the number of component carriers seen by the user terminal 100. A user terminal 100 may, for example, support more DL component carriers than UL component carriers, even though in the geographic cell area 12 the same number of UL and DL component carriers is offered by the network.

[050] One consideration for carrier aggregation is how to configure the PUCCH for uplink control signaling from the user terminal. One solution is to transmit the uplink control information on multiple control channels on multiple UL component carriers. However, this option is likely to result in higher user terminal power consumption and a dependency on specific user terminal capabilities. It may also create implementation issues due to inter-modulation products, and may lead to generally higher complexity for implementation and testing.

[051] According to some embodiments of the present invention, the PUCCH resources on a single uplink component carrier are used to support downlink transmissions on several downlink component carriers. With this approach, a user terminal 100 transmit

HARQ signaling associated with downlink transmissions on two or more downlink component carriers on PUCCH resources on a single uplink component carrier. Similarly, a single uplink component carrier may be used to support uplink transmissions on several uplink component carriers. For example, a user terminal 100 may use PUCCH resources on a single uplink component carrier to request uplink resources on multiple uplink component carriers. The uplink component carrier on which PUCCH resources are used to support downlink or uplink transmissions on two or more component carriers is referred to herein as uplink primary component carrier (UL PCC) or uplink associated with the primary cell (PCell).

[052] For HARQ signaling, a straight-forward approach would be to increase the PUCCH resources on the UL PCC for PUCCH format 1 by a factor of N, where N is the number of aggregated downlink component carriers supported. However, consideration should be given to the typical expected use case. Not all user terminals 100 will be scheduled to receive downlink transmission on multiple downlink component carriers. The number of downlink component carriers used for transmission will be user terminal specific and will vary dynamically as user terminals 100 are scheduled. With bursty data-transmission, the number of user terminals 100 simultaneously assigned resources on several downlink carriers is expected to be rather small. Multiple downlink component carriers are only needed when there are not enough resources on a single component carrier, and there appears to be no benefits from assigning several smaller transport blocks on multiple downlink component carriers for a large number of user terminals 100. Therefore, the design of the ACK/NACK feedback on PUCCH should be optimized for a low number of simultaneous user terminals 100 with assignments on multiple downlink component carrier.

[053] Considering that the typical use case is a rather small number of user terminals 100 simultaneously assigned resources on multiple downlink component carriers,

increasing the overhead with a factor of N is probably not necessary. Rather, the amount of resources should be chosen in anticipation on the number of user terminals 100 that simultaneously are expected to have assignments on multiple downlink component carriers, which is expected to be scenario and implementation dependent. This could be achieved by configuring a set of uplink resources upon which the currently scheduled user terminal(s) 100 using multiple component carriers transmit the ACK/NACK feedback.

[054] According to a first approach, a set of shared PUCCH resources of potentially configurable size, in addition to PUCCH resources according to LTE Rel-8, is allocated for HARQ acknowledgements by user terminals 100 which receive downlink assignments on multiple downlink component carriers. The resource set and/or the size of the resource set can be transmitted to the user terminal by Radio Resource Control (RRC) signaling. With this approach, the UL PCC contains PUCCH resources according to LTE Rel-8 for HARQ acknowledgements from user terminals 100 assigned resources for downlink transmission on a single downlink component carrier associated with the UL PCC. The shared PUCCH resource would be used by user terminals 100 which receive resource assignments for downlink transmission on multiple downlink component carriers. There may be some circumstances, such as retransmissions, when the user terminal 100 is assigned resources on a single downlink component carrier that is different from the downlink component carrier associated with the UL PCC. In such a case the shared set of PUCCH resources can also be used for such "cross-carrier" HARQ acknowledgements.

[055] According to a second approach, a set of shared PUCCH resources of potentially configurable size, in addition to PUCCH resources according to LTE Rel-8, is allocated for HARQ acknowledgements by user terminals 100 which receive downlink assignments on at least one downlink component carrier other than the downlink

component carrier having associated Rel- 8 resources on the UL PCC. The resource set and/or the size of the resource set can be transmitted to the user terminal by RRC signaling.

[056] With either of the above approaches, the set of shared PUCCH resources may be made visible to the user terminal 100 in the same way as for LTE Rel-8 user terminals 100, namely in the form of an association rule between the DL PDCCH CCE and index to PUCCH resource. Thus, from a system perspective, the two sets of PUCCH resources could overlap or be interleaved. In principle, a user terminal 100 could be configured with semi-static PUCCH resources for HARQ acknowledgements and then use these resources for HARQ acknowledgements in case of multiple DL component carrier assignments. By configuring all the user terminals 100 in the cell to have the same semi-static ACK/NACK resources, such a scheme would allow for assigning at most a single user terminal multiple DL component carrier at the same time. When there is no need for HARQ acknowledgements of multiple carriers, the resource could of course be used for data transmission. The user terminals 100 could select which shared PUCCH resources to use based on component carrier, DL PDDCH CCE, C-RNTI and other parameters. There is though a risk for collisions or scheduling constraints, and to reduce this, one could consider having a dynamic indicator to aid the selection of PUCCH resource. The dynamic indication allows managing the ACK/NACK resources more carefully which is of interest when the amount of resources reserved for HARQ acknowledgements is small and orthogonality is desired.

[057] In one exemplary embodiment, semi-static PUCCH resources are reserved for user terminals 100 configured with multiple downlink component carriers. The assignment of PUCCH resources can be achieved by implicit indication of actual resource block, e.g., utilizing CCE index, number of the downlink component carriers, RNTI or a combination of these parameters. Alternatively, reserved PUCCH resources

can be indicated explicitly via signaling to the user terminal 100 (e.g., RRC signaling), or by a combination of implicit and explicit signaling. Additionally, dynamic indication of PUCCH resources for HARQ acknowledgements can be done by using additional relative or explicit dynamic indication to select actual PUCCH resources out of the set of implicit/explicitly reserved (e.g., semi-statically reserved) resources. For example, the base station 20 may send as a control message or part of a control message, an indicator, referred to herein as an acknowledgement resource indication (ARI), comprising a single bit to indicate that the user terminal 100 should use the next available PUCCH resource or the next cyclically available PUCCH resource from the set of semi-statically reserved PUCCH resources. In some embodiments, the ARI may comprise the entire control message. In other embodiment, the ARI may be included as an information element in a larger control message. Alternatively, the base station 20 can send a multi-bit ARI to indicate the actual PUCCH resource out of the set of semi-statically reserved PUCCH resources.

[058] There may be at least two different mappings to PUCCH resources on the UL PCC. A first resource mapping may be used for HARQ acknowledgements of downlink transmissions on a single designated downlink component carrier, and a second mapping for HARQ acknowledgements of downlink transmissions on at least one other downlink component carrier. The two mappings may be described by parameters, such as first resource and size of resource set that are configurable by means of higher layer signaling. The user terminal 100 may, based on the detected downlink assignments on one or several downlink component carriers, select one of the two mappings. In a preferred embodiment, the first mapping coincides with the Rel-8 mapping rules for ACK/NACK resources.

[059] The user terminal 100 may, depending on the detected downlink assignments, and the downlink component carriers on which the downlink assignment was sent, select

which mapping to use. Two approaches may be used by the user terminal 100 to select the mapping of radio resources for uplink control signaling. In the first approach, the user terminal 100 selects a first mapping if downlink assignment of a single downlink component carrier is detected and the downlink assignment is sent on the associated downlink component carrier. The user terminal 100 selects a second mapping if it detects at least one downlink assignment for at least one downlink component carrier different from the single associated downlink component carrier (for which there are Rel-8 ACK/NACK resources). In a second approach, the user terminal selects a mapping depending on the number of component carriers it detects for downlink assignments for downlink transmissions.

[060] Fig. 9 illustrates an exemplary method 50 implemented by a base station 20 in a communication network 10 of receiving uplink control information from a user terminal 100 depending ion the assignment of downlink component carriers. The base station 20 schedules the user terminal 100 to receive downlink transmissions on one or more downlink component carriers (block 52). The user terminal 100 may be scheduled to receive downlink transmissions on a single downlink component carrier associated with a primary uplink component carrier. In this case, the base station 20 receives control information associated with the downlink transmissions to the user terminal 100 on a first set of radio resources on the uplink primary component carrier (block 54). Alternatively, the user terminal 100 may be scheduled to receive downlink transmissions on multiple downlink component carriers, or on a single downlink component carrier other than the downlink component carrier associated with the uplink primary component carrier. In this alternative case, the base station 20 receives uplink control information associated with the downlink transmissions from the user terminal 100 on a second set of radio resources on the uplink component carrier (block 56).

[061] Fig. 10 illustrates an exemplary method 60 implemented by a user terminal of transmission of uplink control signaling to a base station 20. The user terminal 100 receives a radio resource assignment for a downlink transmission from the base station 20 (block 62). If the user terminal 100 detects assignments of radio resources for a single downlink component carrier, the user terminal 100 transmits, on a first set of radio resources on an uplink primary component carrier, uplink control information associated with the downlink transmissions (block 64). On the other hands, if the user terminal 100 receives assignments for multiple downlink component carriers, the user terminal 100 transmits, on a second set of radio resources on the uplink primary component carrier, uplink control information associated with downlink transmissions (block 66).

[062] Fig. 11 illustrates another exemplary method 70 implemented by a user terminal 100 of transmission of uplink control signaling to a base station 20. The user terminal 100 receives a radio resource assignment for a downlink transmission from the base station 20 (block 72). If the user terminal 100 detects assignments of radio resources for a first downlink component carrier, the user terminal 100 transmits, on a first set of radio resources on a uplink primary component carrier, uplink control information associated with the downlink transmissions (block 74). On the other hands, if the user terminal 100 receives assignments for a second downlink component carrier, the user terminal 100 transmits, on a second set of radio resources on the primary uplink component carrier, uplink control information associated with downlink transmissions (block 76).

[063] Fig. 12 illustrates an exemplary base station 20 according to the present invention. The base station 20 comprises a transceiver 22 for communicating with user terminals and processing circuit 32 for processing the signals transmit and received by the transceiver 22. The transceiver 22 includes a transmitter 24 coupled to one or more transmit antennas 28 and receiver 26 coupled to one or more receive antennas 30. The same antenna(s) 28, 30 may be used for both transmission and reception. The

processing circuit 32 may be implemented by one or more processors, hardware, firmware or a combination thereof. Typical functions of the processing circuit 32 include modulation and coding of transmitted signals, and the demodulation and decoding of received signals. The processing circuit 32 also includes a controller 34 for controlling the operation of the base station 20. The controller 34 is responsible for transmission of downlink control information on the PDCCH, and for the processing of uplink control information received on the PUCCH.

[064] Fig. 13 illustrates a functional block diagram of an exemplary user terminal 100. The user terminal 100 comprises a transceiver 110 and a processing circuit 120. The transceiver 110 comprises a transmitter 112 coupled to one or more transmit antennas 114, and a receiver 116, coupled to one or more receive antennas 118. Those skilled in the art will appreciate that the same antennas may be used for transmission and reception. The processing circuit 120 processes signals transmitted and received by the transceiver 110. The processing circuit 120 comprises one or more processors, hardware, firmware, or a combination thereof. Typical functions of the processing circuit 120 include modulation end coding of transmitted signals, and the demodulation and decoding of received signals. The processing circuit 120 includes a controller 122 for controlling uplink transmissions and the reception of downlink transmissions. The controller 122 generates uplink control information for transmission on the PUCCH, and processes downlink control information received on the PDCCH as previously described.

[065] The invention provides means for efficient transmission of PUCCH on one component carrier corresponding to multiple downlink component carriers, without creating implementation problems in the user terminal or being over-dimensioned and therefore inefficient.

[066] The present invention may, of course, be carried out in other specific ways than those herein set forth without departing from the scope and essential characteristics of

the invention. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

CLAIMS

What is claimed is:

1. A method implemented by a base station of receiving control information from a user terminal, the method comprising:

scheduling downlink transmissions to said user terminal on one or more downlink component carriers;

if the user terminal is scheduled to receive downlink transmissions on a first single downlink component carrier, receiving control information associated with the downlink transmissions to the user terminal on a first set of radio resources on a uplink primary component carrier associated with said first downlink component carrier; and

if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier or multiple downlink component carriers, receiving control information associated with the downlink transmissions to the user terminal on a second set of radio resources on the uplink primary component carrier.

2. The method of claim 1 further comprising transmitting control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink primary component carrier.

3. The method of claim 2 further comprising transmitting control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the second set radio resources on the uplink primary component carrier.

4. The method of claim 3 wherein at least one of the first and second sets of radio resources are indicated implicitly by at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier.

5. The method of claim 3 wherein at least one of the first and second sets of radio resources are indicated explicitly by an uplink control channel index.

6. The method of claim 5 wherein the explicit indication is transmitted as radio resource control signaling.

7. The method of claim 1 further comprising transmitting an acknowledgement resource indication on a downlink component carrier to dynamically assign said second set of radio resources on the uplink primary component carrier to the user terminal when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers.

8. The method of claim 7 wherein the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources.

9. A base station comprising:

a transmitter to transmit user data on one or more downlink component carriers to a user terminal; and

a controller to schedule downlink transmissions to said user terminal, the downlink controller configured to

schedule downlink transmissions to a user terminal on one or more downlink component carriers;

if the user terminal is scheduled to receive downlink transmissions on a first single downlink component carrier, receive control information associated with the downlink transmissions to the user terminal on a first set of radio resources on a uplink primary component carrier associated with said first downlink component carrier; and

if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier or multiple downlink component carriers, receive control information associated with the downlink transmissions to the user terminal on a second set of radio resources on the uplink primary component carrier.

10. The base station of claim 9 wherein the controller is further configured to transmit control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink primary component carrier.

11. The base station of claim 10 wherein the controller is further configured to transmit control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the second set of radio resources on the uplink primary component carrier.

12. The base station of claim 11 wherein the controller is further configured to indicate at least one of the first and second sets of radio resources implicitly by sending at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier.

13. The base station of claim 11 wherein the controller is further configured to indicate at least one of the first and second sets of radio resources explicitly by sending an uplink control channel index.

14. The base station of claim 13 wherein the controller is further configured to send the explicit indication as radio resource control signaling.

15. The base station of claim 9 wherein the controller is further configured to transmit an acknowledgement resource indication on a downlink component carrier to dynamically assign said second set of radio resources on the uplink primary component carrier to the user terminal when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers.

16. The base station of claim 15 wherein the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources.

17. A method implemented by a user terminal of transmitting control information in a mobile communication network, the method comprising:

receiving an assignment of radio resources for downlink transmissions from a base station;

transmitting control information associated with the downlink transmissions on a first set of radio resources on an uplink component carrier if an assignment of single downlink component carrier for the downlink transmission is received; and

transmitting control information associated with the downlink transmissions on a second set of radio resources on the uplink component carrier if an assignment of multiple downlink component for the downlink transmission is received.

18. The method of claim 17 further comprising transmitting user data on the second set of radio resources if a single downlink component carrier is assigned for the downlink transmission.

19. The method of claim 17 further comprising receiving control information from the base station on a downlink component carrier implicitly or explicitly indicating the second set of radio resources on the uplink primary component carrier.

20. The method of claim 19 wherein receiving control information comprises receiving one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying said second set of resources.

21. The method of claim 19 wherein receiving control information comprises receiving an uplink control channel index explicitly identifying said second set of resources.

22. The method of claim 21 wherein the explicit indication is received as radio resource control signaling.

23. The method of claim 17 further comprising receiving, from a base station, an acknowledgement resource indication on a downlink component carrier dynamically

assigning said second set of radio resources on the uplink primary component carrier when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers.

24. The method of claim 23 further comprising selecting the second set of resources from a semi-static set of uplink resources responsive to the acknowledgement resource indication.

25. A user terminal for mobile communications, the user terminal comprising:

a receiver to receive downlink transmissions from a base station;

a transmitter to transmit control information associated with the downlink transmission to a base station; and

a controller to select radio resources for transmission of control information associated with the downlink transmissions, the controller configured to:

select a first set of radio resources on an uplink component carrier if an assignment of a single downlink component carrier for the downlink transmission is received; and

select a second set of radio resources on the uplink component carrier if an assignment of multiple downlink component carriers for the downlink transmission is received.

26. The user terminal of claim 25 configured to transmit user data on the second set of radio resources if a single downlink component carrier is assigned for the downlink transmission.

27. The user terminal of claim 25 wherein the controller is further configured to receive control information from the base station on a downlink component carrier implicitly or explicitly identifying the second set of radio resources on the uplink primary component carrier.

28. The user terminal of claim 27 wherein the controller is further configured to receive at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying the second set of radio resources.

29. The user terminal of claim 27 wherein the controller is further configured to receive an uplink control channel index explicitly identifying the second set of radio resources on the uplink primary component carrier.

30. The user terminal of claim 29 wherein the controller is further configured to receive the explicit indication as radio resource control signaling.

31. The user terminal of claim 25 wherein the controller is further configured to receive, from a base station, an acknowledgement resource indication on a downlink component carrier dynamically assigning said second set of radio resources on the uplink primary component carrier when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers.

32. The user terminal of claim 31 wherein the controller is configured to select the second set of resources from a semi-static set of uplink resources responsive to the acknowledgement resource indication.

33. A method implemented by a user terminal in a mobile communication network, the method comprising:

receiving an assignment of radio resources for a downlink transmissions from a base station;

transmitting control information associated with the downlink transmission on a first set of radio resources on an uplink component carrier if an assignment of a first downlink component carrier for the downlink transmission is received; and

transmitting control information associated with the downlink transmission on a second set of radio resources on the uplink component carrier if an assignment of a second downlink component carrier for the downlink transmission is received.

34. A user terminal for mobile communications, the user terminal comprising:

a receiver to receive downlink transmissions from a base station;

a transmitter to transmit control information associated with the downlink transmission to a base station; and

a controller to select radio resources for transmission of control information associated with downlink transmission, the controller configured to:

select a first set of radio resources on an uplink component carrier if an assignment of a first downlink component carrier for the downlink transmission is received; and

select a second set of radio resources on the uplink component carrier if an assignment of a second downlink component carrier for the downlink transmission is received.

ABSTRACT

The invention is a method and apparatus for signaling uplink control information in a mobile communication network using carrier aggregation. The signaling mechanism allows the transmission, on a single uplink component carrier, of control information associated with a downlink transmission on multiple aggregated downlink component carriers. Semi-statically reserved resources for the transmission of control information on the uplink component carrier may be dynamically shared by user terminals that are assigned multiple downlink component carriers for downlink transmissions. Implicit or explicit resource indication can be used in combination with dynamic resource indication.

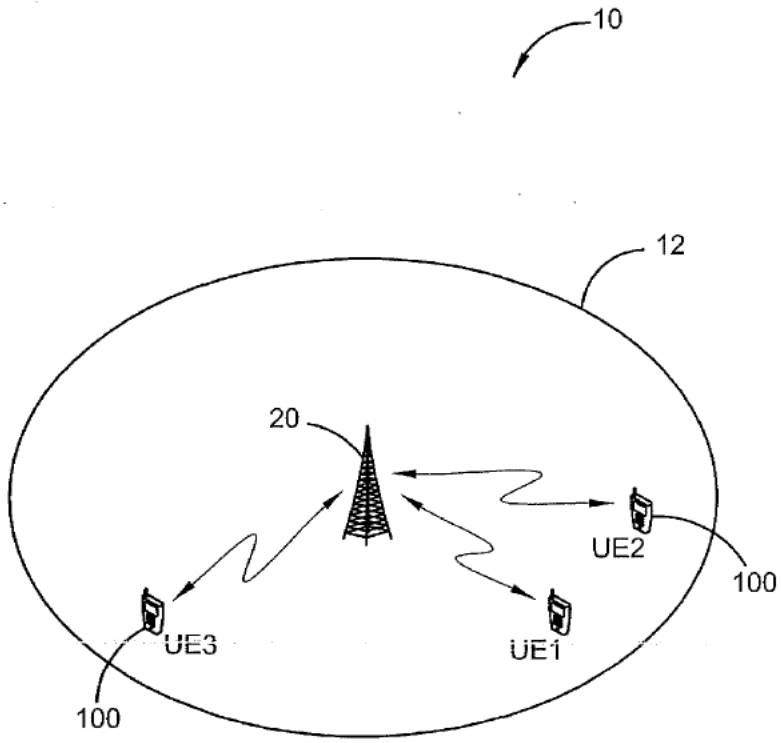

FIG. 1

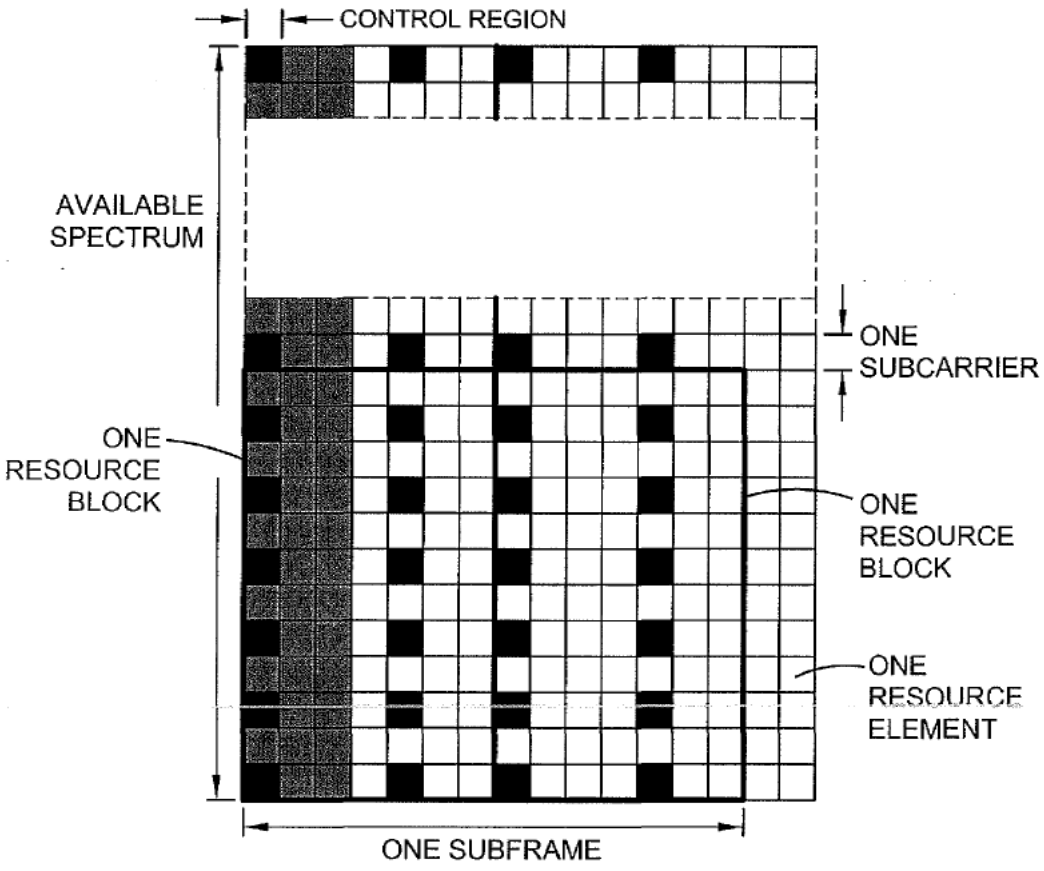
CONTROL REGION
AVAILABLE SPECTRUM
ONE SUBCARRIER
ONE RESOURCE BLOCK
ONE RESOURCE BLOCK
ONE RESOURCE ELEMENT
ONE SUBFRAME

FIG. 2

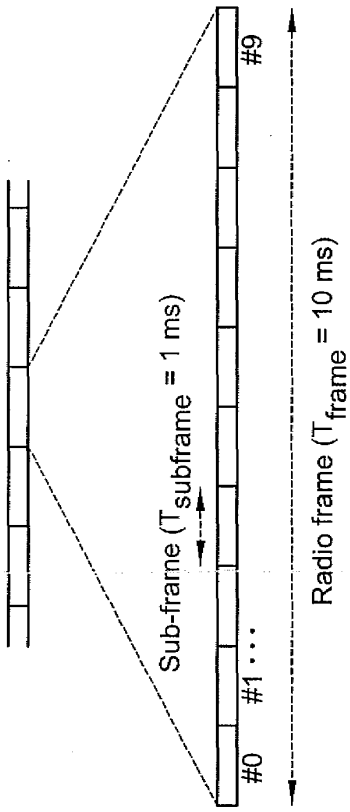

FIG. 3

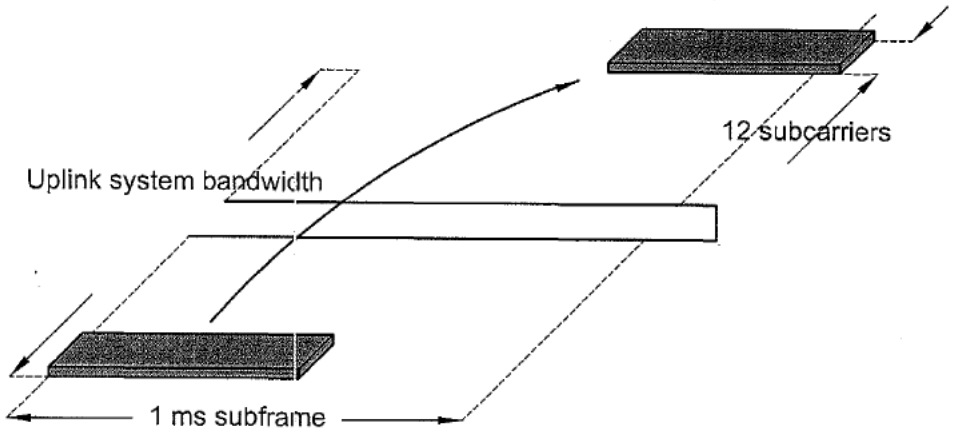

FIG. 4

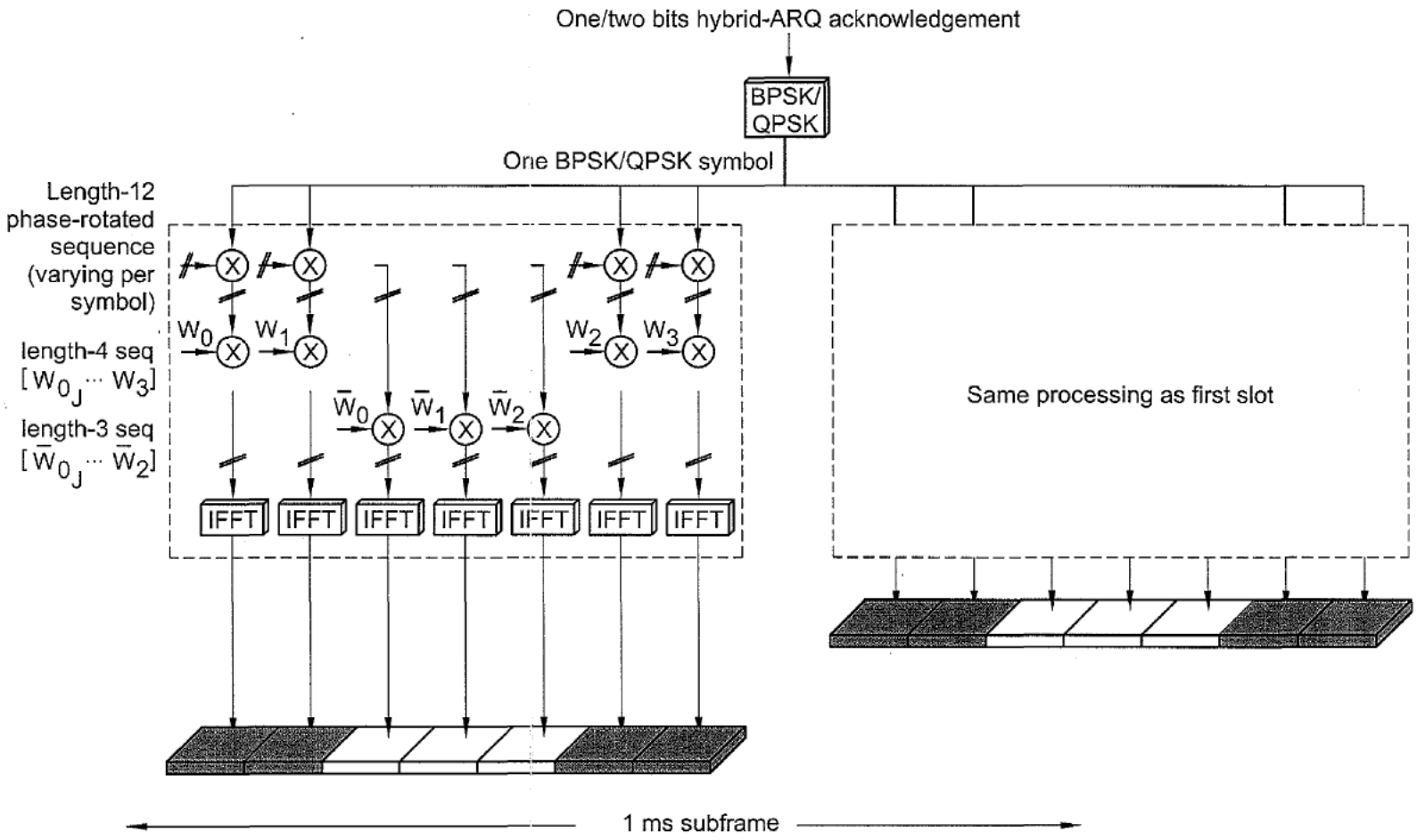
One/two bits hybrid-ARQ acknowledgement
BPSK/
QPSK
One BPSK/QPSK symbol
Length-12
phase-rotated
sequence
(varying per
symbol)
length-4 seq
[W0, ... W3]
length-3 seq
[W̄0, ... W̄2]
W0
W1
W2
W3
W̄0
W̄1
W̄2
IFFT
Same processing as first slot
1 ms subframe

FIG. 5

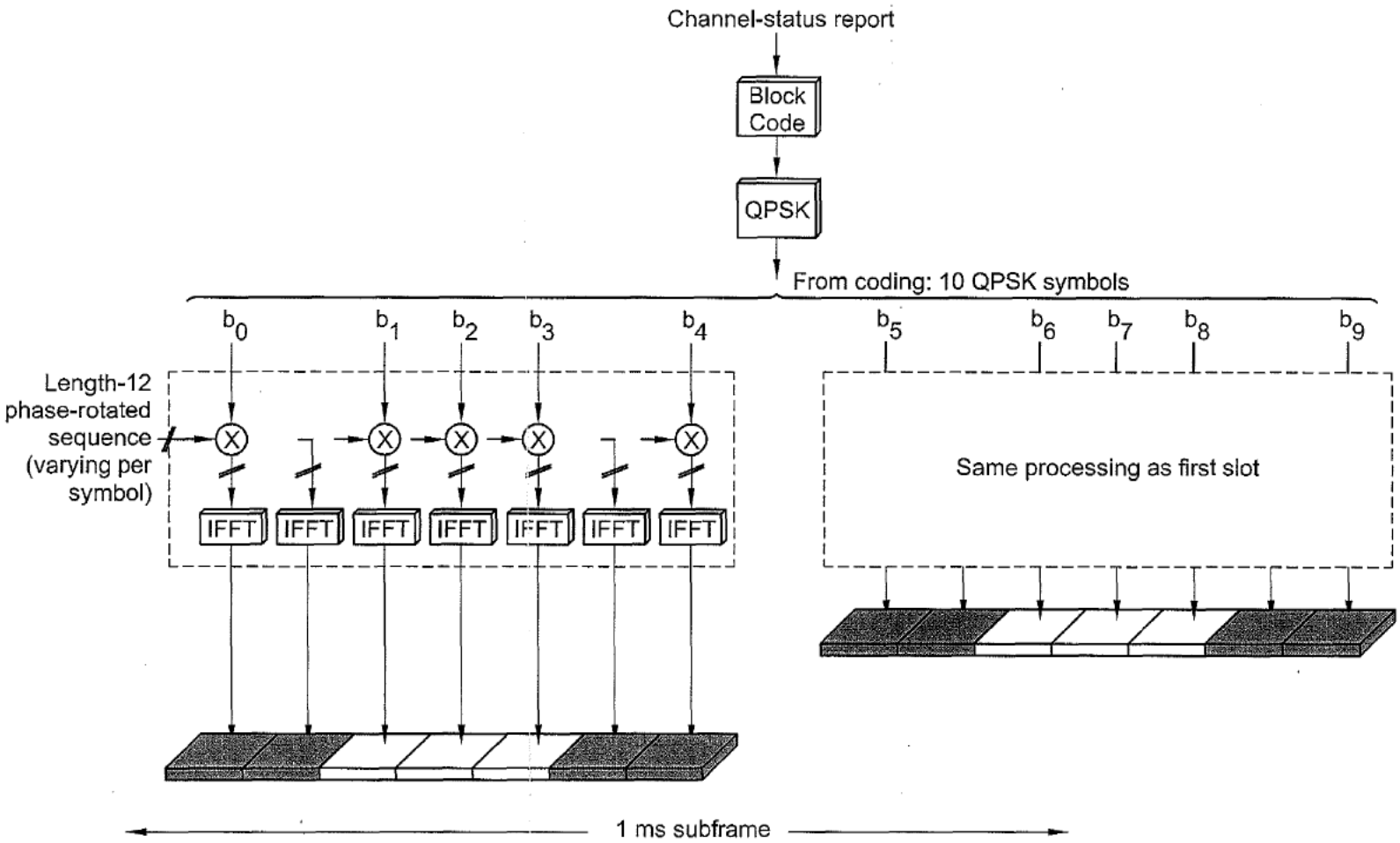
Channel-status report
Block Code
QPSK
From coding: 10 QPSK symbols
b0
b1
b2
b3
b4
b5
b6
b7
b8
b9
Length-12 phase-rotated sequence (varying per symbol)
IFFT
IFFT
IFFT
IFFT
IFFT
IFFT
IFFT
Same processing as first slot
1 ms subframe

FIG. 6

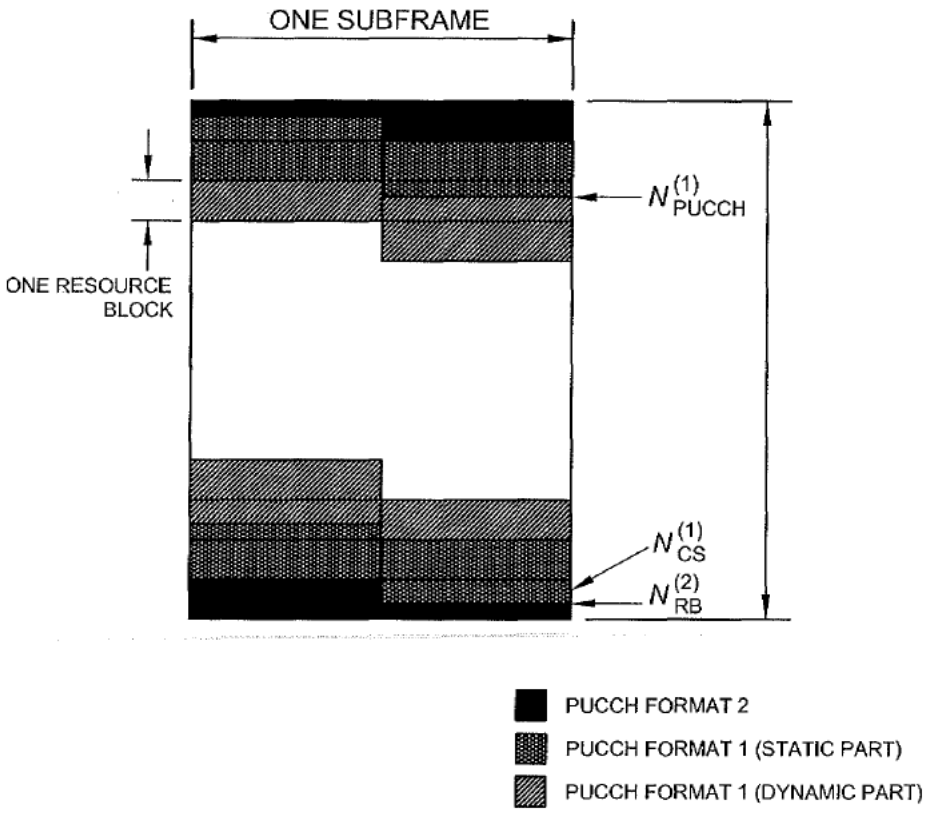
ONE SUBFRAME
ONE RESOURCE BLOCK
$N^{(1)}_{PUCCH}$
$N^{(1)}_{CS}$
$N^{(2)}_{RB}$
PUCCH FORMAT 2
PUCCH FORMAT 1 (STATIC PART)
PUCCH FORMAT 1 (DYNAMIC PART)

FIG. 7

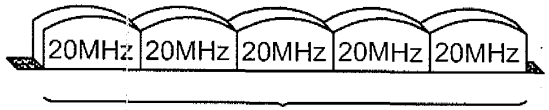
20MHz
20MHz
20MHz
20MHz
20MHz
Aggregated bandwidth of 100 MHz

FIG. 8

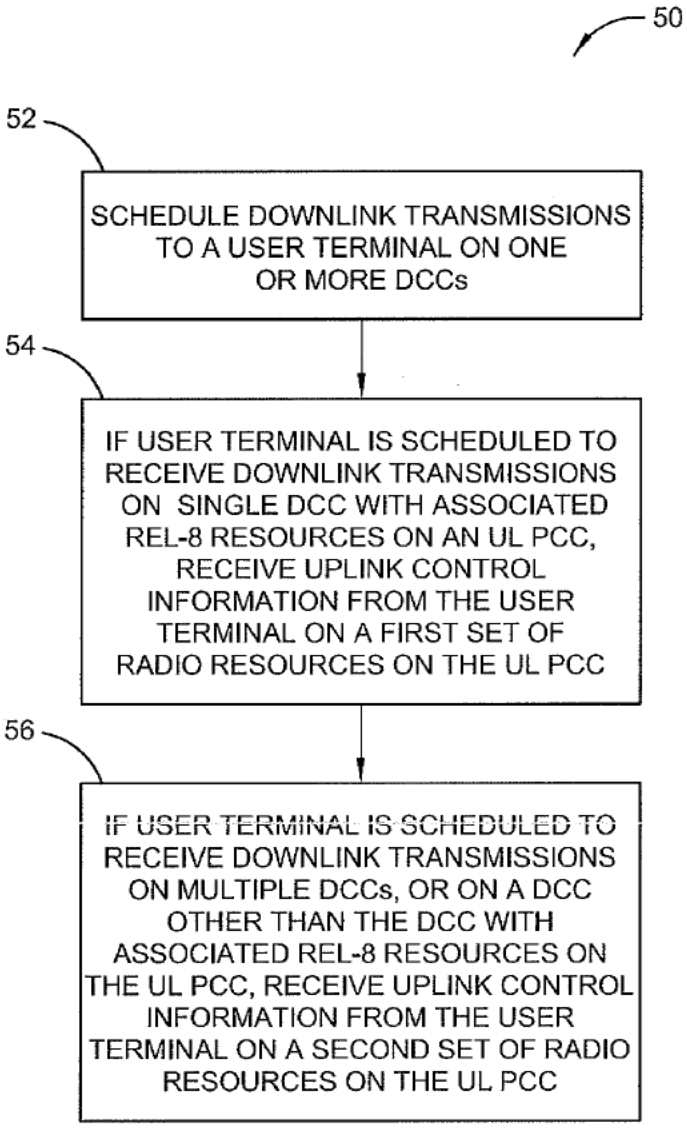
50
52
SCHEDULE DOWNLINK TRANSMISSIONS TO A USER TERMINAL ON ONE OR MORE DCCs
54
IF USER TERMINAL IS SCHEDULED TO RECEIVE DOWNLINK TRANSMISSIONS ON SINGLE DCC WITH ASSOCIATED REL-8 RESOURCES ON AN UL PCC, RECEIVE UPLINK CONTROL INFORMATION FROM THE USER TERMINAL ON A FIRST SET OF RADIO RESOURCES ON THE UL PCC
56
IF USER TERMINAL IS SCHEDULED TO RECEIVE DOWNLINK TRANSMISSIONS ON MULTIPLE DCCs, OR ON A DCC OTHER THAN THE DCC WITH ASSOCIATED REL-8 RESOURCES ON THE UL PCC, RECEIVE UPLINK CONTROL INFORMATION FROM THE USER TERMINAL ON A SECOND SET OF RADIO RESOURCES ON THE UL PCC

FIG. 9

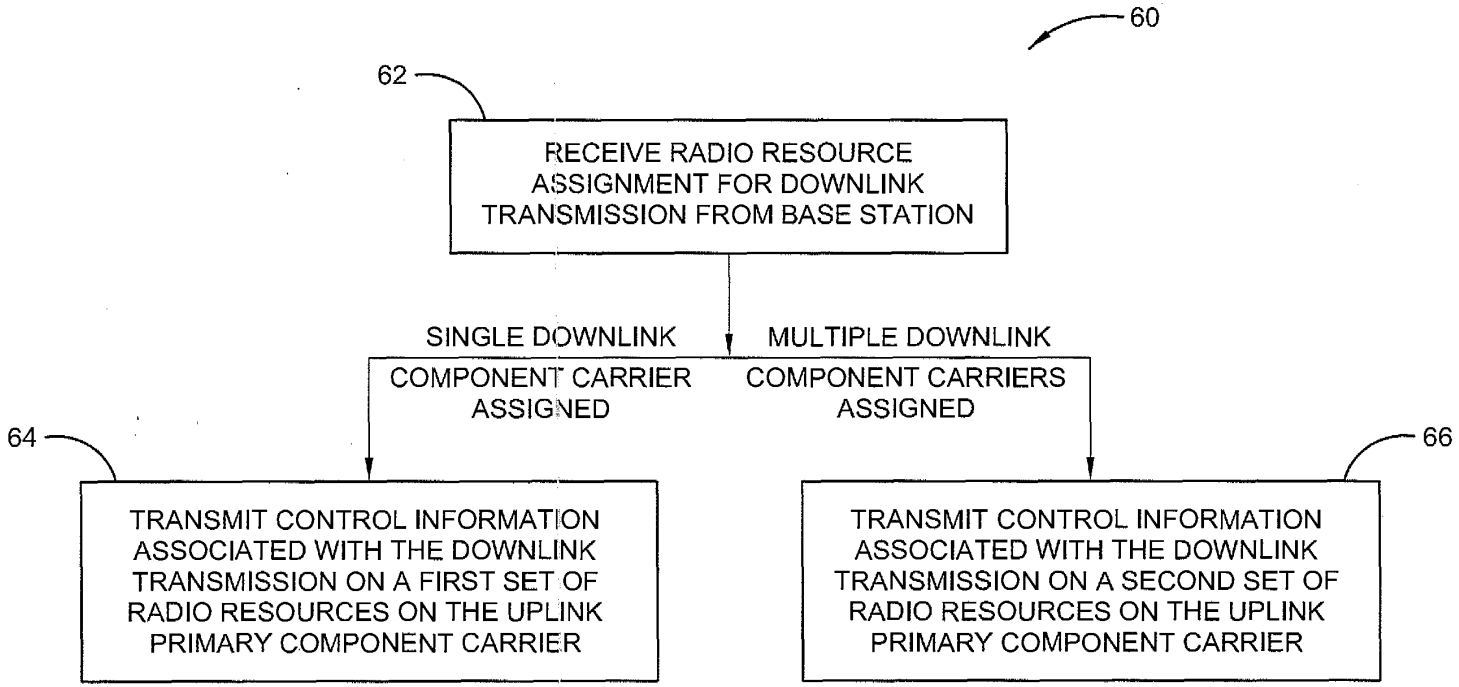
60
62
RECEIVE RADIO RESOURCE ASSIGNMENT FOR DOWNLINK TRANSMISSION FROM BASE STATION
SINGLE DOWNLINK COMPONENT CARRIER ASSIGNED
MULTIPLE DOWNLINK COMPONENT CARRIERS ASSIGNED
64
TRANSMIT CONTROL INFORMATION ASSOCIATED WITH THE DOWNLINK TRANSMISSION ON A FIRST SET OF RADIO RESOURCES ON THE UPLINK PRIMARY COMPONENT CARRIER
66
TRANSMIT CONTROL INFORMATION ASSOCIATED WITH THE DOWNLINK TRANSMISSION ON A SECOND SET OF RADIO RESOURCES ON THE UPLINK PRIMARY COMPONENT CARRIER

FIG. 10

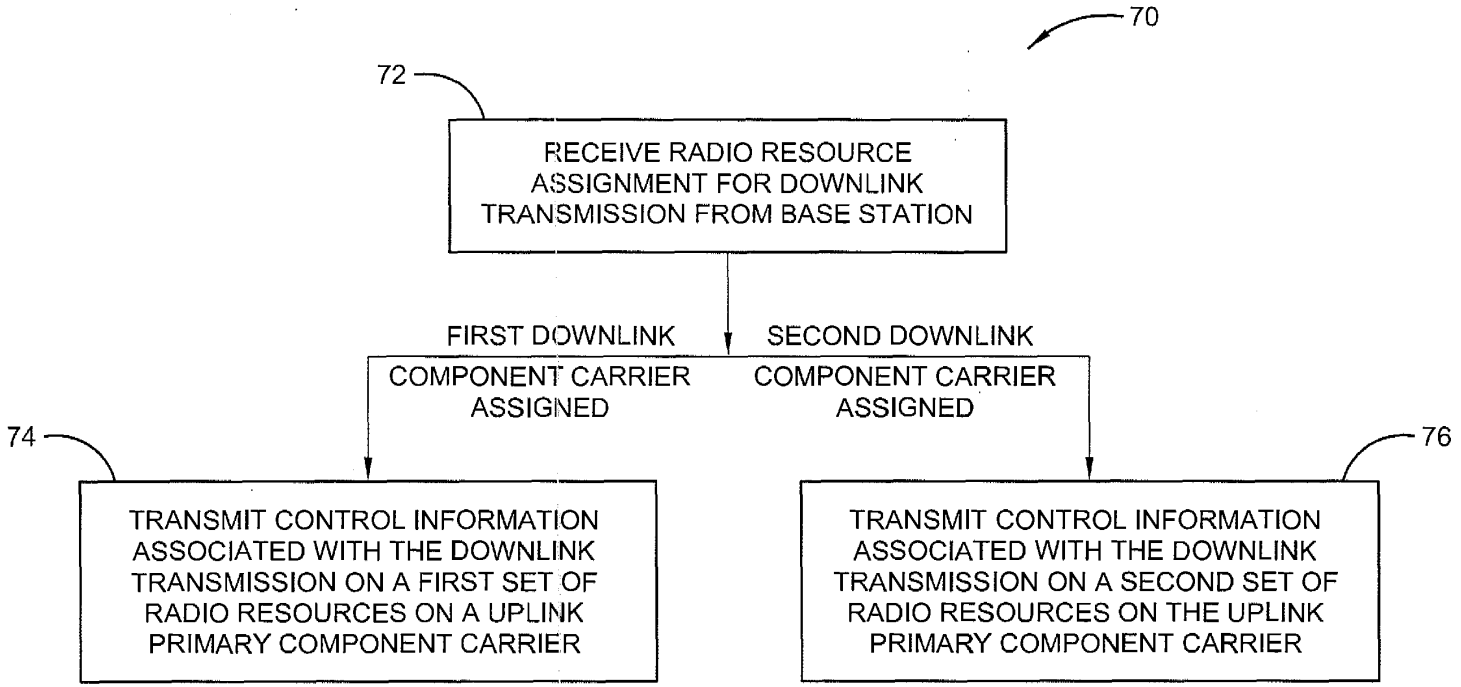
70
72
RECEIVE RADIO RESOURCE ASSIGNMENT FOR DOWNLINK TRANSMISSION FROM BASE STATION
FIRST DOWNLINK COMPONENT CARRIER ASSIGNED
SECOND DOWNLINK COMPONENT CARRIER ASSIGNED
74
76
TRANSMIT CONTROL INFORMATION ASSOCIATED WITH THE DOWNLINK TRANSMISSION ON A FIRST SET OF RADIO RESOURCES ON A UPLINK PRIMARY COMPONENT CARRIER
TRANSMIT CONTROL INFORMATION ASSOCIATED WITH THE DOWNLINK TRANSMISSION ON A SECOND SET OF RADIO RESOURCES ON THE UPLINK PRIMARY COMPONENT CARRIER

FIG. 11

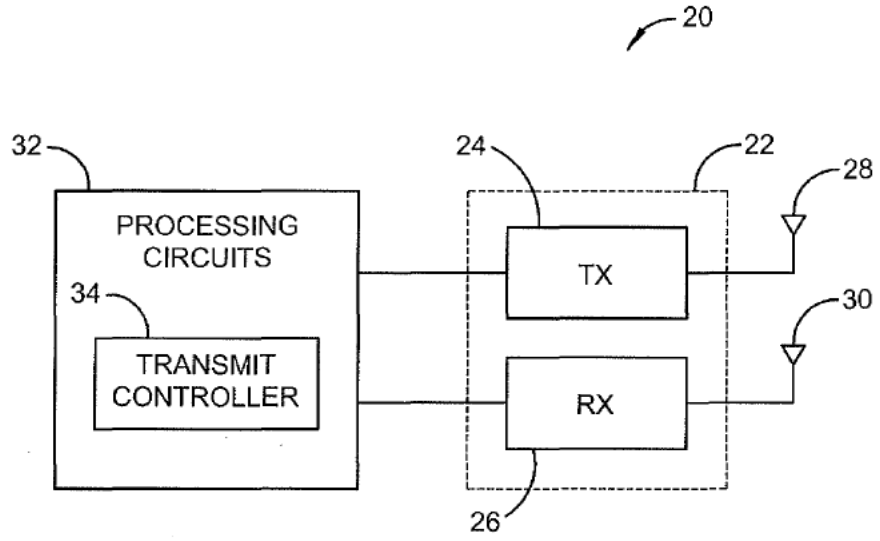
20
32
PROCESSING CIRCUITS
34
TRANSMIT CONTROLLER
24
22
28
TX
30
RX
26

FIG. 12

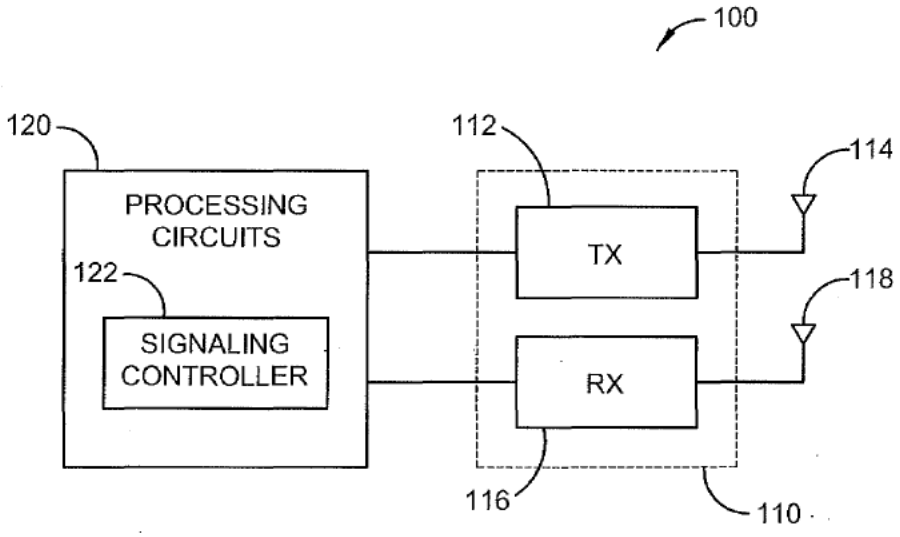
100
120
PROCESSING CIRCUITS
122
SIGNALING CONTROLLER
112
114
TX
118
RX
116
110

FIG. 13

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Filer:	David E. Bennett/Kathleen Koppen
Attorney Docket Number:	4015-6942 / P30138-US2

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	330	330
Utility Search Fee	1111	1	540	540
Utility Examination Fee	1311	1	220	220
Pages:				
Claims:				
Claims in excess of 20	1202	14	52	728
Independent claims in excess of 3	1201	3	220	660
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**2478**

Electronic Acknowledgement Receipt

EFS ID:	8551147
Application Number:	12896993
International Application Number:	
Confirmation Number:	1015
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Customer Number:	24112
Filer:	David E. Bennett/Kathleen Koppen
Filer Authorized By:	David E. Bennett
Attorney Docket Number:	4015-6942 / P30138-US2
Receipt Date:	04-OCT-2010
Filing Date:	
Time Stamp:	11:47:53
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	$2478
RAM confirmation Number	7381
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1		4015-6942.pdf	2015722 616098cf9d8e508c4423f18e41938765d4cd3251	yes	49

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Application Data Sheet	1	5
	Specification	6	27
	Claims	28	36
	Abstract	37	37
	Drawings-only black and white line drawings	38	49

Warnings:

Information:

2	Fee Worksheet (PTO-875)	fee-info.pdf	37856 c6a91787cf232f5ed3c775ea2920d5eb76e4b8ab	no	2

Warnings:

Information:

Total Files Size (in bytes):	2053578

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.

PTO/SB/06 (10-07)
Approved for use through 06/30/2010. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Date: 10/04/2010

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: **12/896,993**

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	330
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	540
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	220
TOTAL CLAIMS (37 CFR 1.16(i))	34 minus 20 =	* 14	X 26=		OR	X 52=	728
INDEPENDENT CLAIMS (37 CFR 1.16(h))	6 minus 3 =	* 3	X 110=			X 220=	660
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $270 ($135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			195			390	
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	2478

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 ($)	SMALL ENTITY ADDI-TIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDI-TIONAL FEE ($)
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))					N.A		OR	N/A	
						TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDI-TIONAL FEE ($)	OR	RATE ($)	ADDI-TIONAL FEE ($)
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))					N/A		OR	N/A	
						TOTAL ADD'T FEE		OR	TOTAL ADD'T 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.

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
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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
12/896,993	10/04/2010		2478	4015-6942 / P30138-US2	34	6

CONFIRMATION NO. 1015

24112
COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

FILING RECEIPT

OC000000044046246

Date Mailed: 10/20/2010

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**

Applicant(s)

David Astely, Bromma, SWEDEN;
Robert Baldemair, Solna, SWEDEN;
Dirk Gerstenberger, Stockholm, SWEDEN;
Daniel Larsson, Solna, SWEDEN;
Lars Lindbom, Karlstad, SWEDEN;
Stefan Parkvall, Stockholm, SWEDEN;

Assignment For Published Patent Application

Telefonaktiebolaget L M Ericsson (publ), Stockholm, SWEDEN

Power of Attorney: None

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/248,661 10/05/2009

Foreign Applications

If Required, Foreign Filing License Granted: 10/18/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/896,993**

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: No

Title

PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced

Preliminary Class

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 (1-866-999-4158).

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).

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/896,993	10/04/2010	David Astely	4015-6942 / P30138-US2

CONFIRMATION NO. 1015

24112
COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

FORMALITIES LETTER

OC000000044046247

Date Mailed: 10/20/2010

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The oath or declaration is missing.
  A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
  Note: If a petition under 37 CFR 1.47 is being filed, an oath or declaration in compliance with 37 CFR 1.63 signed by all available joint inventors, or if no inventor is available by a party with sufficient proprietary interest, is required.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of $**130** for a non-small entity, must be submitted with the missing items identified in this notice.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is $**130** for a non-small entity
- $**130** Surcharge.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.
https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

/smunpanthovong/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of
Astely *et al.*

Serial No.: **12/896,993**

Filed: **October 4, 2010**

For: **PUCCH Resource Allocation for Carrier Aggregation for LTE-Advanced**

Docket No: **4015-6942**

PATENT PENDING

Examiner:

Group Art Unit:

Confirmation No.: 1015

Mail Stop MISSING PARTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF MAILING OR TRANSMISSION [37 CFR 1.8(a)]

I hereby certify that this correspondence is being:

☐ deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Mail Stop MISSING PARTS, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

☐ transmitted by facsimile on the date shown below to the United States Patent and Trademark Office at (571) 273-8300.

December 20, 2010 — Date
Kathleen Koppen

This correspondence is being:

☒ electronically submitted via EFS-Web

Sir:

In response to the Notice to File Missing Parts of Application, please find enclosed the signed Declaration and Power of Attorney for Patent Application. Payment in the amount of $130 to cover the surcharge for the incomplete filing is being concurrently submitted with this electronic submission. If additional fees are required, please deduct from the Coats & Bennett, P.L.L.C. Deposit Account No. 18-1167.

Respectfully submitted,

COATS & BENNETT, P.L.L.C.

David E. Bennett

Dated: December 20, 2010

David E. Bennett
Registration No.: 32,194

1400 Crescent Green, Suite 300
Cary, NC 27518
Telephone: (919) 854-1844
Facsimile: (919) 854-2084

RULE 63 (37 C.F.R. 1.63)

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **PUCCH RESOURCE ALLOCATION FOR CARRIER AGGREGATION FOR LTE-ADVANCED,** the specification of which (check applicable box(es)):

☐ is attached hereto;
☒ was filed on October 4, 2010 as U.S. Application Serial No. 12/896,993
☐ was filed as PCT international application No. PCT/_____/_____ on _____ and (if applicable to U.S. or PCT application) was amended on _____.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with 37 C.F.R. 1.56.

I hereby claim priority benefits under 35 U.S.C. 119/365 of any U.S. Provisional or foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed or, if no priority is claimed before the filing date of this application:

Prior U.S. Provisional or Foreign Application(s):		
Application Number	Country	Day/Month/Year Filed
61/248,661	US	05/Oct/2009

I hereby claim the benefit under 35 U.S.C. 120/365 of all prior United States and PCT international applications listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in such prior application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose material information as defined in 37 C.F.R. 1.56 which occurred between the filing date of the prior applications and the national or PCT international filing date of this application:

Prior U.S./PCT Application(s):		
Prior Application Serial No.	Day/Month/Year Filed	Status: patented, pending, abandoned

I hereby declare that all statements made herein of my knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine

or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Further, I hereby appoint the Attorneys and Patent Agents of **Coats & Bennett, PLLC** as identified by **Customer Number 24112** in the records of the United States Patent and Trademark Office and as updated from time to time, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith. Direct all correspondence to David E. Bennett:

24112

INVENTOR SIGNATURE(S):

Full Name: **David** (First Name) Middle Name/Initial **Astely** (Last Name)

Signature: _____ Date: 2010-11-29

Residence: Bromma, Sweden
City, State, and Country

Citizenship: Sweden

Post Office Address: Stobaeusvägen 22
SE-168 56 Bromma
Sweden

Full Name: **Robert** (First Name) Middle Name/Initial **Baldemair** (Last Name)

Signature: _____ Date: _____

Residence: Solna, Sweden
City, State, and Country

Citizenship: Austria

Post Office Address: Ängkärrsgatan 3
SE-171 10 Solna
Sweden

or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Further, I hereby appoint the Attorneys and Patent Agents of **Coats & Bennett, PLLC** as identified by **Customer Number 24112** in the records of the United States Patent and Trademark Office and as updated from time to time, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith. Direct all correspondence to David E. Bennett:

24112

INVENTOR SIGNATURE(S):

Full Name: **David** (First Name) (Middle Name/Initial) **Astely** (Last Name)

Signature: _____ Date: _____

Residence: Bromma, Sweden
City, State, and Country

Citizenship: Sweden

Post Office Address: Stobaeusvägen 22
SE-168 56 Bromma
Sweden

Full Name: **Robert** (First Name) (Middle Name/Initial) **Baldemair** (Last Name)

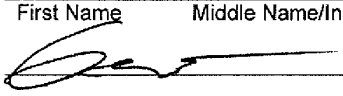
Signature: [signature] Date: 2010-12-20

Residence: Solna, Sweden
City, State, and Country

Citizenship: Austria

Post Office Address: Ängkärrsgatan 3
SE-171 10 Solna
Sweden

Full Name: **Dirk** **Gerstenberger**
First Name Middle Name/Initial Last Name

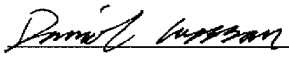
Signature:  Date: 2010-10-18

Residence: Stockholm, Sweden
City, State, and Country

Citizenship: Germany

Post Office Address: Birger Jarlsgatan 113 C
SE-113 56 Stockholm
Sweden

Full Name: **Daniel** **Larsson**
First Name Middle Name/Initial Last Name

Signature:  Date: 2010-10-18

Residence: Solna, Sweden
City, State, and Country

Citizenship: Sweden

Post Office Address: Storgatan 50
SE-171 52, Solna
Sweden

Full Name: **Lars** **Lindbom**
First Name Middle Name/Initial Last Name

Signature: _____ Date: _____

Residence: Karlstad, Sweden
City, State, and Country

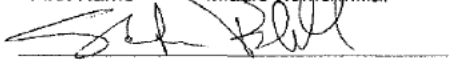
Citizenship: Sweden

Post Office Address: Fogdegatan 7
SE-654 62 Karlstad
Sweden

Full Name:	**Dirk**		**Gerstenberger**
	First Name	Middle Name/Initial	Last Name
Signature:			Date:
Residence:	Stockholm, Sweden		
	City, State, and Country		
Citizenship:	Germany		
Post Office Address:	Birger Jarlsgatan 113 C SE-113 56 Stockholm Sweden		

Full Name:	**Daniel**		**Larsson**
	First Name	Middle Name/Initial	Last Name
Signature:			Date:
Residence:	Solna, Sweden		
	City, State, and Country		
Citizenship:	Sweden		
Post Office Address:	Storgatan 50 SE-171 52, Solna Sweden		

Full Name:	**Lars**		**Lindbom**
	First Name	Middle Name/Initial	Last Name
Signature:			Date: 4 Nov 2010
Residence:	Karlstad, Sweden		
	City, State, and Country		
Citizenship:	Sweden		
Post Office Address:	Fogdegatan 7 SE-654 62 Karlstad Sweden		

Full Name:	**Stefan**		**Parkvall**
	First Name	Middle Name/Initial	Last Name
Signature:			Date: Oct 18, 2010
Residence:	Stockholm, Sweden		
	City, State, and Country		
Citizenship:	Sweden		
Post Office Address:	Västmannagatan 53 SE-113 25 Stockholm Sweden		

Electronic Patent Application Fee Transmittal

Application Number:	12896993
Filing Date:	04-Oct-2010
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Filer:	David E. Bennett/Kathleen Koppen
Attorney Docket Number:	4015-6942 / P30138-US2

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Late filing fee for oath or declaration	1051	1	130	130
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
		Total in USD ($)		**130**

Electronic Acknowledgement Receipt

EFS ID:	9069606
Application Number:	12896993
International Application Number:	
Confirmation Number:	1015
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Customer Number:	24112
Filer:	David E. Bennett/Kathleen Koppen
Filer Authorized By:	David E. Bennett
Attorney Docket Number:	4015-6942 / P30138-US2
Receipt Date:	20-DEC-2010
Filing Date:	04-OCT-2010
Time Stamp:	09:07:38
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	$130
RAM confirmation Number	8408
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1		4015-6942missingparts.pdf	232480 379672ca0969b507882169999675e819b096309ae	yes	7

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Miscellaneous Incoming Letter	1	1
	Oath or Declaration filed	2	7

Warnings:

Information:

2	Fee Worksheet (PTO-875)	fee-info.pdf	29909 8906dce227a43a1b310c7c2de8be56d0deac63fd	no	2

Warnings:

Information:

Total Files Size (in bytes):	262389

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.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/896,993	10/04/2010		2608	4015-6942	34	6

CONFIRMATION NO. 1015

UPDATED FILING RECEIPT

24112
COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

OC000000045156478

Date Mailed: 12/29/2010

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**

Applicant(s)

David Astely, Bromma, SWEDEN;
Robert Baldemair, Solna, SWEDEN;
Dirk Gerstenberger, Stockholm, SWEDEN;
Daniel Larsson, Solna, SWEDEN;
Lars Lindbom, Karlstad, SWEDEN;
Stefan Parkvall, Stockholm, SWEDEN;

Assignment For Published Patent Application

Telefonaktiebolaget L M Ericsson (publ), Stockholm, SWEDEN

Power of Attorney: The patent practitioners associated with Customer Number 24112

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/248,661 10/05/2009

Foreign Applications

If Required, Foreign Filing License Granted: 10/18/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/896,993**

Projected Publication Date: 04/07/2011

Non-Publication Request: No

Early Publication Request: No

Title

PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced

Preliminary Class

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 (1-866-999-4158).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 12/896,993

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	330
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	540
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	220
TOTAL CLAIMS (37 CFR 1.16(i))	34 minus 20 =	* 14			OR	x 52 =	728
INDEPENDENT CLAIMS (37 CFR 1.16(h))	6 minus 3 =	* 3				x 220 =	660
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $270 ($135 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).						0.00
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	2478

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($)	ADDITIONAL FEE($)	OR	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.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/896,993	10/04/2010	David Astely	4015-6942

CONFIRMATION NO. 1015

24112
COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

PUBLICATION NOTICE

Title:PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced

Publication No.US-2011-0081932-A1
Publication Date:04/07/2011

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

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	12896993
	Filing Date	2010-10-04
	First Named Inventor	Astely, David
	Art Unit	TBD
	Examiner Name	TBD
	Attorney Docket Number	4015-6942

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] ¡	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12896993
	Filing Date	2010-10-04
	First Named Inventor	Astely, David
	Art Unit	TBD
	Examiner Name	TBD
	Attorney Docket Number	4015-6942

	1	3RD GENERATION PARTNERSHIP PROJECT, MOTOROLA (source), "Control Signalling Design for Supporting Carrier Aggregation," 3GPP TSG RANI #56, R1-090792, Athens, GR, Feb. 9-13, 2009.	☐
	2	3RD GENERATION PARTNERSHIP PROJECT, ZTE (source), "Uplink Control Channel Design for LTE-Advanced," TSG-RAN WG1 #58, R1-093209, Shenzhen, China, June 25 - Aug. 29, 2009.	☐
	3	3RD GENERATION PARTNERSHIP PROJECT, NOKIA, NOKIA SIEMENS NETWORKS (source), "L1 Control Signaling with Carrier Aggregation in LTE-Advanced," 3GPP TSG-RAN WG1 Meeting #54bis, R1-083730, Prague, Czech Republic, Sept. 29 - October 3, 2008.	☐
	4	3RD GENERATION PARTNERSHIP PROJECT, NOKIA SIEMENS NETWORKS, NOKIA (source), "Channelization of SRI and Persistent ACK/NACK on PUCCH," 3GPP TSG RAN WG1 Meeting #52bis, R1-081460, Shenzhen, China, March 31 - April 4, 2008.	☐
	5	3RD GENERATION PARTNERSHIP PROJECT, QUALCOMM EUROPE, "Clarifying PUSCH Resource Allocation," 3GPP TSG-RAN WG1 Meeting #54, R1-083181, Jeju, Korea, August 18-22, 2008.	☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12896993
	Filing Date	2010-10-04
	First Named Inventor	Astely, David
	Art Unit	TBD
	Examiner Name	TBD
	Attorney Docket Number	4015-6942

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the 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 the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/David E. Bennett, Reg. No. 32194/	Date (YYYY-MM-DD)	2011-06-23
Name/Print	David E. Bennett	Registration Number	32194

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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.**

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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 Acknowledgement Receipt

EFS ID:	10369476
Application Number:	12896993
International Application Number:	
Confirmation Number:	1015
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Customer Number:	24112
Filer:	David E. Bennett/Wendy Henshaw
Filer Authorized By:	David E. Bennett
Attorney Docket Number:	4015-6942
Receipt Date:	23-JUN-2011
Filing Date:	04-OCT-2010
Time Stamp:	11:08:07
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	Transmittal Letter	4015-6942_IDS_Coverletter.pdf	53215 3b25a31fc4e68487ee47d2ff3ea4e69657255dd0	no	1

Warnings:	
Information:	

2	Non Patent Literature	R1-081460.pdf	181211 5853e37865b3fd52172669ee22eeb2b8eff58b9f	no	5
Warnings:					
Information:					
3	Non Patent Literature	R1-083181.pdf	201926 a00057537bf9767faae47e530bf905164c920485	no	5
Warnings:					
Information:					
4	Non Patent Literature	R1-083730.pdf	280956 a56f1810d80e9a59648152e614f052b8bba339f7	no	6
Warnings:					
Information:					
5	Non Patent Literature	R1-090792.pdf	207218 e5c1a07402b725272039aa3aa3502fc195135176	no	8
Warnings:					
Information:					
6	Non Patent Literature	R1-093209.pdf	144743 bc2ce4917a5076000482e158e80b4068046f7ec7	no	4
Warnings:					
Information:					
7	Information Disclosure Statement (IDS) Form (SB08)	4015-6942_IDS.pdf	612178 ddb22a35dcf24af56e2da0570f88010b8d5e5636	no	4
Warnings:					
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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.

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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.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of **Astely et al.**	)	
Serial No.: **12/896993**	)	PATENT PENDING
Filed: **October 4, 2010**	)	Examiner:
For: **PUCCH Resource Allocation for Carrier Aggregation for LTE-Advanced**	)	Group Art Unit:
Attorney's Docket No: **4015-6942**	)	Confirmation No.: 1015

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

INFORMATION DISCLOSURE STATEMENT

In accordance with 37 C.F.R. 1.56, counsel wishes to make of record the attached items of information for the Examiner's consideration in connection with this application. Also enclosed is Form PTO/SB/08a for the Examiner's convenience in making such consideration of record. Inclusion herein of any particular item of information is not to be construed as an admission that same is prior art.

The Commissioner is hereby authorized to charge any fees that may be required or credit any overpayment to Deposit Account 18-1167.

Respectfully submitted,

COATS & BENNETT, P.L.L.C.

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Dated: June 23, 2011

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
TALUKDER, MD K	
ART UNIT	PAPER NUMBER
2648	
MAIL DATE	DELIVERY MODE
12/19/2012	PAPER

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.

Office Action Summary	Application No.	Applicant(s)	
	12/896,993	ASTELY ET AL.	
	Examiner	Art Unit	
	MD TALUKDER	2648	

-- 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 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 _____.

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) *1-34* 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) *1-34* 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 *04 October 2010* 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).

a)☐ All b)☐ Some * c)☐ None of:

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/08) Paper No(s)/Mail Date *6/23/2011*.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

1. It would be of great assistance to the office if all incoming papers pertaining to a filed application carried the following items:

i. Application number (checked for accuracy, including series code and serial no.).
ii. Group art unit number (copied from most recent Office communication).
iii. Filing date.
iv. Name of the examiner who prepared the most recent Office action.
v. Title of invention.
vi. Confirmation number (See MPEP § 503).

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on (06 /23/2011) is being considered by the examiner.

Claim Rejection- 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-34 are rejected under 35 USC 102(e) as being anticipated by Bala (Pub No. US 2010/0098012).

Regarding Claim 1, Bala teaches a method implemented by a base station of receiving control information from a user terminal (**Fig. 1**), the method comprising: scheduling downlink transmissions to said user terminal on one or more downlink component carriers ((Fig. 2: **the controller of the eNB schedule downlink transmission**. see Para. 25, 26, 38 & 55 and Para. 38:

"**In another embodiment for mapping of CQI, PMI and RI to physical resource elements in carrier aggregation, the PUCCH that carries the CQI (and any other possible control information such as scheduling request, ACK/NACK, etc.) is transmitted on more than one uplink component carrier. In an example method for transmission on more than one uplink carrier, there is one PUCCH per UL component carrier carrying control information corresponding to one DL component carrier**"); if the user terminal is scheduled to receive downlink transmissions on a first single downlink component carrier, receiving control information associated with the downlink transmissions to the user terminal on a first set of radio resources on a uplink primary component carrier associated with said first downlink component carrier; and if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier or multiple downlink component carriers, receiving control information associated with the downlink transmissions to the user terminal on a second set of radio resources on the uplink primary component carrier (**The terminal schedule to receive downlink transmissions on single downlink component carrier, receiving control information a set of radio resources on a uplink primary component carrier associated with said first downlink component carrier and receive other downlink component and control information on a different set of radio resources (RB-resource block).** see Para, **25** and **32-39, 103-14**). (Para. 37: "**The control information for each downlink carrier may be transmitted by using different RBs, different spreading sequences/cyclic shifts or a combination of these. As an example, RBs m=1 and m=3 may be used for control data transmission corresponding to two different downlink carriers. In this case, the mapping of the control data resources (frequency, sequence, cyclic shift) to the downlink carriers may**

be performed with L1 and/or L2/L3 signaling. This mapping may also be performed implicitly by using mapping rules. For example, the CQI for the second downlink carriers may be transmitted with the same spreading sequence/cyclic shift pair as for the first downlink carriers but on the next available RB") (Fig. **5-7:** PUCCH resource block allocations).

Regarding Claim 2, Bala, remains as applied above and continues to teach transmitting control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink primary component carrier (Para. 107-108: "**Disclosed herein are implementation embodiments to configure uplink data channel for transmitting UCI. In Release 8 LTE, the periodic CQI reporting mode is given by the parameter, cqi-Format Indicator Periodic which is configured by higher-layer signaling. In one example, the periodic PUSCH-based CQI reporting mode is given by the parameter X e.g., cqi-Format Indicator Periodic PUSCH which is configured by higher-layer signaling. Depending on transmission mode, reporting mode is implicitly given. In another method, the periodic PUSCH-based CQI reporting mode is given by the parameter Y e.g., cqi-R eport Mode Periodic PUSCH which is configured by higher-layer signaling. Reporting mode is explicitly given via this parameter**").

Regarding Claim 3, Bala continues to teach transmitting control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the second set radio resources on the uplink primary component carrier (See Para. 37 and 107-108 above) (Next available resource blocks is the second set of radio resources).

Regarding Claim 4, Bala continues to teach that the first and second sets of radio resources are indicated implicitly by at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier (Para. 32-33: "**…Alternatively, these WTRUs may be required to report wideband CQI/PMI/RI which requires a smaller number of bits or these WTRUs may be configured to use more subframes to transmit the whole control information. For example, in one subframe, the WTRU may transmit the control information corresponding to only one downlink component carrier and complete transmitting the control information corresponding to all component carriers in several subframes. For example, in subframe 1, the WTRU may transmit control information for downlink component carrier #1, and then in subframe 2, the WTRU may transmit the control information for downlink component carrier # 2, etc. The WTRU configuration may be performed with L1 or L2/L3 signaling. The carrier (or spectrum) edge resource blocks (RBs) may be used for control data transmission when an LTE-A network is configured to use LTE uplink control channel structure, as shown in FIG. 3. As shown in FIG. 3 for LTE Release 8, the WTRU uses two different RBs in the two time slots. For example, the RB indexed with m=1 is used by one WTRU, and m=1 is on opposite edges of the frequency in the two time slots. RBs on opposite edges of the spectrum may be used in two time slots for maximum frequency diversity. In this case, LTE-A and LTE Release 8 WTRUs may be configured to share the same PUCCH resources within the uplink (UL) carrier**") (Also see Para. 46). (Note: sending terminal identifier information is well known technique in this art).

Regarding Claim 5, Bala teaches at least one of the first and second sets of radio resources are indicated explicitly by an uplink control channel index (Para. 48: "**In another reporting example, L1, L2/3, or broadcast signaling may be transmitted to the WTRU indicating which carriers are associated carriers within the LTE-A aggregation for which it should report carrier wide CQI/PMI/RI. The WTRU may be configured to transmit a network defined set of wideband CQI reports. Carrier wide is meant to cover the fact that "associated carriers" may mean multiple carriers and we want to report for all. In addition, separate reports for each of these component carriers may be sent**"). (Also see Para. 107-108) (See Fig. 3, 5 and 7).

Regarding Claim 6, Bala teaches the explicit indication is transmitted as radio resource control signaling (See Abstract. Transmitting uplink control information- UCI and using resource blocks- RBs).

Regarding Claim 7, Bala teaches transmitting an acknowledgement resource indication on a downlink component carrier to dynamically assign said second set of radio resources on the uplink primary component carrier to the user terminal when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers (Para. 104: "**In an example method, a semi-static indication is used. In this method, PDCCH is used to indicate resources, etc. for periodic PUSCH not only in the beginning but also in the subsequent reporting intervals. In other words parameters such as resources; etc. may be changed in the next reporting instance. This may achieve scheduling gain for each reporting instance. PDCCH may be transmitted in every interval. In this case RB allocation may be changed dynamically in each scheduled**

reporting interval for periodic PUSCH. The WTRU may monitor PDCCH for periodic PUSCH in each scheduled reporting interval. The base station may or may not transmit PDCCH corresponding to periodic PUSCH in every scheduled interval. Periodic PUSCH (control) and PUSCH (data) may merge on PUSCH resources and share the grant. CQI request bit may be used to indicate if the grant received in the scheduled reporting interval is applied to periodic PUSCH (control) only or applied to both periodic PUSCH (control) and PUSCH (data)"). (Also see Fig. 5-7 and Para. 32-38). (Also see Fig. 5-7 and Para. 32-38). (For acknowledgement indication see Para. 6).

Regarding Claim 8, Bala teaches the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources (Para. 43, 89, 95 and Para. 104: "**In an example method, a semi-static indication is used. In this method, PDCCH is used to indicate resources, etc. for periodic PUSCH not only in the beginning but also in the subsequent reporting intervals. In other words parameters such as resources, etc…**").

Regarding Claim 9, Bala teaches a base station comprising: a transmitter to transmit user data on one or more downlink component carriers to a user terminal (**Fig. 2:** Transmitter of the BS 120 transmits user data on component carriers); a controller to schedule downlink transmissions to said user terminal, the downlink controller configured to schedule downlink transmissions to a user terminal on one or more downlink component carriers (Fig. 2: **the controller of the eNB schedule downlink transmission**. see Para. 25, 26, 38 & 55); if the user terminal is scheduled to receive downlink transmissions on a first single downlink component carrier, receive control information associated with the downlink transmissions to the user terminal on a first set of radio resources on a uplink primary component carrier associated with

said first downlink component carrier; and if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier or multiple downlink component carriers, receive control information associated with the downlink transmissions to the user terminal on a second set of radio resources on the uplink primary component carrier (**The terminal schedule to receive downlink transmissions on single downlink component carrier, receiving control information a set of radio resources on a uplink primary component carrier associated with said first downlink component carrier and receive other downlink component and control information on a different set of radio resources (RB-resource block).** see Para, **25** and **32-39, 103-14**). (Para. 37: "**The control information for each downlink carrier may be transmitted by using different RBs, different spreading sequences/cyclic shifts or a combination of these. As an example, RBs m=1 and m=3 may be used for control data transmission corresponding to two different downlink carriers. In this case, the mapping of the control data resources (frequency, sequence, cyclic shift) to the downlink carriers may be performed with L1 and/or L2/L3 signaling. This mapping may also be performed implicitly by using mapping rules. For example, the CQI for the second downlink carriers may be transmitted with the same spreading sequence/cyclic shift pair as for the first downlink carriers but on the next available RB**") (Fig. **5-7:** PUCCH resource block allocations).

Regarding Claim 10, Bala teaches that the controller is further configured to transmit control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink primary component carrier (Para. 107-108: "**Disclosed herein are implementation embodiments to configure uplink data**

channel for transmitting UCI. In Release 8 LTE, the periodic CQI reporting mode is given by the parameter, cqi-Format Indicator Periodic which is configured by higher-layer signaling. In one example, the periodic PUSCH-based CQI reporting mode is given by the parameter X e.g., cqi-Format Indicator Periodic PUSCH which is configured by higher-layer signaling. Depending on transmission mode, reporting mode is implicitly given. In another method, the periodic PUSCH-based CQI reporting mode is given by the parameter Y e.g., cqi-R eport Mode Periodic PUSCH which is configured by higher-layer signaling. Reporting mode is explicitly given via this parameter").

Regarding Claim 11, Bala continues to teach that the controller is further configured to transmit control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the second set radio resources on the uplink primary component carrier (See Para. 37 and 107-108 above) (Next available resource blocks is the second set of radio resources).

Regarding Claim 12, Bala continues to teach that the controller is further configured to indicate the first and second sets of radio resources are indicated implicitly by at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier (Para. 32-33: "**…Alternatively, these WTRUs may be required to report wideband CQI/PMI/RI which requires a smaller number of bits or these WTRUs may be configured to use more subframes to transmit the whole control information. For example, in one subframe, the WTRU may transmit the control information corresponding to only one downlink component carrier and complete transmitting the control information corresponding to all component carriers in several subframes. For example, in subframe 1,**

the WTRU may transmit control information for downlink component carrier #1, and then in subframe 2, the WTRU may transmit the control information for downlink component carrier # 2, etc. The WTRU configuration may be performed with L1 or L2/L3 signaling. The carrier (or spectrum) edge resource blocks (RBs) may be used for control data transmission when an LTE-A network is configured to use LTE uplink control channel structure, as shown in FIG. 3. As shown in FIG. 3 for LTE Release 8, the WTRU uses two different RBs in the two time slots. For example, the RB indexed with m=1 is used by one WTRU, and m=1 is on opposite edges of the frequency in the two time slots. RBs on opposite edges of the spectrum may be used in two time slots for maximum frequency diversity. In this case, LTE-A and LTE Release 8 WTRUs may be configured to share the same PUCCH resources within the uplink (UL) carrier") (Also see Para. 46). (Note: sending terminal identifier information is well known technique in this art).

Regarding Claim 13, Bala teaches that the controller is further configured to indicate the first and second sets of radio resources are indicated explicitly by an uplink control channel index (Para. 48: "**In another reporting example, L1, L2/3, or broadcast signaling may be transmitted to the WTRU indicating which carriers are associated carriers within the LTE-A aggregation for which it should report carrier wide CQI/PMI/RI. The WTRU may be configured to transmit a network defined set of wideband CQI reports. Carrier wide is meant to cover the fact that "associated carriers" may mean multiple carriers and we want to report for all. In addition, separate reports for each of these component carriers may be sent**"). (Also see Para. 107-108) (See Fig. 3, 5 and 7).

Regarding Claim 14, Bala teaches that the controller is further configured to send the explicit indication is transmitted as radio resource control signaling (See Abstract. Transmitting UCI).

Regarding Claim 15, Bala teaches that the controller is further configured to transmit an acknowledgement resource indication on a downlink component carrier to dynamically assign said second set of radio resources on the uplink primary component carrier to the user terminal when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers (Para. 104: "**In an example method, a semi-static indication is used. In this method, PDCCH is used to indicate resources, etc. for periodic PUSCH not only in the beginning but also in the subsequent reporting intervals. In other words parameters such as resources; etc. may be changed in the next reporting instance. This may achieve scheduling gain for each reporting instance. PDCCH may be transmitted in every interval. In this case RB allocation may be changed dynamically in each scheduled reporting interval for periodic PUSCH. The WTRU may monitor PDCCH for periodic PUSCH in each scheduled reporting interval. The base station may or may not transmit PDCCH corresponding to periodic PUSCH in every scheduled interval. Periodic PUSCH (control) and PUSCH (data) may merge on PUSCH resources and share the grant. CQI request bit may be used to indicate if the grant received in the scheduled reporting interval is applied to periodic PUSCH (control) only or applied to both periodic PUSCH (control) and PUSCH (data)**"). (Also see Fig. 5-7 and Para. 32-38).

Regarding Claim 16, Bala teaches the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources (Para. 43, 89, 95 and Para. 104: "**In an example method, a semi-static indication is used. In this method, PDCCH is used to indicate resources, etc. for periodic PUSCH not only in the beginning but also in the subsequent reporting intervals. In other words parameters such as resources, etc…**").

Regarding Claim 17, Bala teaches a method implemented by a user terminal of transmitting control information in a mobile communication network, the method comprising: receiving an assignment of radio resources for downlink transmissions from a base station (**Fig. 2:** the BS 120 assign/allocate radio resources. Para. 28: "**The number of downlink carriers for each WTRU may be different, resulting in N being different. The code orthogonality may not be maintained if the same set of resource blocks (RBs) are used for all WTRUs each having different N. In this case, different sets of RBs may be allocated for different sequence lengths**"); transmitting control information associated with the downlink transmissions on a first set of radio resources on an uplink component carrier if an assignment of single downlink component carrier for the downlink transmission is received; an transmitting control information associated with the downlink transmissions on a second set of radio resources on the uplink component carrier if an assignment of multiple downlink component for the downlink transmission is received (**The terminal schedule to receive downlink transmissions on single downlink component carrier, receiving control information a set of radio resources on a uplink primary component carrier associated with said first downlink component carrier and receive other downlink component and control information on a different set of radio resources (RB-resource block).** see Para, **25** and **32-39, 103-14**). (Para. 37: "**The control**

information for each downlink carrier may be transmitted by using different RBs, different spreading sequences/cyclic shifts or a combination of these. As an example, RBs m=1 and m=3 may be used for control data transmission corresponding to two different downlink carriers. In this case, the mapping of the control data resources (frequency, sequence, cyclic shift) to the downlink carriers may be performed with L1 and/or L2/L3 signaling. This mapping may also be performed implicitly by using mapping rules. For example, the CQI for the second downlink carriers may be transmitted with the same spreading sequence/cyclic shift pair as for the first downlink carriers but on the next available RB") (Fig. **5-7:** PUCCH resource block allocations).

Regarding Claim 18, Bala teaches transmitting user data on the second set of radio resources if a single downlink component carrier is assigned for the downlink transmission (Para. 37: "**As an example, RBs m=1 and m=3 may be used for control data transmission corresponding to two different downlink carriers. In this case, the mapping of the control data resources (frequency, sequence, cyclic shift) to the downlink carriers may be performed with L1 and/or L2/L3 signaling. This mapping may also be performed implicitly by using mapping rules. For example, the CQI for the second downlink carriers may be transmitted with the same spreading sequence/cyclic shift pair as for the first downlink carriers but on the next available RB**"). So the system using second set of resource block RB for the signal downlink component carrier.

Regarding Claim 19, Bala teaches receiving control information from the base station on a downlink component carrier implicitly or explicitly indicating the second set of radio

resources on the uplink primary component carrier (See Para. 37 and 107-108 above) (Next available resource blocks is the second set of radio resources).

Regarding Claim 20, Bala teaches receiving control information comprises receiving one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying said second set of resources (Para. 32-33: "**…Alternatively, these WTRUs may be required to report wideband CQI/PMI/RI which requires a smaller number of bits or these WTRUs may be configured to use more subframes to transmit the whole control information. For example, in one subframe, the WTRU may transmit the control information corresponding to only one downlink component carrier and complete transmitting the control information corresponding to all component carriers in several subframes. For example, in subframe 1, the WTRU may transmit control information for downlink component carrier #1, and then in subframe 2, the WTRU may transmit the control information for downlink component carrier # 2, etc. The WTRU configuration may be performed with L1 or L2/L3 signaling. The carrier (or spectrum) edge resource blocks (RBs) may be used for control data transmission when an LTE-A network is configured to use LTE uplink control channel structure, as shown in FIG. 3. As shown in FIG. 3 for LTE Release 8, the WTRU uses two different RBs in the two time slots. For example, the RB indexed with m=1 is used by one WTRU, and m=1 is on opposite edges of the frequency in the two time slots. RBs on opposite edges of the spectrum may be used in two time slots for maximum frequency diversity. In this case, LTE-A and LTE Release 8 WTRUs may be configured to share the same PUCCH resources within the**

uplink (UL) carrier") (Also see Para. 46). (Note: sending terminal identifier information is well known technique in this art).

Regarding Claim 21, Bala teaches receiving control information comprises receiving an uplink control channel index explicitly identifying said second set of resources (Para. 48: "**In another reporting example, L1, L2/3, or broadcast signaling may be transmitted to the WTRU indicating which carriers are associated carriers within the LTE-A aggregation for which it should report carrier wide CQI/PMI/RI. The WTRU may be configured to transmit a network defined set of wideband CQI reports. Carrier wide is meant to cover the fact that "associated carriers" may mean multiple carriers and we want to report for all. In addition, separate reports for each of these component carriers may be sent**"). (Also see Para. 107-108) (See Fig. 3, 5 and 7).

Regarding Claim 22, Bala teaches the explicit indication is received as radio resource control signaling (See Abstract. Transmitting uplink control information UCI).

Regarding Claim 23, Bala teaches receiving, from a base station, an acknowledgement resource indication on a downlink component carrier dynamically assigning said second set of radio resources on the uplink primary component carrier when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers (Para. 104: "**In an example method, a semi-static indication is used. In this method, PDCCH is used to indicate resources, etc. for periodic PUSCH not only in the beginning but also in the subsequent reporting intervals. In other words parameters such as resources; etc. may be changed in the next reporting instance. This may achieve scheduling gain for each reporting instance. PDCCH may be transmitted in every**

interval. In this case RB allocation may be changed dynamically in each scheduled reporting interval for periodic PUSCH. The WTRU may monitor PDCCH for periodic PUSCH in each scheduled reporting interval. The base station may or may not transmit PDCCH corresponding to periodic PUSCH in every scheduled interval. Periodic PUSCH (control) and PUSCH (data) may merge on PUSCH resources and share the grant. CQI request bit may be used to indicate if the grant received in the scheduled reporting interval is applied to periodic PUSCH (control) only or applied to both periodic PUSCH (control) and PUSCH (data)"). (Also see Fig. 5-7 and Para. 32-38). (For acknowledgement indication see Para. 6).

Regarding Claim 24, Bala teaches that the method further comprising selecting the second set of resources from a semi-static set of uplink resources responsive to the acknowledgement resource indication (Para. 43, 89, 95 and Para. 104: "**In an example method, a semi-static indication is used. In this method, PDCCH is used to indicate resources, etc. for periodic PUSCH not only in the beginning but also in the subsequent reporting intervals. In other words parameters such as resources, etc…**").

Regarding Claim 25, Bala teaches a user terminal for mobile communications, the user terminal comprising: a receiver to receive downlink transmissions from a base station (Fig. 2: **transceiver 214 receives downlink transmission from the eNB-120**); a transmitter to transmit control information associated with the downlink transmission to a base station (**Fig. 2 transceiver 221 transmit control information. See Para. 32**); and a controller to select radio resources for transmission of control information associated with the downlink transmissions (Fig. 2: **the controller of the eNB schedule downlink transmission**. see Para. 25, 26, 38 & 55);

(Para. 38: "**In another embodiment for mapping of CQI, PMI and RI to physical resource elements in carrier aggregation, the PUCCH that carries the CQI (and any other possible control information such as scheduling request, ACK/NACK, etc.) is transmitted on more than one uplink component carrier. In an example method for transmission on more than one uplink carrier, there is one PUCCH per UL component carrier carrying control information corresponding to one DL component carrier**"); the controller configured to: select a first set of radio resources on an uplink component carrier if an assignment of a single downlink component carrier for the downlink transmission is received; and select a second set of radio resources on the uplink component carrier if an assignment of multiple downlink component carriers for the downlink transmission is received **(RB-resource blocks.** see Para, **25** and **32-39, 103-14**). (Para. 37: "**The control information for each downlink carrier may be transmitted by using different RBs, different spreading sequences/cyclic shifts or a combination of these. As an example, RBs m=1 and m=3 may be used for control data transmission corresponding to two different downlink carriers. In this case, the mapping of the control data resources (frequency, sequence, cyclic shift) to the downlink carriers may be performed with L1 and/or L2/L3 signaling. This mapping may also be performed implicitly by using mapping rules. For example, the CQI for the second downlink carriers may be transmitted with the same spreading sequence/cyclic shift pair as for the first downlink carriers but on the next available RB**") (Fig. **5-7:** PUCCH resource block allocations).

Regarding Claim 26, Bala teaches transmitting user data on the second set of radio resources if a single downlink component carrier is assigned for the downlink transmission (Para.

37: "**As an example, RBs m=1 and m=3 may be used for control data transmission corresponding to two different downlink carriers. In this case, the mapping of the control data resources (frequency, sequence, cyclic shift) to the downlink carriers may be performed with L1 and/or L2/L3 signaling. This mapping may also be performed implicitly by using mapping rules. For example, the CQI for the second downlink carriers may be transmitted with the same spreading sequence/cyclic shift pair as for the first downlink carriers but on the next available RB**"). So the system using second set of resource block RB for the signal downlink component carrier.

Regarding Claim 27, Bala teaches receiving control information from the base station on a downlink component carrier implicitly or explicitly indicating the second set of radio resources on the uplink primary component carrier (See Para. 37 and 107-108 above) (Next available resource blocks is the second set of radio resources).

Regarding Claim 28, Bala teaches receiving control information comprises receiving one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying said second set of resources (Para. 32-33: "**…Alternatively, these WTRUs may be required to report wideband CQI/PMI/RI which requires a smaller number of bits or these WTRUs may be configured to use more subframes to transmit the whole control information. For example, in one subframe, the WTRU may transmit the control information corresponding to only one downlink component carrier and complete transmitting the control information corresponding to all component carriers in several subframes. For example, in subframe 1, the WTRU may transmit control information for downlink component carrier #1, and then in subframe 2,**

the WTRU may transmit the control information for downlink component carrier # 2, etc. The WTRU configuration may be performed with L1 or L2/L3 signaling. The carrier (or spectrum) edge resource blocks (RBs) may be used for control data transmission when an LTE-A network is configured to use LTE uplink control channel structure, as shown in FIG. 3. As shown in FIG. 3 for LTE Release 8, the WTRU uses two different RBs in the two time slots. For example, the RB indexed with m=1 is used by one WTRU, and m=1 is on opposite edges of the frequency in the two time slots. RBs on opposite edges of the spectrum may be used in two time slots for maximum frequency diversity. In this case, LTE-A and LTE Release 8 WTRUs may be configured to share the same PUCCH resources within the uplink (UL) carrier") (Also see Para. 46). (Note: sending terminal identifier information is well known technique in this art).

Regarding Claim 29, Bala teaches receiving control information comprises receiving an uplink control channel index explicitly identifying said second set of resources on the uplink primary component carrier (Para. 48: "**In another reporting example, L1, L2/3, or broadcast signaling may be transmitted to the WTRU indicating which carriers are associated carriers within the LTE-A aggregation for which it should report carrier wide CQI/PMI/RI. The WTRU may be configured to transmit a network defined set of wideband CQI reports. Carrier wide is meant to cover the fact that "associated carriers" may mean multiple carriers and we want to report for all. In addition, separate reports for each of these component carriers may be sent**"). (Also see Para. 107-108) (See Fig. 3, 5 and 7).

Regarding Claim 30, Bala teaches the explicit indication is received as radio resource control signaling (See Abstract. Transmitting uplink control information UCI).

Regarding Claim 31, Bala teaches receiving, from a base station, an acknowledgement resource indication on a downlink component carrier dynamically assigning said second set of radio resources on the uplink primary component carrier when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers (Para. 104: "**In an example method, a semi-static indication is used. In this method, PDCCH is used to indicate resources, etc. for periodic PUSCH not only in the beginning but also in the subsequent reporting intervals. In other words parameters such as resources; etc. may be changed in the next reporting instance. This may achieve scheduling gain for each reporting instance. PDCCH may be transmitted in every interval. In this case RB allocation may be changed dynamically in each scheduled reporting interval for periodic PUSCH. The WTRU may monitor PDCCH for periodic PUSCH in each scheduled reporting interval. The base station may or may not transmit PDCCH corresponding to periodic PUSCH in every scheduled interval. Periodic PUSCH (control) and PUSCH (data) may merge on PUSCH resources and share the grant. CQI request bit may be used to indicate if the grant received in the scheduled reporting interval is applied to periodic PUSCH (control) only or applied to both periodic PUSCH (control) and PUSCH (data)**"). (Also see Fig. 5-7 and Para. 32-38). (For acknowledgement indication see Para. 6).

Regarding Claim 32, Bala teaches that the method further comprising selecting the second set of resources from a semi-static set of uplink resources responsive to the

acknowledgement resource indication (Para. 43, 89, 95 and Para. 104: "**In an example method, a semi-static indication is used. In this method, PDCCH is used to indicate resources, etc. for periodic PUSCH not only in the beginning but also in the subsequent reporting intervals. In other words parameters such as resources, etc…**").

Regarding Claim 33, Bala teaches a method implemented by a user terminal in a mobile communication network, the method comprising: receiving an assignment of radio resources for a downlink transmission from a base station (**Fig. 2:** the BS 120 assign/allocate radio resources. Para. 28: "**The number of downlink carriers for each WTRU may be different, resulting in N being different. The code orthogonality may not be maintained if the same set of resource blocks (RBs) are used for all WTRUs each having different N. In this case, different sets of RBs may be allocated for different sequence lengths**"); transmitting control information associated with the downlink transmission on a first set of radio resources on an uplink component carrier if an assignment of a first downlink component carrier for the downlink transmission is received; and transmitting control information associated with the downlink transmission on a second set of radio resources on the uplink component carrier if an assignment of a second downlink component carrier for the downlink transmission is received (**The terminal schedule to receive downlink transmissions on single downlink component carrier, receiving control information a set of radio resources on a uplink primary component carrier associated with said first downlink component carrier and receive other downlink component and control information on a different set of radio resources (RB-resource block).** see Para, **25** and **32-39, 103-14**). (Para. 37: "**The control information for each downlink carrier may be transmitted by using different RBs, different spreading**

sequences/cyclic shifts or a combination of these. As an example, RBs m=1 and m=3 may be used for control data transmission corresponding to two different downlink carriers. In this case, the mapping of the control data resources (frequency, sequence, cyclic shift) to the downlink carriers may be performed with L1 and/or L2/L3 signaling. This mapping may also be performed implicitly by using mapping rules. For example, the CQI for the second downlink carriers may be transmitted with the same spreading sequence/cyclic shift pair as for the first downlink carriers but on the next available RB") (Fig. **5-7:** PUCCH resource block allocations).

Regarding Claim 34, Bala teaches a user terminal for mobile communications, the user terminal comprising: a receiver to receive downlink transmissions from a base station (Fig. 2: **transceiver 214 receives downlink transmission from the eNB-120**); a transmitter to transmit control information associated with the downlink transmission to a base station **(Fig. 2 transceiver 221 transmit control information. See Para. 32)**; a controller to select radio resources for transmission of control information associated with downlink transmission (Fig. 2: **the controller of the eNB schedule downlink transmission**. see Para. 25, 26, 38 & 55) (Para. 38: "**In another embodiment for mapping of CQI, PMI and RI to physical resource elements in carrier aggregation, the PUCCH that carries the CQI (and any other possible control information such as scheduling request, ACK/NACK, etc.) is transmitted on more than one uplink component carrier. In an example method for transmission on more than one uplink carrier, there is one PUCCH per UL component carrier carrying control information corresponding to one DL component carrier**"); the controller configured to select a first set of radio resources on an uplink component carrier if an assignment of a first

downlink component carrier for the downlink transmission is received; an select a second set of radio resources on the uplink component carrier if an assignment of a second downlink component carrier for the downlink transmission is received (**RB-resource blocks.** see Para, **25** and **32-39, 103-14**). (Para. 37: "**The control information for each downlink carrier may be transmitted by using different RBs, different spreading sequences/cyclic shifts or a combination of these. As an example, RBs m=1 and m=3 may be used for control data transmission corresponding to two different downlink carriers. In this case, the mapping of the control data resources (frequency, sequence, cyclic shift) to the downlink carriers may be performed with L1 and/or L2/L3 signaling. This mapping may also be performed implicitly by using mapping rules. For example, the CQI for the second downlink carriers may be transmitted with the same spreading sequence/cyclic shift pair as for the first downlink carriers but on the next available RB**") (Fig. **5-7:** PUCCH resource block allocations).

CONCLUSION

Any inquiry concerning this communication from the examiner should be directed to Patent Examiner Md Talukder whose telephone number is (571) 270-3222. The examiner can normally be reached on Mon-Th 9:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisors, Ghebretinsae, Temesghen can be reached on (571) 272-3017.

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applications may be obtained from either private PAIR or public PAIR. Status information for unpublished application is available through private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have any questions on access to the private PAIR system, contract the Electronics Business Center (EBC) at 866-217-9197. If you would like assistance from USPTO customer service representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA).

/ Md. Talukder /

/ Art Unit # 2648 /

/TEMESGHEN GHEBRETINSAE/

Supervisory Patent Examiner, Art Unit 2648

12/17/12R

Notice of References Cited	Application/Control No. 12/896,993	Applicant(s)/Patent Under Reexamination ASTELY ET AL.	
	Examiner MD TALUKDER	Art Unit 2648	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2012/0140708	06-2012	Choudhury et al.	370/328
*	B	US-2010/0098012	04-2010	Bala et al.	370/329
*	C	US-2012/0082125	04-2012	Huang, Yada	370/329
*	D	US-2011/0310856	12-2011	Hariharan et al.	370/336
*	E	US-2012/0020317	01-2012	Ishii et al.	370/329
*	F	US-2010/0232373	09-2010	Nory et al.	370/329
*	G	US-8,265,030	09-2012	Miki et al.	370/330
	H	US-			
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	K	US-			
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FOREIGN PATENT DOCUMENTS

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12896993	ASTELY ET AL.
	Examiner	**Art Unit**
	MD TALUKDER	2648

SEARCHED			
Class	**Subclass**	**Date**	**Examiner**
455	509,522,456.6,137,103,575	12/11/2012	Talukder
370	329,252,331	12/11/2012	Talukder

SEARCH NOTES		
Search Notes	**Date**	**Examiner**
East Search	12/10/2012	talukder
East Search	12/11/2012	talukder

INTERFERENCE SEARCH			
Class	**Subclass**	**Date**	**Examiner**

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12896993
	Filing Date	2010-10-04
	First Named Inventor	Astely, David
	Art Unit	TBD
	Examiner Name	TBD
	Attorney Docket Number	4015-6942

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Receipt date: 06/23/2011	Application Number	12896993 12896993 - GAU: 2648
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Filing Date	2010-10-04
(Not for submission under 37 CFR 1.99)	First Named Inventor	Astely, David
	Art Unit	TBD
	Examiner Name	TBD
	Attorney Docket Number	4015-6942

/M.T./	1	3RD GENERATION PARTNERSHIP PROJECT, MOTOROLA (source), "Control Signalling Design for Supporting Carrier Aggregation," 3GPP TSG RANI #56, R1-090792, Athens, GR, Feb. 9-13, 2009.	☐
/M.T./	2	3RD GENERATION PARTNERSHIP PROJECT, ZTE (source), "Uplink Control Channel Design for LTE-Advanced," TSG-RAN WG1 #58, R1-093209, Shenzhen, China, June 25 - Aug. 29, 2009.	☐
/M.T./	3	3RD GENERATION PARTNERSHIP PROJECT, NOKIA, NOKIA SIEMENS NETWORKS (source), "L1 Control Signaling with Carrier Aggregation in LTE-Advanced," 3GPP TSG-RAN WG1 Meeting #54bis, R1-083730, Prague, Czech Republic, Sept. 29 - October 3, 2008.	☐
/M.T./	4	3RD GENERATION PARTNERSHIP PROJECT, NOKIA SIEMENS NETWORKS, NOKIA (source), "Channelization of SRI and Persistent ACK/NACK on PUCCH," 3GPP TSG RAN WG1 Meeting #52bis, R1-081460, Shenzhen, China, March 31 - April 4, 2008.	☐
/M.T./	5	3RD GENERATION PARTNERSHIP PROJECT, QUALCOMM EUROPE, "Clarifying PUSCH Resource Allocation," 3GPP TSG-RAN WG1 Meeting #54, R1-083181, Jeju, Korea, August 18-22, 2008.	☐

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[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"12896993"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 17:09
S2	367	((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:04
S3	176	S2 and (radio near3 resource)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:09
S4	28	S2 and (radio near3 resource) and (component with carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:09
S5	173	(downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:04
S6	137	S5 and (scheduling)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:04
S7	36	("20120263121" | "20110310856" | "20120127950" | "20110310819 " | "20120275395" | "20120287828" | "20120039291" | "20100271970" | "20120307781" | "20110286436" | "20120224535" | "20120140708" | "20110310820" | "20120163288" | "20110299486" | "20100098012" | "20120082125 " | "20120294273" | "20110268048" | "20120113910").pn.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:15
S8	127	(downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (carrier adj aggregation)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 10:16
S9	2	"20110292887"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:17

S11	25	((first 1st) adj6 component adj3 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:22
S12	1718	((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:47
S13	66	(carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:47
S14	10842	455/509,522,456.6,137,103,575.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:41
S15	28232	370/329,252,331.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:41
S16	102	(S14 S15) and (downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:42
S17	1	"13140333"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:18
S18	2	"20110310856"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:18
S19	38	((first 1st) adj6 component adj3 carrier) same ((radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:31
S20	38	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:31
S21	27	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj4 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:32
S22	38	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:32

S23	24	(carrier adj aggregation) and (schedul$3 near3 (downlink DL) with ((first primary initial) near6 (resource radio frequency frame)))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:48
S24	8	("7551898" | "7649960" | "7656843" | "7773699").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:14
S25	2	"20110292900"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:36
S26	2	"20100271970"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:37
S27	3	"8050202"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:38
S28	1	"20120307689"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:45
S29	2	"8160017"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:48
S30	2	"20100232373"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:48
S31	2	"20090016278"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 17:16
S32	2	"8265030"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 17:19
S33	3	"2008139923"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 18:17

EAST Search History (Interference)

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12/896,993	10/04/2010 RULE	455	2648	4015-6942

APPLICANTS

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Stefan Parkvall, Stockholm, SWEDEN;

**** CONTINUING DATA ***************************

This appln claims benefit of 61/248,661 10/05/2009

**** FOREIGN APPLICATIONS ***************************

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10/18/2010

Foreign Priority claimed	35 USC 119(a-d) conditions met	Verified and Acknowledged	Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
☐ Yes ☑ No	☐ Yes ☑ No	/MD K TALUKDER/ Examiner's Signature	☐ Initials	SWEDEN	12	34	6

ADDRESS

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UNITED STATES

TITLE

PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12896993	ASTELY ET AL.
	Examiner	Art Unit
	MD TALUKDER	2648

✓	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	12/13/2012								
	1	✓								
	2	✓								
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	34	✓								

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of **Astely et al.**

Serial No.: **12/896,993**

Filed: **October 4, 2010**

For: **PUCCH Resource Allocation for Carrier Aggregation for LTE-Advanced**

Docket No: **4015-6942**

Examiner: Mr. Md K. Talukder

Group Art Unit: 2648

Confirmation No.: 1015

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO OFFICE ACTION

This paper is being filed in response to the Office Action mailed December 19, 2012 having a reply due date of March 19, 2013. Reconsideration is respectfully requested in light of the amendments and/or remarks below. The Office is hereby authorized to charge any fees required for entry of this paper to Deposit Account 18-1167.

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method implemented by a base station of receiving control information from a user terminal, the method comprising:

scheduling downlink transmissions to said user terminal on one or more downlink component carriers;

if the user terminal is scheduled to receive downlink transmissions on a first single downlink component carrier, receiving control information associated with the downlink transmissions to the user terminal on a first set of radio resources on a uplink primary component carrier associated with said first downlink component carrier, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier; and

if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier or multiple downlink component carriers, receiving control information associated with the downlink transmissions to the user terminal on a second set of radio resources on the uplink primary component carrier, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers.

2. (Original) The method of claim 1 further comprising transmitting control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink primary component carrier.

3. (Original) The method of claim 2 further comprising transmitting control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the second set radio resources on the uplink primary component carrier.

4. (Original) The method of claim 3 wherein at least one of the first and second sets of radio resources are indicated implicitly by at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier.

5. (Original) The method of claim 3 wherein at least one of the first and second sets of radio resources are indicated explicitly by an uplink control channel index.

6. (Original) The method of claim 5 wherein the explicit indication is transmitted as radio resource control signaling.

7. (Original) The method of claim 1 further comprising transmitting an acknowledgement resource indication on a downlink component carrier to dynamically assign said second set of radio resources on the uplink primary component carrier to the user terminal when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers.

8. (Original) The method of claim 7 wherein the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources.

9. (Currently amended) A base station comprising:

a transmitter to transmit user data on one or more downlink component carriers to a user terminal; and

a controller to schedule downlink transmissions to said user terminal, the downlink controller configured to

schedule downlink transmissions to a user terminal on one or more downlink component carriers;

if the user terminal is scheduled to receive downlink transmissions on a first single downlink component carrier, receive control information associated with the downlink transmissions to the user terminal on a first set of radio resources on a uplink primary component carrier associated with said first downlink component carrier, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier; and

if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier or multiple downlink component carriers, receive control information associated with the downlink transmissions to the user terminal on a second set of radio resources on the uplink primary component carrier, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers.

10. (Original) The base station of claim 9 wherein the controller is further configured to transmit control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink primary component carrier.

11. (Original) The base station of claim 10 wherein the controller is further configured to transmit control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the second set of radio resources on the uplink primary component carrier.

12. (Original) The base station of claim 11 wherein the controller is further configured to indicate at least one of the first and second sets of radio resources implicitly by sending at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier.

13. (Original) The base station of claim 11 wherein the controller is further configured to indicate at least one of the first and second sets of radio resources explicitly by sending an uplink control channel index.

14. (Original) The base station of claim 13 wherein the controller is further configured to send the explicit indication as radio resource control signaling.

15. (Original) The base station of claim 9 wherein the controller is further configured to transmit an acknowledgement resource indication on a downlink component carrier to dynamically assign said second set of radio resources on the uplink primary component carrier to the user terminal when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers.

16. (Original) The base station of claim 15 wherein the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources.

17. (Currently amended) A method implemented by a user terminal of transmitting control information in a mobile communication network, the method comprising:

receiving an assignment of radio resources for downlink transmissions from a base station;

transmitting control information associated with the downlink transmissions on a first set of radio resources on an uplink component carrier if an assignment of single downlink component carrier for the downlink transmission is received, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier; and

transmitting control information associated with the downlink transmissions on a second set of radio resources on the uplink component carrier if an assignment of multiple downlink component for the downlink transmission is received, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers.

18. (Original) The method of claim 17 further comprising transmitting user data on the second set of radio resources if a single downlink component carrier is assigned for the downlink transmission.

19. (Original) The method of claim 17 further comprising receiving control information from the base station on a downlink component carrier implicitly or explicitly indicating the second set of radio resources on the uplink primary component carrier.

20. (Original) The method of claim 19 wherein receiving control information comprises receiving one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying said second set of resources.

21. (Original) The method of claim 19 wherein receiving control information comprises receiving an uplink control channel index explicitly identifying said second set of resources.

22. (Original) The method of claim 21 wherein the explicit indication is received as radio resource control signaling.

23. (Original) The method of claim 17 further comprising receiving, from a base station, an acknowledgement resource indication on a downlink component carrier dynamically assigning said second set of radio resources on the uplink primary component carrier when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers.

24. (Original) The method of claim 23 further comprising selecting the second set of resources from a semi-static set of uplink resources responsive to the acknowledgement resource indication.

25. (Currently amended) A user terminal for mobile communications, the user terminal comprising:

a receiver to receive downlink transmissions from a base station;

a transmitter to transmit control information associated with the downlink transmission to a base station; and

a controller to select radio resources for transmission of control information associated with the downlink transmissions, the controller configured to:

select a first set of radio resources on an uplink component carrier if an assignment of a single downlink component carrier for the downlink transmission is received, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier; and

select a second set of radio resources on the uplink component carrier if an assignment of multiple downlink component carriers for the downlink transmission is received, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers.

26. (Original) The user terminal of claim 25 configured to transmit user data on the second set of radio resources if a single downlink component carrier is assigned for the downlink transmission.

27. (Original) The user terminal of claim 25 wherein the controller is further configured to receive control information from the base station on a downlink component carrier implicitly or explicitly identifying the second set of radio resources on the uplink primary component carrier.

28. (Original) The user terminal of claim 27 wherein the controller is further configured to receive at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying the second set of radio resources.

29. (Original) The user terminal of claim 27 wherein the controller is further configured to receive an uplink control channel index explicitly identifying the second set of radio resources on the uplink primary component carrier.

30. (Original) The user terminal of claim 29 wherein the controller is further configured to receive the explicit indication as radio resource control signaling.

31. (Original) The user terminal of claim 25 wherein the controller is further configured to receive, from a base station, an acknowledgement resource indication on a downlink component carrier dynamically assigning said second set of radio resources on the uplink primary component carrier when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers.

32. (Original) The user terminal of claim 31 wherein the controller is configured to select the second set of resources from a semi-static set of uplink resources responsive to the acknowledgement resource indication.

33. (Currently amended) A method implemented by a user terminal in a mobile communication network, the method comprising:

receiving an assignment of radio resources for a downlink transmissions from a base station;

transmitting control information associated with the downlink transmission on a first set of radio resources on an uplink component carrier if an assignment of a first

downlink component carrier for the downlink transmission is received, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier; and

transmitting control information associated with the downlink transmission on a second set of radio resources on the uplink component carrier if an assignment of a second downlink component carrier for the downlink transmission is received, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers.

34. (Currently amended) A user terminal for mobile communications, the user terminal comprising:

a receiver to receive downlink transmissions from a base station;

a transmitter to transmit control information associated with the downlink transmission to a base station; and

a controller to select radio resources for transmission of control information associated with downlink transmission, the controller configured to:

select a first set of radio resources on an uplink component carrier if an assignment of a first downlink component carrier for the downlink transmission is received, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier; and

select a second set of radio resources on the uplink component carrier if an assignment of a second downlink component carrier for the downlink transmission is received, wherein the second set of radio resources is

reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers.

REMARKS

In response to the Official Office Action dated December 19, 2012, claims 1, 9, 17, 25, 33, and 34 have been amended. Applicant respectfully submits that the claims are allowable over the cited prior art. Accordingly, reconsideration of this application in light of the following remarks is respectfully requested.

The claimed invention relates to transmission of scheduling information in a communication system using carrier aggregation. The downlink channel comprises multiple downlink component carriers. A user terminal may be scheduled on any one of the downlink component carriers, or on multiple component carriers. In exemplary embodiments of the invention, the transmission of uplink control information associated with downlink transmissions on multiple aggregated downlink component carriers is transmitted on a single, uplink component carrier. The uplink component carrier designated to carry uplink control information is called the uplink primary component carrier (PCC). A first set of resources on the uplink PCC are reserved for single-carrier user terminals scheduled to receive on a first downlink component carrier, e.g. the uplink component carrier associated with the uplink PCC. A second set of resources on the same uplink PCC are semi-statically reserved for single-carrier user terminals scheduled to receive on a second downlink component carrier, or multi-carrier user terminals scheduled to receive downlink transmissions on multiple downlink component carriers. The second set of resources can be dynamically shared by the multi-carrier user terminals to reduce the amount of radio resources needed to support the multi-carrier user terminals.

Claims 1 and 9 are directed to a base station in a multi-carrier communication system using carrier aggregation. Claims 1 and 9 recite that, if a user terminal is scheduled to receive downlink transmissions on a first single downlink component carrier, the base station receives control information associated with the downlink transmissions to the user terminal on a first set of radio resources on a uplink primary component carrier associated with said first downlink

component carrier. Claims 1 and 9 further recite that if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier or multiple downlink component carriers, the base station receives control information associated with the downlink transmissions to the user terminal on a second set of radio resources on the uplink primary component carrier. The claims have been amended to clarify that the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier, and that the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers.

Claims 1 and 9 have been rejected as being anticipated by Bala (US 2010/0098012). Bala discloses techniques for transmitting uplink control information in a multi-carrier communication system that uses carrier aggregation. Bala describes techniques for allocating resources on the PUCCH in order to control the peak to average power ratio (PAPR) on the uplink control channel. However, Bala does not disclose the claimed first and second sets of radio resources. Rather, Bala discloses that the multi-carrier-carrier user terminals may be assigned more RBs (radio resources) than single-carrier user terminals. Bala does not state, however, that different sets of radio resources are reserved for multi-carrier and single-carrier user terminals. Because Bala does not disclose the claimed first and second sets of resources, Bala does not anticipate claims 1and 9.

Claims 17, 25, 33, and 34 are directed to a base station in a multi-carrier communication system. Claims 17, 25, 33, and 34 all recite first and second sets of radio resources. The first set of radio resources in claims 17, 25, 33, and 34 is reserved for user terminals scheduled to receive downlink transmissions on a first single downlink component carrier. The second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on a second single downlink component carrier (claims 17 and 25), or on multiple downlink

component carriers (claims 33 and 34). Claims 17, 25, 33, and 34 further recite that, if a user terminal is scheduled to receive downlink transmissions on a first single downlink component carrier, the user terminal selects the first set of radio resources for transmission of control information associated with the downlink transmissions to the user terminal. Claims 17 and 25 further recite that if the user terminal is scheduled to receive downlink transmissions on multiple downlink component carriers, the user terminal selects the second set of radio resources for transmission of control information associated with the downlink transmissions to the user terminal. Claims 33 and 34 further recite that if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier, the user terminal selects the second set of radio resources for transmission of control information associated with the downlink transmissions to the user terminal.

Claims 17, 25, 33, and 34 have been rejected as being anticipated by Bala (US 2010/0098012). As noted above, Bala does not disclose the claimed first and second sets of reserved radio resources as recited in claims 17, 25, 33 and 34. Therefore, claims 17, 25, 33 and 34 are allowable for the same reasons as claims 1 and 9.

The dependent claims all depend directly or indirectly from allowable independent claims and are therefore believed to be allowable for the same reasons.

Claims 7, 15, 23, and 31 further recite an acknowledgement resource indicator to dynamically assign the second set of radio resources on the primary uplink component carrier when the user terminal is scheduled to receive a downlink transmission on the second downlink component carrier or multiple downlink component carriers. Bala does not disclose any element analogous to the claimed acknowledgement resource indicator. Accordingly, these claims are believed to be allowable for this additional reason.

For the forgoing reasons, it is submitted that the application is in condition for allowance and notice to such effect is respectfully requested.

Respectfully submitted,

COATS & BENNETT, P.L.L.C.

Dated: March 19, 2013

David E. Bennett
Registration No.: 32,194
Telephone: (919) 854-1844

Electronic Acknowledgement Receipt

EFS ID:	15294254
Application Number:	12896993
International Application Number:	
Confirmation Number:	1015
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Customer Number:	24112
Filer:	David E. Bennett/Donna Donovan
Filer Authorized By:	David E. Bennett
Attorney Docket Number:	4015-6942
Receipt Date:	19-MAR-2013
Filing Date:	04-OCT-2010
Time Stamp:	10:33:13
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		Response_to_OA.pdf	60476 4ccc5ebfed61a842b3e501d894a7c155ea9fdca4	yes	15

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	11
	Applicant Arguments/Remarks Made in an Amendment	12	15
Warnings:			
Information:			
	Total Files Size (in bytes):	60476	

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 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
12/896,993	10/04/2010	

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	330
☒ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	540
☒ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	220
TOTAL CLAIMS (37 CFR 1.16(i))	34 minus 20 =	* 14	X $ =		OR	X $52 =	728
INDEPENDENT CLAIMS (37 CFR 1.16(h))	6 minus 3 =	* 3	X $ =			X $220 =	660
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 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			TOTAL	2478

APPLICATION AS AMENDED – PART II

AMENDMENT 03/19/2013	(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 ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 34	Minus	** 34	= 0	X $ =		OR	X $80=	0
Independent (37 CFR 1.16(h))	* 6	Minus	***6	= 0	X $ =		OR	X $420=	0
☐ 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	0

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
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 number found in the appropriate box in column 1.

Legal Instrument Examiner:
/DIANE JOHNSON/

UNITED STATES PATENT AND TRADEMARK OFFICE

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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/896,993	10/04/2010	David Astely	4015-6942	1015

24112 7590 07/03/2013

COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

EXAMINER	
TALUKDER, MD K	
ART UNIT	PAPER NUMBER
2648	
MAIL DATE	DELIVERY MODE
07/03/2013	PAPER

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.

Office Action Summary	Application No. 12/896,993	Applicant(s) ASTELY ET AL.	
	Examiner MD TALUKDER	Art Unit 2648	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* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 *19 March 2013*.

☐ 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) *1-34* 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) *1-34* 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/08) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

1. It would be of great assistance to the office if all incoming papers pertaining to a filed application carried the following items:

i. Application number (checked for accuracy, including series code and serial no.).
ii. Group art unit number (copied from most recent Office communication).
iii. Filing date.
iv. Name of the examiner who prepared the most recent Office action.
v. Title of invention.
vi. Confirmation number (See MPEP § 503).

Response to Arguments

2. Applicant's arguments with respect to claims **1** have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejection- 35 USC § 103

3. 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.

Claims 1-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nory (Pub No. 2010/0232373) and further in view of Pan (Pub No. 2010/0271970).

Regarding claim 1, Nory teaches a method implemented by a base station of receiving control information from a user terminal (**Fig. 3 & 4**), the method comprising: scheduling downlink transmissions to said user terminal on one or more downlink component carriers (Para. 49: **"…If a sub frame n+1 with single component carrier**

allocation must follow a sub frame n with multi-component carrier allocation, both PDCCH-1 and PDCCH-2 can be transmitted in a sub-frame n+1 to only schedule the single component carrier resource assignment…"); if the user terminal is scheduled to receive downlink transmissions on a first single downlink component carrier, receiving control information on a first set of radio resources, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier) (also Para. 13-17);** if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier or multiple downlink component carriers, receiving control information on a second set of radio resources, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers (Para. 36: "**… the remaining ten bits can signal the resource block allocation for the second component carrier. Alternately, if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier, UE can interpret that the Resource Block assignment bits are signaling a resource block assignment**

in groups of 4 resource blocks each. If the UE is configured to receive PDSCH on a set of two component carriers, UE can interpret that the Resource Block assignment bits are signaling resource blocks in groups of 12 resource blocks each").

Nory fails to teach that the control information associated with the downlink transmissions to the user terminal on uplink primary component carrier associated with said first downlink component carrier.

In a same field of endeavor, Pan teaches the control information associated with the downlink transmissions to the user terminal on uplink primary component carrier associated with downlink component carrier (Para. 41: "…**the WTRU may use the same UL/DL carrier association rule for both UCI and DCI transmission. In order to indicate which UL component carrier that an UL grant is intended, the UL component carrier may be associated with a DL component carrier in such way that if an UL grant is transmitted in a DL component carrier x, then the UL grant is intended for an UL component carrier y where a mapping function f( ) that maps a DL component carrier x to UL component carrier y by y=f(x)…**") and (Para. 36: "**For asymmetric carrier aggregation in which there are more configured DL carriers than UL component carriers, the WTRU may use UCI grouping in conjunction with single or multiple PUCCH(s) with combined joint coding, multiplexing or bundling techniques, periodic or aperiodic PUSCH, or combinations of PUCCH and PUSCH to transmit the UCI…**") (Also Para. 24, 32, 47, 54,101, 102).

Therefore, it would have been obvious to one of the ordinary skilled in the art to

which this invention pertains at the time it was made to use uplink downlink control information transmission process of Pan's disclosure with resource allocation system for multiple component carriers, as taught by Nory. Doing so would have resulted in efficiently using and assigning resource blocks in uplink and downlink transmission system.

Regarding claim 2, 10, Nory teaches that the control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink primary component carrier (abstract: "**…The transceiver is also configured to receive a second control message on the anchor carrier, the second control message associated with a set of component carriers, the set of component carriers are distinct from the anchor carrier. The controller determines a resource assignment for at least one component carrier in the set of component carriers using both the first and the second control messages**").

Regarding claim 3, 11, Nory teaches transmitting control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the second set radio resources on the uplink primary component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier and the remaining ten bits can signal the resource block allocation for the second component carrier…**").

Regarding claim 4, 12, Nory teaches at least one of the first and second sets of radio resources are indicated implicitly by at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier (**Fig. 3**).

Regarding claim 5, 13, Nory teaches one of the first and second sets of radio resources are indicated explicitly by an uplink control channel index (Para. 26: "**…Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted. When a PDSCH is also scheduled to the UE in the same sub-frame as the PDCCH-A, multiple ACK/NACKs (one each for PDCCH-A and the PDSCH) can be transmitted using multiple PUCCH resources…**").

Regarding claim 6, 14, Nory teaches the explicit indication is transmitted as radio resource control signaling (Para. 22: "**In first exemplary implementation, the base station configures UE via radio resource control (RRC) signaling with an anchor carrier. The UE is expected to only monitor PDCCH messages from the anchor carrier after initial access. Before assigning resources on non-anchor component carriers via individual PDCCH in each component carrier, base unit sends a configuration message to the UE instructing the UE, the set of component carriers, whose PDCCH messages are also expected to be monitored…").**

Regarding claim 7, 15, Nory teaches transmitting an acknowledgement resource indication on a downlink component carrier to dynamically assign said second set of radio resources on the uplink primary component carrier to the user terminal when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers (Para. 25: "**…The PDCCH-A can also include or indicate resources for acknowledging the**

transmission of the configuration message to increase reliability of signaling of the configuration message. Optionally, the base unit can also instruct the UE to send CQI for the set of component carriers identified in the long term bitmap by signaling a CQI-only uplink grant in the same sub-frame where PDCCH-A is transmitted. The configuration message can also optionally include a time offset limit before which UE should configure its receiver to monitor PDCCH messages from multiple component carriers") and (Para. **26, 36 & 40**).

Regarding claim 8, 16, Nory teaches the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources (Para. 27: "**In a third exemplary implementation, the base station configures UE via radio resource control (RRC) signaling with an anchor carrier. The UE is expected to only monitor the anchor carrier after initial access. Before assigning resources on component carriers other than the anchor carrier, base unit sends a configuration message to the UE, instructing it, the set of component carriers, where PDSCH resource allocations are expected. The configuration message allows the UE to semi-statically configure its receiver to receive PDSCH on the set of component carriers**").

Regarding claim 9, Nory teaches a base station comprising (Fig. **1 & 3**): a transmitter to transmit user data on one or more downlink component carriers to a user terminal; and a controller to schedule downlink transmissions to said user terminal, the downlink controller configured to schedule downlink transmissions to a user terminal on one or more downlink component carriers (Para. 49: **"…If a sub frame n+1 with single component carrier allocation must follow a sub frame n with multi-component**

carrier allocation, both PDCCH-1 and PDCCH-2 can be transmitted in a sub-frame n+1 to only schedule the single component carrier resource assignment…"); if the user terminal is scheduled to receive downlink transmissions on a first single downlink component carrier, receiving control information on a first set of radio resources, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier) (also Para. 13-17);** if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier or multiple downlink component carriers, receiving control information on a second set of radio resources, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers (Para. 36: "**… the remaining ten bits can signal the resource block allocation for the second component carrier. Alternately, if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier, UE can interpret that the Resource Block assignment bits are signaling a resource block assignment in groups of 4 resource blocks each. If the UE is configured to receive**

PDSCH on a set of two component carriers, UE can interpret that the Resource Block assignment bits are signaling resource blocks in groups of 12 resource blocks each").

Nory fails to teach that the control information associated with the downlink transmissions to the user terminal on uplink primary component carrier associated with said first downlink component carrier.

In a same field of endeavor, Pan teaches the control information associated with the downlink transmissions to the user terminal on uplink primary component carrier associated with downlink component carrier (Para. 41: "…**the WTRU may use the same UL/DL carrier association rule for both UCI and DCI transmission. In order to indicate which UL component carrier that an UL grant is intended, the UL component carrier may be associated with a DL component carrier in such way that if an UL grant is transmitted in a DL component carrier x, then the UL grant is intended for an UL component carrier y where a mapping function f( ) that maps a DL component carrier x to UL component carrier y by y=f(x)…**") and (Para. 36: "**For asymmetric carrier aggregation in which there are more configured DL carriers than UL component carriers, the WTRU may use UCI grouping in conjunction with single or multiple PUCCH(s) with combined joint coding, multiplexing or bundling techniques, periodic or aperiodic PUSCH, or combinations of PUCCH and PUSCH to transmit the UCI…**") (Also Para. 24, 32, 47, 54,101, 102).

Therefore, it would have been obvious to one of the ordinary skilled in the art to which this invention pertains at the time it was made to use uplink downlink control

information transmission process of Pan's disclosure with resource allocation system for multiple component carriers, as taught by Nory. Doing so would have resulted in efficiently using and assigning resource blocks in uplink and downlink transmission system.

Regarding claim 17, Claim 17 corresponds to claim 9 and is analyzed accordingly.

Regarding claim 18, Nory teaches transmitting user data on the second set of radio resources if a single downlink component carrier is assigned for the downlink transmission (Para. **36**: **"Alternately, if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier, UE can interpret that the Resource Block assignment bits are signaling a resource block assignment in groups of 4 resource blocks each"**).

Regarding claim 19, Claim 19 corresponds to claim 2 and is analyzed accordingly.

Regarding claim 20, Claim 20 corresponds to claim 3 and is analyzed accordingly.

Regarding claim 21, Claim 21 corresponds to claim 5 and is analyzed accordingly.

Regarding claim 22, Claim 22 corresponds to claim 6 and is analyzed accordingly.

Regarding claim 23, Claim 23 corresponds to claim 7 and is analyzed

accordingly.

Regarding claim 24, Claim 24 corresponds to claim 8 and is analyzed accordingly.

Regarding claim 25, Nory teaches user terminal for mobile communications, the user terminal comprising: a receiver to receive downlink transmissions from a base station (**Fig. 1**); a transmitter to transmit control information associated with the downlink transmission to a base station (**Fig. 1**: **remote unit receive and transmit signals to the base unit**); and a controller to select radio resources for transmission of control information associated with the downlink transmissions (**Fig. 3**), the controller configured to: select a first set of radio resources if an assignment of a single downlink component carrier for the downlink transmission is received, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier (Para. 36: "**The 'Resource Block assignment' bits signal the resource blocks assigned to the UE for receiving PDSCH transmissions within each component carrier. UE can choose an appropriate mapping function to map the Resource Block assignment bits to a set of resource block indices assigned for PDSCH transmission. The mapping function can be a "type 0" mapping function or a "type 1" mapping function or a "type 2" mapping function as described in 3GPP TS 36.213 section 7.1.6. For example, if the UE is configured to receive PDSCH on a set of two component carriers, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier**"); and select a second set of radio resources on the uplink component carrier if an assignment of multiple downlink component

carriers for the downlink transmission is received, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers Para. 36: "**the remaining ten bits can signal the resource block allocation for the second component carrier. Alternately, if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier, UE can interpret that the Resource Block assignment bits are signaling a resource block assignment in groups of 4 resource blocks each. If the UE is configured to receive PDSCH on a set of two component carriers, UE can interpret that the Resource Block assignment bits are signaling resource blocks in groups of 12 resource blocks each. In a different example, the RB assignment bits in PDCCH-2 can be used to signal an offset value to the RB assignment of the anchor carrier (signaled in PDCCH-1) for determining the RB assignment for the component carrier**").

Nory fails to teach that the control information associated with the downlink transmissions to the user terminal on uplink primary component carrier.

In a same field of endeavor, Pan teaches the control information associated with the downlink transmissions to the user terminal on uplink primary component carrier (Para. 41: "…**the WTRU may use the same UL/DL carrier association rule for both UCI and DCI transmission. In order to indicate which UL component carrier that an UL grant is intended, the UL component carrier may be associated with a DL**

component carrier in such way that if an UL grant is transmitted in a DL component carrier x, then the UL grant is intended for an UL component carrier y where a mapping function f( ) that maps a DL component carrier x to UL component carrier y by y=f(x)…") and (Para. 36: "**For asymmetric carrier aggregation in which there are more configured DL carriers than UL component carriers, the WTRU may use UCI grouping in conjunction with single or multiple PUCCH(s) with combined joint coding, multiplexing or bundling techniques, periodic or aperiodic PUSCH, or combinations of PUCCH and PUSCH to transmit the UCI…**") (Also Para. 24, 32, 47, 54,101, 102).

Therefore, it would have been obvious to one of the ordinary skilled in the art to which this invention pertains at the time it was made to use uplink downlink control information transmission process of Pan's disclosure with resource allocation system for multiple component carriers, as taught by Nory. Doing so would have resulted in efficiently using and assigning resource blocks in uplink and downlink transmission system.

Regarding claim 26, Nory teaches transmitting user data on the second set of radio resources if a single downlink component carrier is assigned for the downlink transmission (Para. **36**: **"Alternately, if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier, UE can interpret that the Resource Block assignment bits are signaling a resource block assignment in groups of 4 resource blocks each"**).

Regarding claim 27, Nory teaches the controller is further configured to receive control information from the base station on a downlink component carrier implicitly or explicitly identifying the second set of radio resources on the uplink primary component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier and the remaining ten bits can signal the resource block allocation for the second component carrier…**").

Regarding claim 28, Nory teaches the controller is further configured to receive at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying the second set of radio resources (**Fig. 3**).

Regarding claim 29, Nory teaches one of the first and second sets of radio resources are indicated explicitly by an uplink control channel index (Para. 26: "**…Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted. When a PDSCH is also scheduled to the UE in the same sub-frame as the PDCCH-A, multiple ACK/NACKs (one each for PDCCH-A and the PDSCH) can be transmitted using multiple PUCCH resources…**").

Regarding claim 30, Nory teaches the explicit indication is transmitted as radio resource control signaling (Para. 22: "**In first exemplary implementation, the base**

station configures UE via radio resource control (RRC) signaling with an anchor carrier. The UE is expected to only monitor PDCCH messages from the anchor carrier after initial access. Before assigning resources on non-anchor component carriers via individual PDCCH in each component carrier, base unit sends a configuration message to the UE instructing the UE, the set of component carriers, whose PDCCH messages are also expected to be monitored…").

Regarding claim 31, Nory teaches the controller is further configured to receive, from a base station, an acknowledgement resource indication on a downlink component carrier dynamically assigning said second set of radio resources on the uplink primary component carrier when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers (Para. 25: "**…The PDCCH-A can also include or indicate resources for acknowledging the transmission of the configuration message to increase reliability of signaling of the configuration message. Optionally, the base unit can also instruct the UE to send CQI for the set of component carriers identified in the long term bitmap by signaling a CQI-only uplink grant in the same sub-frame where PDCCH-A is transmitted. The configuration message can also optionally include a time offset limit before which UE should configure its receiver to monitor PDCCH messages from multiple component carriers**") and (Para. **26, 36 & 40**).

Regarding claim 32, Nory teaches the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources (Para. 27: "**In a third exemplary implementation, the base station configures UE via radio**

resource control (RRC) signaling with an anchor carrier. The UE is expected to only monitor the anchor carrier after initial access. Before assigning resources on component carriers other than the anchor carrier, base unit sends a configuration message to the UE, instructing it, the set of component carriers, where PDSCH resource allocations are expected. The configuration message allows the UE to semi-statically configure its receiver to receive PDSCH on the set of component carriers").

Regarding claim 33, Claim 33 corresponds to claim 17 & 9 and is analyzed accordingly.

Regarding claim 34, Claim 34 corresponds to claim 25 and is analyzed accordingly.

CONCLUSION

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 from the examiner should be directed to Patent Examiner Md Talukder whose telephone number is (571) 270-3222. The examiner can normally be reached on Mon-Th 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisors, Ghebretinsae, Temesghen can be reached on (571) 272-3017.

Information regarding the status of an application may be obtaining from the patent application information retrieval (PAIR) system. Status information for the published applications may be obtained from either private PAIR or public PAIR. Status information for unpublished application is available through private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have any questions on access to the private PAIR system, contract the Electronics Business Center (EBC) at 866-217-9197. If you would like assistance from USPTO customer service representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA).

/ Md. Talukder /

/ Art Unit # 2648 /

/TEMESGHEN GHEBRETINSAE/
Supervisory Patent Examiner, Art Unit 2648
7/1/13R

Notice of References Cited	Application/Control No. 12/896,993	Applicant(s)/Patent Under Reexamination ASTELY ET AL.	
	Examiner MD TALUKDER	Art Unit 2648	Page 1 of 2

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2010/0003997 A1	01-2010	KOYANAGI, Kenichiro	455/450
*	B	US-2010/0098012 A1	04-2010	Bala et al.	370/329
*	C	US-2010/0208679 A1	08-2010	Papasakellariou et al.	370/329
*	D	US-2010/0232373 A1	09-2010	Nory et al.	370/329
*	E	US-2010/0271970 A1	10-2010	Pan et al.	370/252
*	F	US-2010/0296389 A1	11-2010	Khandekar et al.	370/216
*	G	US-2010/0285809 A1	11-2010	Lindstrom et al.	455/450
*	H	US-2010/0322173 A1	12-2010	Marinier et al.	370/329
*	I	US-2011/0007695 A1	01-2011	Choi et al.	370/329
*	J	US-2011/0007699 A1	01-2011	Moon et al.	370/329
*	K	US-2011/0081932 A1	04-2011	Astely et al.	455/509
*	L	US-2011/0081913 A1	04-2011	Lee et al.	455/450
*	M	US-2011/0310856 A1	12-2011	Hariharan et al.	370/336

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
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	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
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	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.

Notice of References Cited	Application/Control No. 12/896,993	Applicant(s)/Patent Under Reexamination ASTELY ET AL.	
	Examiner MD TALUKDER	Art Unit 2648	Page 2 of 2

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2012/0020317 A1	01-2012	Ishii et al.	370/329
*	B	US-2012/0051306 A1	03-2012	Chung et al.	370/329
*	C	US-2012/0082125 A1	04-2012	Huang, Yada	370/329
*	D	US-2012/0140708 A1	06-2012	Choudhury et al.	370/328
*	E	US-8,265,030 B2	09-2012	Miki et al.	370/330
*	F	US-2012/0314675 A1	12-2012	Vujcic, Dragan	370/329
*	G	US-2013/0003700 A1	01-2013	Zhang et al.	370/331
*	H	US-2013/0010721 A1	01-2013	Aiba et al.	370/329
*	I	US-2013/0034073 A1	02-2013	Aiba et al.	370/329
*	J	US-8,447,343 B2	05-2013	Gerstenberger et al.	455/522
*	K	US-2013/0136084 A1	05-2013	ZHANG et al.	370/329
*	L	US-8,472,368 B2	06-2013	Baldemair et al.	370/318
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
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NON-PATENT DOCUMENTS

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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12896993	ASTELY ET AL.
	Examiner	Art Unit
	MD TALUKDER	2648

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
455	509,522,456.6,137,103,575	12/11/2012	Talukder
370	329,252,331	12/11/2012	Talukder
455	Text	6/17/2013	
370	329,341,348,395.4	6/26/2013	

SEARCH NOTES		
Search Notes	Date	Examiner
East Search	12/10/2012	talukder
East Search	12/11/2012	talukder
East Search	6/17/2013	talukder
East Search	6/18/2013	talukder
East Search	6/26/2013	talukder
East Search	6/27/2013	

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"12896993"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 17:09
S2	367	((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:04
S3	176	S2 and (radio near3 resource)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:09
S4	28	S2 and (radio near3 resource) and (component with carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:09
S5	173	(downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:04
S6	137	S5 and (scheduling)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:04
S7	36	("20120263121" | "20110310856" | "20120127950" | "20110310819 " | "20120275395" | "20120287828" | "20120039291" | "20100271970" | "20120307781" | "20110286436" | "20120224535" | "20120140708" | "20110310820" | "20120163288" | "20110299486" | "20100098012" | "20120082125 " | "20120294273" | "20110268048" | "20120113910").pn.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:15
S8	127	(downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (carrier adj aggregation)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 10:16
S9	2	"20110292887"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:17

S11	25	((first 1st) adj6 component adj3 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:22
S12	1718	((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:47
S13	66	(carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:47
S14	10842	455/509,522,456.6,137,103,575.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:41
S15	28232	370/329,252,331.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:41
S16	102	(S14 S15) and (downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:42
S17	1	"13140333"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:18
S18	2	"20110310856"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:18
S19	38	((first 1st) adj6 component adj3 carrier) same ((radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:31
S20	38	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:31
S21	27	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj4 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:32
S22	38	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:32

S23	24	(carrier adj aggregation) and (schedul$3 near3 (downlink DL) with ((first primary initial) near6 (resource radio frequency frame)))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:48
S24	8	("7551898" | "7649960" | "7656843" | "7773699").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:14
S25	2	"20110292900"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:36
S26	2	"20100271970"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:37
S27	3	"8050202"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:38
S28	1	"20120307689"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:45
S29	2	"8160017"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:48
S30	2	"20100232373"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:48
S31	2	"20090016278"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 17:16
S32	2	"8265030"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 17:19
S33	3	"2008139923"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 18:17
S34	14	("20100098012" | "20100232373" | "20110310856" | "20120020317" | "20120082125" | "20120140708" | "8265030").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/29 17:19

S35	7	"455"/$.ccls. and (carrier adj aggregation) and (schedul$3 near3 (downlink DL) with ((first primary initial) near6 (resource radio frequency frame)))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/29 17:22
S36	9	"455"/$.ccls. and (((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/29 21:37
S37	57	((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/30 12:21
S38	4	("20070053294" | "20100290405").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/30 12:42
S39	16	("7596114" | "20050013279" | "20030219028" | "20070217406" | "20020105970" | "20060050664" | "20090303938" | "20070064669").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/30 12:42
S40	290	(first 1st) with (component near2 carrier) with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 10:07
S41	114	(first 1st) with (component near2 carrier) with down$1link and receiv$3 near3 control near3 information	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 10:09
S42	47	(first 1st) near3 (radio adj resource) and (second other another 2nd) near3 (radio adj resource) and component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:29
S43	26	S42 and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:31
S44	5	(first 1st) near3 (radio adj resource) and (second other another 2nd) near3 (radio adj resource) same (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:46
S45	26	(first 1st) near3 (radio adj resource) and (second other another 2nd) near3 (radio adj resource) and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:47
S46	31	(second other another 2nd) near3 (radio adj resource) and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT;	OR	ON	2013/06/17 12:49

			IBM_TDB			
S47	0	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:51
S48	0	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:52
S49	1	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component) and ((down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:53
S50	1	@ad<"20091005" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component) and ((down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:55
S51	1	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:56
S52	20	(second other another 2nd) near3 (radio adj resource) and (carrier adj component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 13:31
S53	16	(set near3 radio near3 resource) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:14
S54	27	(set near3 ((radio near3 resource) (resource adj block))) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:19
S55	755	(((radio near3 resource) (resource adj block))) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:25
S56	70	((second 2nd other) with ((radio near3 resource) (resource adj block))) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:26
S57	327	(((radio near3 resource) (resource adj block))) same component adj carrier and (schedul$3 near3 downlink reverse)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:27
S58	29	((second 2nd other) with ((radio near3 resource) (resource adj block))) same component adj carrier and (schedul$3 near3 down$1link reverse$1link)	US-PGPUB; USPAT; USOCR; DERWENT;	OR	ON	2013/06/17 14:27

			IBM_TDB			
S59	24	((second 2nd other) with ((radio near3 resource) (resource adj block))) same (component adj carrier) same (down$1link reverse$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:31
S60	10	("20090097447" | "20110081856" | "20090116427" | "20100232373" | "8331307").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:49
S61	2562	(schedul$3 near3 downlink) and ((radio adj resource) (resource adj block)) and component	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:16
S62	739	(schedul$3 near3 downlink) and ((radio adj resource) (resource adj block)) and component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:17
S63	259	(schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) and component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:17
S64	39	(schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (component adj carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:18
S65	1	@ad<"20091005" and (schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (component adj carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:18
S66	1	@ad<"20091005" and (schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:20
S67	47	(schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:20
S68	356	"455"/$.ccls. and ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 17:10
S70	19	"455"/$.ccls. and (carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 17:17
S71	0	("2013/0107855").URPN.	USPAT	OR	ON	2013/06/18 09:15

S72	0	("2013/0107855").URPN.	US-PGPUB; USPAT	OR	ON	2013/06/18 09:16
S73	408	set near3 (radio frequency) near2 (resource band) same downlink and component	US-PGPUB; USPAT	OR	ON	2013/06/18 09:18
S74	17	set near3 (radio frequency) near2 (resource band) same downlink same (component adj carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 09:19
S75	19	(set group Cluster) near3 (radio frequency) near2 (resource band) same downlink same (component adj carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 09:21
S76	12	("8457060" | "20110310819" | "20100271970" | "20130034073" | "20100098012" | "20110310856" | "20110317653" | "20130083742" | "20130083741" | "20120114021" | "20120275395" | "20110317645" | "20110310856").pn.	US-PGPUB; USPAT	OR	ON	2013/06/18 09:31
S77	200	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource)	US-PGPUB; USPAT	OR	ON	2013/06/18 10:37
S78	2911	(UL up$link) with (set group) near6 (radio resource)	US-PGPUB; USPAT	OR	ON	2013/06/18 10:38
S79	110	S77 and S78	US-PGPUB; USPAT	OR	ON	2013/06/18 10:38
S80	3	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (set group) near6 (radio resource) with (2nd second other another) near2 component	US-PGPUB; USPAT	OR	ON	2013/06/18 10:47
S81	28	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 11:17
S82	5	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (second 2nd) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 11:20
S83	4	(1st first first primary initia) near3 (set group) near6 (radio resource) with (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 13:50
S84	3	(set group) near6 (radio resource) with (2nd second other another) near6 (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 13:52
S85	42	(set group) near6 (radio resource) with (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 13:58
S86	30	(set group) near3 ((radio resource)(resource near2 block)) with (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 14:07
S87	2	(second 2nd) near3 (down$1link DL) with ((component near3 carrier) CC) same (set group) with ((radio near2	US-PGPUB; USPAT	OR	ON	2013/06/18 14:14

		resource) (resource near2 block))				
S88	21	reserv$3 with component near3 carrier and (second near2 (radio frequency band))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/25 15:31
S89	36	"739528"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 09:34
S90	30	"5754138"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 09:35
S91	2046	(carrier near3 aggregation) and up$1link with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 10:24
S92	1052	(carrier near3 aggregation) and (component near3 carrier) same up$1link with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 10:26
S93	110	(carrier near3 aggregation) and (component near3 carrier) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 10:27
S94	16	("370"/$.ccls "455"/$.ccls.) and (carrier near3 aggregation) and (component near3 carrier) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 15:20
S95	17	("370"/$.ccls "455"/$.ccls.) and (aggregation) and (CC (component near3 carrier)) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 15:22
S96	67	370/329,341,348,395.4.ccls. and (carrier near3 aggregation) and (component near3 carrier) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 15:26
S97	345368	schedule (DL (down adj link) down$1link) and (carrier near3 aggregation) and ((UL up$link) adj6 associat$4 near4 (DL down$link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 16:45
S98	9	schedule near3 (DL (down adj link) down$1link) and (carrier near3 aggregation) same((UL up$link) adj6 associat$4 near4 (DL down$link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 16:46
S99	35	(schedule allocat$4) near3 (DL (down adj link) down$1link) and (carrier near3 aggregation) same((UL up$link) adj6 associat$4 near4 (DL down$link))	US-PGPUB; USPAT; USOCR; DERWENT;	OR	ON	2013/06/26 16:48

			IBM_TDB			
S100	0	(1st first) near3 (radio band resource frequency) with (1st first) near3 (CCcomponent adj carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 17:14
S101	216	(1st first) near3 (radio band resource frequency) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 17:14
S102	43	(1st first) near3 (radio band resource frequency) with (reserv$3 schedul$3 allocat$3) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 17:15
S103	22	("20100142455" | "20120009923" | "20100254329" | "20100091678" | "20110194501" | "20130010619" | "20080310359" | "20060274712" | "20100227569" | "20120208583" | "20110267978").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/27 09:57
S104	10	("20100254329" | "20100195624" | "20100023282" | "20090274100" | "20080316957").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/27 10:15

EAST Search History (Interference)

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6/27/2013 4:48:25 PM
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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12896993	ASTELY ET AL.
	Examiner	Art Unit
	MD TALUKDER	2648

✓	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	12/13/2012	06/27/2013							
	1	✓	✓							
	2	✓	✓							
	3	✓	✓							
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	32	✓	✓							
	33	✓	✓							
	34	✓	✓							

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-09)
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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	12896993	Filing Date	2010-10-04	Docket Number (if applicable)	4015-6942	Art Unit	2648
First Named Inventor	David Astely			Examiner Name	Mr. Md K. Talukder		

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, 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 181167

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Signature of Registered U.S. Patent Practitioner			
Signature	/Zheng Li, Reg. No. 70555/	Date (YYYY-MM-DD)	2013-10-25
Name	Zheng Li	Registration Number	70555

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.

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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 t purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcem agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of **Astely et al.**

Serial No.: **12/896,993**

Filed: **October 4, 2010**

For: **PUCCH Resource Allocation for Carrier Aggregation for LTE-Advanced**

Docket No: **4015-6942**

Examiner: Mr. Md K. Talukder

Group Art Unit: 2648

Confirmation No.: 1015

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT

This amendment is being filed in concurrently with a Request for Continued Examination (RCE) response to the Final Office Action mailed July 3, 2013. Reconsideration is respectfully requested in light of the amendments and remarks below. Applicant is electronically submitting the requisite fees for the RCE and a two-month extension of time. No other fees should be required or due for entry of this amendment. However, if any other fees are required for entry of this amendment, the Office is authorized to charge those fees to Deposit Account 18-1167.

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method implemented by a base station of receiving control information from a user terminal, the method comprising:

scheduling downlink transmissions to said user terminal on one or more downlink component carriers;

if the user terminal is scheduled to receive downlink transmissions on a first single downlink component carrier associated with an uplink primary component carrier, receiving control information associated with the downlink transmissions to the user terminal on a first set of radio resources on ~~a~~ the uplink primary component carrier associated with said first downlink component carrier, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier; and

if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier or multiple downlink component carriers, receiving control information associated with the downlink transmissions to the user terminal on a second set of radio resources on the uplink primary component carrier, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers.

2. (Original) The method of claim 1 further comprising transmitting control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink primary component carrier.

3. (Original) The method of claim 2 further comprising transmitting control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the second set radio resources on the uplink primary component carrier.

4. (Original) The method of claim 3 wherein at least one of the first and second sets of radio resources are indicated implicitly by at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier.

5. (Original) The method of claim 3 wherein at least one of the first and second sets of radio resources are indicated explicitly by an uplink control channel index.

6. (Original) The method of claim 5 wherein the explicit indication is transmitted as radio resource control signaling.

7. (Original) The method of claim 1 further comprising transmitting an acknowledgement resource indication on a downlink component carrier to dynamically assign said second set of radio resources on the uplink primary component carrier to the user terminal when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers.

8. (Original) The method of claim 7 wherein the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources.

9. (Currently amended) A base station comprising:

a transmitter to transmit user data on one or more downlink component carriers to a user terminal; and

a controller to schedule downlink transmissions to said user terminal, the downlink controller configured to

schedule downlink transmissions to a user terminal on one or more downlink component carriers;

if the user terminal is scheduled to receive downlink transmissions on a first single downlink component carrier associated with an uplink primary component carrier, receive control information associated with the downlink transmissions to the user terminal on a first set of radio resources on ~~a~~ the uplink primary component carrier associated with said first downlink component carrier, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier; and

if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier or multiple downlink component carriers, receive control information associated with the downlink transmissions to the user terminal on a second set of radio resources on the uplink primary component carrier, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers.

10. (Original) The base station of claim 9 wherein the controller is further configured to transmit control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink primary component carrier.

11. (Original) The base station of claim 10 wherein the controller is further configured to transmit control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the second set of radio resources on the uplink primary component carrier.

12. (Original) The base station of claim 11 wherein the controller is further configured to indicate at least one of the first and second sets of radio resources implicitly by sending at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier.

13. (Original) The base station of claim 11 wherein the controller is further configured to indicate at least one of the first and second sets of radio resources explicitly by sending an uplink control channel index.

14. (Original) The base station of claim 13 wherein the controller is further configured to send the explicit indication as radio resource control signaling.

15. (Original) The base station of claim 9 wherein the controller is further configured to transmit an acknowledgement resource indication on a downlink component carrier to dynamically assign said second set of radio resources on the uplink primary component carrier to the user terminal when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers.

16. (Original) The base station of claim 15 wherein the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources.

17. (Currently amended) A method implemented by a user terminal of transmitting control information in a mobile communication network, the method comprising:

receiving an assignment of radio resources for downlink transmissions from a base station;

transmitting control information associated with the downlink transmissions on a first set of radio resources on an uplink primary component carrier if an assignment of a single downlink component carrier associated with the uplink primary component carrier is received for the downlink transmission ~~is received~~, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier; and

transmitting control information associated with the downlink transmissions on a second set of radio resources on the uplink component carrier if an assignment of multiple downlink component carriers for the downlink transmission is received, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers.

18. (Original) The method of claim 17 further comprising transmitting user data on the second set of radio resources if a single downlink component carrier is assigned for the downlink transmission.

19. (Original) The method of claim 17 further comprising receiving control information from the base station on a downlink component carrier implicitly or explicitly indicating the second set of radio resources on the uplink primary component carrier.

20. (Original) The method of claim 19 wherein receiving control information comprises receiving one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying said second set of resources.

21. (Original) The method of claim 19 wherein receiving control information comprises receiving an uplink control channel index explicitly identifying said second set of resources.

22. (Original) The method of claim 21 wherein the explicit indication is received as radio resource control signaling.

23. (Original) The method of claim 17 further comprising receiving, from a base station, an acknowledgement resource indication on a downlink component carrier dynamically assigning said second set of radio resources on the uplink primary component carrier when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers.

24. (Original) The method of claim 23 further comprising selecting the second set of resources from a semi-static set of uplink resources responsive to the acknowledgement resource indication.

25. (Currently amended) A user terminal for mobile communications, the user terminal comprising:

a receiver to receive downlink transmissions from a base station;

a transmitter to transmit control information associated with the downlink transmission to a base station; and

a controller to select radio resources for transmission of control information associated with the downlink transmissions, the controller configured to:

select a first set of radio resources on an uplink primary component carrier if an assignment of a single downlink component carrier associated with the uplink primary component carrier is received for the downlink transmission ~~is received~~, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier; and

select a second set of radio resources on the uplink component carrier if an assignment of multiple downlink component carriers for the downlink transmission is received, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers.

26. (Original) The user terminal of claim 25 configured to transmit user data on the second set of radio resources if a single downlink component carrier is assigned for the downlink transmission.

27. (Original) The user terminal of claim 25 wherein the controller is further configured to receive control information from the base station on a downlink component carrier implicitly or explicitly identifying the second set of radio resources on the uplink primary component carrier.

28. (Original) The user terminal of claim 27 wherein the controller is further configured to receive at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying the second set of radio resources.

29. (Original) The user terminal of claim 27 wherein the controller is further configured to receive an uplink control channel index explicitly identifying the second set of radio resources on the uplink primary component carrier.

30. (Original) The user terminal of claim 29 wherein the controller is further configured to receive the explicit indication as radio resource control signaling.

31. (Original) The user terminal of claim 25 wherein the controller is further configured to receive, from a base station, an acknowledgement resource indication on a downlink component carrier dynamically assigning said second set of radio resources on the uplink primary component carrier when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers.

32. (Original) The user terminal of claim 31 wherein the controller is configured to select the second set of resources from a semi-static set of uplink resources responsive to the acknowledgement resource indication.

33. (Currently amended) A method implemented by a user terminal in a mobile communication network, the method comprising:

receiving an assignment of radio resources for a downlink transmissions from a base station;

transmitting control information associated with the downlink transmission on a first set of radio resources on an uplink primary component carrier if an assignment of a first downlink component carrier associated with the uplink primary component carrier is received for the downlink transmission ~~is received~~, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier; and

transmitting control information associated with the downlink transmission on a second set of radio resources on the uplink component carrier if an assignment of a second downlink component carrier for the downlink transmission is received, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers.

34. (Currently amended) A user terminal for mobile communications, the user terminal comprising:

a receiver to receive downlink transmissions from a base station;

a transmitter to transmit control information associated with the downlink transmission to a base station; and

a controller to select radio resources for transmission of control information associated with downlink transmission, the controller configured to:

select a first set of radio resources on an uplink primary component carrier if an assignment of a first downlink component carrier associated with the uplink primary component carrier is received for the downlink transmission ~~is received~~, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier; and

select a second set of radio resources on the uplink component carrier if an assignment of a second downlink component carrier for the downlink transmission is received, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers.

REMARKS

In response to the Official Office Action dated July 3, 2013, Applicant has amended claims 1, 9, 17, 25, 33 and 34. Applicant respectfully submits that the claims 1-34 are allowable over the cited prior art. Accordingly, reconsideration of this application in light of the following remarks is respectfully requested.

The invention discloses an uplink signaling mechanism for efficient transmission of control information in a communication system using carrier aggregation. The downlink channel comprises multiple downlink component carriers. A user terminal may be scheduled to receive downlink transmissions on any one of the downlink component carriers, or on multiple downlink component carriers. The uplink signaling mechanism allows the transmission, on a single uplink component carrier, of control information associated with downlink transmissions on one or multiple aggregated downlink component carriers. The uplink component carrier designated to carry uplink control information is called the uplink primary component carrier (UL-PCC). A user terminal transmits control information on a first set of radio resources on the UL-PCC if an assignment of a first single downlink component carrier for the downlink transmissions is received by the user terminal. And a user terminal transmits control information on a second set of radio resources on the UL-PCC if an assignment of a second single downlink component carrier or multiple downlink component carriers for the downlink transmissions is received by the user terminal.

Independent claims 1, 9, 27, 25, 33 and 34 are rejected under 35 USC 103(a) as being obvious over Nory (US 2010/0232373) in view of Pan (US 2010/0271970). The cited references do not disclose transmitting/receiving uplink control information on a first set of radio resources for downlink transmission on a first single downlink component carrier, and transmitting/receiving uplink control information on a second set of radio resources for downlink transmissions on a second single downlink component carrier or on multiple downlink

component carriers. Accordingly, for reasons explained more fully below, Applicant believes that the claimed invention is allowable of the cited references.

Nory discloses that the base station transmits a first control message on an anchor carrier in downlink for the UE to determine its PDSCH resource assignment for a first set of component carriers. The base station also transmits a second control message on the same anchor carrier for the UE to determine its PDSCH resource assignment for a second set of component carriers [see Fig. 3 and Fig. 4]. Nory also discloses that the UE can use the "Resource Block (RB) assignment" bits to determine the resource block indices assigned for PDSCH transmissions. For example, if the UE is configured to receive PDSCH on a set of two component carriers, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier and the remaining ten bits can signal the resource block allocation for the second component carrier [see 0036]. As acknowledged by the Examiner, Nory does not disclose transmitting uplink control information associated with the downlink transmissions to the user terminal on an uplink primary component carrier associated with a first downlink component carrier.

Pan discloses transmitting control information associated with the downlink transmissions to the user terminal on an uplink component carrier associated with said first downlink component carrier [see 0041]. The Examiner contends that it would be obvious to modify Nory to transmit uplink control information on an uplink component carrier as taught by Pan.

It is respectfully submitted that the combination of the prior art references does not teach the claimed invention.

First, Nory discloses a downlink signaling mechanism while the claimed invention is related to a uplink signaling mechanism. In Nory, the "Resource Block (RB) assignment" bits are used to signal additional information to the UE. That is, the signal mechanism in Nory is

performed on the downlink [see 0035]. Rather, in the claimed invention, the user terminal transmits uplink control information on the uplink primary component carrier (UL-PCC). Nory does not disclose any signal mechanism performed by the user terminal on a first set of radio resources and on a second set of radio resources on the uplink. Pan does not solve the deficiency.

Second, in Nory, the base station transmits control messages on both the two sets of resources on the anchor carrier [see Fig. 3] while in the claimed invention, the user terminal transmits control information on either the first set of resources or the second set of resources on the uplink. In Nory, if the UE is configured to receive PDSCH on a set of two component carriers, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier and the remaining ten bits can signal the resource block allocation for the second component carrier [see 0036]. That is, both the two sets of resources (twenty bits) in the RB assignment field are transmitted to the UE. However, in the claimed invention, a user terminal transmits control information on a first set of radio resources if an assignment of a first single downlink component carrier for the downlink transmissions is received. And a user terminal transmits control information on a second set of radio resources if an assignment of a second single downlink component carrier or multiple downlink component carriers for the downlink transmissions is received. Thus, the user terminal transmits control information on either the first set of resources or the second set of resources depending on what type of downlink assignment is received. That is, the user terminal does not transmit on both the first and the second sets of resources simultaneously. Nory does not disclose that the user terminal transmits control information on either the first set of resources or the second set of resources on the uplink. Pan does not solve the deficiency.

The dependent claims all depend directly or indirectly from allowable independent claims and are therefore believed to be allowable for the same reasons.

For the forgoing reasons, it is submitted that the application is in condition for allowance and notice to such effect is respectfully requested.

Respectfully submitted,

COATS & BENNETT, P.L.L.C.

Zheng Li

Dated: October 25, 2013

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Electronic Patent Application Fee Transmittal

Application Number:	12896993
Filing Date:	04-Oct-2010
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Filer:	Zheng Li/Donna Donovan
Attorney Docket Number:	4015-6942

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

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($)
Miscellaneous:				
Request for Continued Examination	1801	1	1200	1200
		Total in USD ($)		**1200**

Electronic Acknowledgement Receipt

EFS ID:	17227887
Application Number:	12896993
International Application Number:	
Confirmation Number:	1015
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Customer Number:	24112
Filer:	Zheng Li/Donna Donovan
Filer Authorized By:	Zheng Li
Attorney Docket Number:	4015-6942
Receipt Date:	25-OCT-2013
Filing Date:	04-OCT-2010
Time Stamp:	12:24:52
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	$1200
RAM confirmation Number	11103
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Request for Continued Examination (RCE)	RCE.pdf	79003 53f8f37f5935966c4eb52e0da10a858389982f7f	no	3
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
2		Preliminary_Amendment.pdf	60757 9788875e16964d44f08619815bb48f05f1d2757b	yes	15

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Preliminary Amendment	1	1
	Claims	2	11
	Applicant Arguments/Remarks Made in an Amendment	12	15

Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	29894 c7745a28bf679680940939c3394c2e45997d3f94	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	169654		

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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.

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
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/896,993	Filing Date 10/04/2010	☒ 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	10/25/2013	(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))	* 34	Minus	** 34	= 0	X $80 =	0
	Independent (37 CFR 1.16(h))	* 6	Minus	***6	= 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
/NICHELE PETERSON/

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/896,993	10/04/2010	David Astely	4015-6942	1015

24112 7590 05/05/2014
COATS & BENNETT, PLLC
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EXAMINER	
TALUKDER, MD K	
ART UNIT	PAPER NUMBER
2648	
MAIL DATE	DELIVERY MODE
05/05/2014	PAPER

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.

Office Action Summary	Application No. 12/896,993	Applicant(s) ASTELY ET AL.	
	Examiner MD TALUKDER	Art Unit 2648	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 *10/25/2013*.

☐ 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) *1-34* 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) *1-34* 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 _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

2. It would be of great assistance to the office if all incoming papers pertaining to a filed application carried the following items:

i. Application number (checked for accuracy, including series code and serial no.).
ii. Group art unit number (copied from most recent Office communication).
iii. Filing date.
iv. Name of the examiner who prepared the most recent Office action.
v. Title of invention.
vi. Confirmation number (See MPEP § 503).

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 04/21/2014 has been entered.

Claim Rejection- 35 USC § 103

4. 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.

Claims 1-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nory (Pub No. 2010/0232373) and further in view of Pan (Pub No. 2010/0271970).

Regarding claim 1, Nory teaches a method implemented by a base station of receiving control information from a user terminal (**Fig. 3 & 4**), the method comprising: scheduling downlink transmissions to said user terminal on one or more downlink component carriers (Para. 49: **"…If a sub frame n+1 with single component carrier allocation must follow a sub frame n with multi-component carrier allocation, both PDCCH-1 and PDCCH-2 can be transmitted in a sub-frame n+1 to only schedule the single component carrier resource assignment…");** if the user terminal is scheduled to receive downlink transmissions on a first single downlink component carrier associated with an uplink component carrier, receiving control information on a first set of radio resources, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier…if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier) & (Para. 26: "Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted. When a PDSCH is also**

scheduled to the UE in the same sub-frame as the PDCCH-A…") (also Para. 13-17); if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier or multiple downlink component carriers, receiving control information on a second set of radio resources, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers (Para. 36: "**… the remaining ten bits can signal the resource block allocation for the second component carrier. Alternately, if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier, UE can interpret that the Resource Block assignment bits are signaling a resource block assignment in groups of 4 resource blocks each. If the UE is configured to receive PDSCH on a set of two component carriers, UE can interpret that the Resource Block assignment bits are signaling resource blocks in groups of 12 resource blocks each**").

Nory fails to teach that the control information associated with the downlink transmissions to the user terminal on uplink primary component carrier associated with said first downlink component carrier.

In a same field of endeavor, Pan teaches the control information associated with the downlink transmissions to the user terminal on uplink primary component carrier associated with downlink component carrier (Para. 41: "…**the WTRU may use the same UL/DL carrier association rule for both UCI and DCI transmission. In order to indicate which UL**

component carrier that an UL grant is intended, the UL component carrier may be associated with a DL component carrier in such way that if an UL grant is transmitted in a DL component carrier x, then the UL grant is intended for an UL component carrier y where a mapping function f( ) that maps a DL component carrier x to UL component carrier y by y=f(x)…") and (Para. 36: "**For asymmetric carrier aggregation in which there are more configured DL carriers than UL component carriers, the WTRU may use UCI grouping in conjunction with single or multiple PUCCH(s) with combined joint coding, multiplexing or bundling techniques, periodic or aperiodic PUSCH, or combinations of PUCCH and PUSCH to transmit the UCI…**") (Also Para. 24, 32, 47, 54,101, 102).

Therefore, it would have been obvious to one of the ordinary skilled in the art to which this invention pertains at the time it was made to use uplink downlink control information transmission process of Pan's disclosure with resource allocation system for multiple component carriers, as taught by Nory. Doing so would have resulted in efficiently using and assigning resource blocks in uplink and downlink transmission system.

Regarding claim 2, 10, Nory teaches that the control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink primary component carrier (abstract: "**…The transceiver is also configured to receive a second control message on the anchor carrier, the second control message associated with a set of component carriers, the set of component carriers are distinct from the anchor carrier. The controller determines a resource assignment for at least one component carrier in the set of component carriers using both the first and the second control messages**").

Regarding claim 3, 11, Nory teaches transmitting control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the second set radio resources on the uplink primary component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier and the remaining ten bits can signal the resource block allocation for the second component carrier…**").

Regarding claim 4, 12, Nory teaches at least one of the first and second sets of radio resources are indicated implicitly by at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier (**Fig. 3**).

Regarding claim 5, 13, Nory teaches one of the first and second sets of radio resources are indicated explicitly by an uplink control channel index (Para. 26: "**…Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted. When a PDSCH is also scheduled to the UE in the same sub-frame as the PDCCH-A, multiple ACK/NACKs (one each for PDCCH-A and the PDSCH) can be transmitted using multiple PUCCH resources…**").

Regarding claim 6, 14, Nory teaches the explicit indication is transmitted as radio resource control signaling (Para. 22: "**In first exemplary implementation, the base station configures UE via radio resource control (RRC) signaling with an anchor carrier. The UE is expected to only monitor PDCCH messages from the anchor carrier after initial access.**

Before assigning resources on non-anchor component carriers via individual PDCCH in each component carrier, base unit sends a configuration message to the UE instructing the UE, the set of component carriers, whose PDCCH messages are also expected to be monitored…").

Regarding claim 7, 15, Nory teaches transmitting an acknowledgement resource indication on a downlink component carrier to dynamically assign said second set of radio resources on the uplink primary component carrier to the user terminal when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers (Para. 25: "**…The PDCCH-A can also include or indicate resources for acknowledging the transmission of the configuration message to increase reliability of signaling of the configuration message. Optionally, the base unit can also instruct the UE to send CQI for the set of component carriers identified in the long term bitmap by signaling a CQI-only uplink grant in the same sub-frame where PDCCH-A is transmitted. The configuration message can also optionally include a time offset limit before which UE should configure its receiver to monitor PDCCH messages from multiple component carriers**") and (Para. **26, 36 & 40**).

Regarding claim 8, 16, Nory teaches the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources (Para. 27: "**In a third exemplary implementation, the base station configures UE via radio resource control (RRC) signaling with an anchor carrier. The UE is expected to only monitor the anchor carrier after initial access. Before assigning resources on component carriers other than the anchor carrier, base unit sends a configuration message to the UE, instructing it, the set of**

component carriers, where PDSCH resource allocations are expected. The configuration message allows the UE to semi-statically configure its receiver to receive PDSCH on the set of component carriers").

Regarding claim 9, Nory teaches a base station comprising (Fig. **1 & 3**): a transmitter to transmit user data on one or more downlink component carriers to a user terminal; and a controller to schedule downlink transmissions to said user terminal, the downlink controller configured to schedule downlink transmissions to a user terminal on one or more downlink component carriers (Para. 49: **"…If a sub frame n+1 with single component carrier allocation must follow a sub frame n with multi-component carrier allocation, both PDCCH-1 and PDCCH-2 can be transmitted in a sub-frame n+1 to only schedule the single component carrier resource assignment…");** if the user terminal is scheduled to receive downlink transmissions on a first single downlink component carrier associated with an uplink primary component carrier, receive control information on a first set of radio resources, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier …if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component**

carrier) & (Para. 26: "Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted. When a PDSCH is also scheduled to the UE in the same sub-frame as the PDCCH-A…") (also Para. 13-17); if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier or multiple downlink component carriers, receiving control information on a second set of radio resources, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers (Para. 36: "**… the remaining ten bits can signal the resource block allocation for the second component carrier. Alternately, if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier, UE can interpret that the Resource Block assignment bits are signaling a resource block assignment in groups of 4 resource blocks each. If the UE is configured to receive PDSCH on a set of two component carriers, UE can interpret that the Resource Block assignment bits are signaling resource blocks in groups of 12 resource blocks each**").

Nory fails to teach that the control information associated with the downlink transmissions to the user terminal on uplink primary component carrier associated with said first downlink component carrier.

In a same field of endeavor, Pan teaches the control information associated with the downlink transmissions to the user terminal on uplink primary component carrier associated with downlink component carrier (Para. 41: "…**the WTRU may use the same UL/DL carrier association rule for both UCI and DCI transmission. In order to indicate which UL component carrier that an UL grant is intended, the UL component carrier may be associated with a DL component carrier in such way that if an UL grant is transmitted in a DL component carrier x, then the UL grant is intended for an UL component carrier y where a mapping function f( ) that maps a DL component carrier x to UL component carrier y by y=f(x)…**") and (Para. 36: "**For asymmetric carrier aggregation in which there are more configured DL carriers than UL component carriers, the WTRU may use UCI grouping in conjunction with single or multiple PUCCH(s) with combined joint coding, multiplexing or bundling techniques, periodic or aperiodic PUSCH, or combinations of PUCCH and PUSCH to transmit the UCI…**") (Also Para. 24, 32, 47, 54,101, 102).

Therefore, it would have been obvious to one of the ordinary skilled in the art to which this invention pertains at the time it was made to use uplink downlink control information transmission process of Pan's disclosure with resource allocation system for multiple component carriers, as taught by Nory. Doing so would have resulted in efficiently using and assigning resource blocks in uplink and downlink transmission system.

Regarding claim 17, Nory teaches a user terminal of transmitting control information in a mobile communication network, the method comprising: receiving an assignment of radio resources for downlink transmissions from a base station (**Fig. 3 & 4 and Abstract: "A wireless communication terminal including a controller coupled to a wireless transceiver wherein**

the transceiver is configured to receive a first control message on an anchor carrier, the first control message including a resource assignment for the anchor carrier"); transmitting the downlink transmissions on a first set of radio resources on an uplink primary component carrier if an assignment of single downlink component carrier associated with the uplink primary component carrier is received for the downlink transmission, wherein the first set of radio resources is reserved for user terminal scheduled to receive downlink transmission on the first downlink component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier…if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier) & (Para. 26: "Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted. When a PDSCH is also scheduled to the UE in the same sub-frame as the PDCCH-A…") (also Para. 13-17)**; and transmitting the downlink transmissions on a second set of radio resources on the uplink component carrier if an assignment of multiple downlink component carriers for the downlink transmission is received, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmission on the second downlink component carrier or multiple component carriers (Para. 36: "**… the remaining ten bits can**

signal the resource block allocation for the second component carrier. Alternately, if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier, UE can interpret that the Resource Block assignment bits are signaling a resource block assignment in groups of 4 resource blocks each. If the UE is configured to receive PDSCH on a set of two component carriers, UE can interpret that the Resource Block assignment bits are signaling resource blocks in groups of 12 resource blocks each").

Nory fails to teach that the control information associated with the downlink transmissions to the user terminal on uplink primary component carrier associated with said first downlink component carrier.

In a same field of endeavor, Pan teaches the control information associated with the downlink transmissions to the user terminal on uplink primary component carrier associated with downlink component carrier (Para. 41: "…**the WTRU may use the same UL/DL carrier association rule for both UCI and DCI transmission. In order to indicate which UL component carrier that an UL grant is intended, the UL component carrier may be associated with a DL component carrier in such way that if an UL grant is transmitted in a DL component carrier x, then the UL grant is intended for an UL component carrier y where a mapping function f( ) that maps a DL component carrier x to UL component carrier y by y=f(x)…**") and (Para. 36: "**For asymmetric carrier aggregation in which there are more configured DL carriers than UL component carriers, the WTRU may use UCI**

grouping in conjunction with single or multiple PUCCH(s) with combined joint coding, multiplexing or bundling techniques, periodic or aperiodic PUSCH, or combinations of PUCCH and PUSCH to transmit the UCI…") (Also Para. 24, 32, 47, 54,101, 102).

Therefore, it would have been obvious to one of the ordinary skilled in the art to which this invention pertains at the time it was made to use uplink downlink control information transmission process of Pan's disclosure with resource allocation system for multiple component carriers, as taught by Nory. Doing so would have resulted in efficiently using and assigning resource blocks in uplink and downlink transmission system.

Regarding claim 18, Nory teaches transmitting user data on the second set of radio resources if a single downlink component carrier is assigned for the downlink transmission (Para. **36**: **"Alternately, if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier, UE can interpret that the Resource Block assignment bits are signaling a resource block assignment in groups of 4 resource blocks each"**).

Regarding claim 19, Claim 19 corresponds to claim 2 and is analyzed accordingly.

Regarding claim 20, Claim 20 corresponds to claim 3 and is analyzed accordingly.

Regarding claim 21, Claim 21 corresponds to claim 5 and is analyzed accordingly.

Regarding claim 22, Claim 22 corresponds to claim 6 and is analyzed accordingly.

Regarding claim 23, Claim 23 corresponds to claim 7 and is analyzed accordingly.

Regarding claim 24, Claim 24 corresponds to claim 8 and is analyzed accordingly.

Regarding claim 25, Nory teaches user terminal for mobile communications, the user terminal comprising: a receiver to receive downlink transmissions from a base station (**Fig. 1**); a transmitter to transmit control information associated with the downlink transmission to a base station (**Fig. 1**: **remote unit receive and transmit signals to the base unit**); and a controller to select radio resources for transmission of control information associated with the downlink transmissions (**Fig. 3**), the controller configured to: select a first set of radio resources on an uplink primary component carrier if an assignment of a single downlink component carrier for the downlink transmission is received, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier (Para. 36: "**The 'Resource Block assignment' bits signal the resource blocks assigned to the UE for receiving PDSCH transmissions within each component carrier. UE can choose an appropriate mapping function to map the Resource Block assignment bits to a set of resource block indices assigned for PDSCH transmission. The mapping function can be a "type 0" mapping function or a "type 1" mapping function or a "type 2" mapping function as described in 3GPP TS 36.213 section 7.1.6. For example, if the UE is configured to receive PDSCH on a set of two component carriers, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component**

carrier") & (Para. **13-17 & 26**); and select a second set of radio resources on the uplink component carrier if an assignment of multiple downlink component carriers for the downlink transmission is received, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second downlink component carrier and/or multiple component carriers (Para. 36: "**the remaining ten bits can signal the resource block allocation for the second component carrier. Alternately, if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier, UE can interpret that the Resource Block assignment bits are signaling a resource block assignment in groups of 4 resource blocks each. If the UE is configured to receive PDSCH on a set of two component carriers, UE can interpret that the Resource Block assignment bits are signaling resource blocks in groups of 12 resource blocks each. In a different example, the RB assignment bits in PDCCH-2 can be used to signal an offset value to the RB assignment of the anchor carrier (signaled in PDCCH-1) for determining the RB assignment for the component carrier**").

Nory fails to teach that the control information associated with the downlink transmissions to the user terminal on uplink primary component carrier.

In a same field of endeavor, Pan teaches the control information associated with the downlink transmissions to the user terminal on uplink primary component carrier (Para. 41: "…**the WTRU may use the same UL/DL carrier association rule for both UCI and DCI transmission. In order to indicate which UL component carrier that an UL grant is**

intended, the UL component carrier may be associated with a DL component carrier in such way that if an UL grant is transmitted in a DL component carrier x, then the UL grant is intended for an UL component carrier y where a mapping function f( ) that maps a DL component carrier x to UL component carrier y by y=f(x)…") and (Para. 36: "**For asymmetric carrier aggregation in which there are more configured DL carriers than UL component carriers, the WTRU may use UCI grouping in conjunction with single or multiple PUCCH(s) with combined joint coding, multiplexing or bundling techniques, periodic or aperiodic PUSCH, or combinations of PUCCH and PUSCH to transmit the UCI…**") (Also Para. 24, 32, 47, 54,101, 102).

Therefore, it would have been obvious to one of the ordinary skilled in the art to which this invention pertains at the time it was made to use uplink downlink control information transmission process of Pan's disclosure with resource allocation system for multiple component carriers, as taught by Nory. Doing so would have resulted in efficiently using and assigning resource blocks in uplink and downlink transmission system.

Regarding claim 26, Nory teaches transmitting user data on the second set of radio resources if a single downlink component carrier is assigned for the downlink transmission (Para. **36**: **"Alternately, if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier, UE can interpret that the Resource Block assignment bits are signaling a resource block assignment in groups of 4 resource blocks each"**).

Regarding claim 27, Nory teaches the controller is further configured to receive control information from the base station on a downlink component carrier implicitly or explicitly identifying the second set of radio resources on the uplink primary component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier and the remaining ten bits can signal the resource block allocation for the second component carrier…**").

Regarding claim 28, Nory teaches the controller is further configured to receive at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying the second set of radio resources (**Fig. 3**).

Regarding claim 29, Nory teaches one of the first and second sets of radio resources are indicated explicitly by an uplink control channel index (Para. 26: "**…Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted. When a PDSCH is also scheduled to the UE in the same sub-frame as the PDCCH-A, multiple ACK/NACKs (one each for PDCCH-A and the PDSCH) can be transmitted using multiple PUCCH resources…**").

Regarding claim 30, Nory teaches the explicit indication is transmitted as radio resource control signaling (Para. 22: "**In first exemplary implementation, the base station configures UE via radio resource control (RRC) signaling with an anchor carrier. The UE is expected to only monitor PDCCH messages from the anchor carrier after initial access. Before**

assigning resources on non-anchor component carriers via individual PDCCH in each component carrier, base unit sends a configuration message to the UE instructing the UE, the set of component carriers, whose PDCCH messages are also expected to be monitored…").

Regarding claim 31, Nory teaches the controller is further configured to receive, from a base station, an acknowledgement resource indication on a downlink component carrier dynamically assigning said second set of radio resources on the uplink primary component carrier when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers (Para. 25: "**…The PDCCH-A can also include or indicate resources for acknowledging the transmission of the configuration message to increase reliability of signaling of the configuration message. Optionally, the base unit can also instruct the UE to send CQI for the set of component carriers identified in the long term bitmap by signaling a CQI-only uplink grant in the same sub-frame where PDCCH-A is transmitted. The configuration message can also optionally include a time offset limit before which UE should configure its receiver to monitor PDCCH messages from multiple component carriers**") and (Para. **26, 36 & 40**).

Regarding claim 32, Nory teaches the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources (Para. 27: "**In a third exemplary implementation, the base station configures UE via radio resource control (RRC) signaling with an anchor carrier. The UE is expected to only monitor the anchor carrier after initial access. Before assigning resources on component carriers other than the anchor carrier, base unit sends a configuration message to the UE, instructing it, the set of**

component carriers, where PDSCH resource allocations are expected. The configuration message allows the UE to semi-statically configure its receiver to receive PDSCH on the set of component carriers").

Regarding claim 33, Claim 33 corresponds to claim 17 & 9 and is analyzed accordingly.

Regarding claim 34, Claim 34 corresponds to claim 25 and is analyzed accordingly.

Response to Arguments

5. i. Applicant's arguments, with regards to claims have been fully considered but they are not persuasive.

ii. On page 13-14, Applicant arguing that "First, Nory discloses a downlink signaling mechanism while the claimed invention is related to a uplink signaling mechanism. In Nory, the 'Resource Block (RB) assignment' bits are used to signal additional information to the UE. That is, the signal mechanism in Nory is performed on the downlink [see 0035]. Rather, in the claimed invention, the user terminal transmits uplink control information on the uplink primary component carrier (UL-PCC). Nory does not disclose any signal mechanism performed by the user terminal on a first set of radio resources and on a second set of radio resources on the uplink. Pan does not solve the deficiency".

Examiner respectfully disagrees with the applicant arguments. First of all, the claimed invention is related to an uplink signaling mechanism which is not true. Claim 1 state

"**scheduling downlink transmissions to said user terminal on one or more downlink component carriers**" (Line 3). Therefore, claim is related to scheduling downlink transmission.

Next, Nory's invention related to radio resource allocation system for the downlink and uplink communication (Para. 27: "**where PDSCH resource allocations are expected. The configuration message allows the UE to semi-statically configure its receiver to receive PDSCH on the set of component carriers. The configuration message can be signaled to the UE via RRC signaling. Alternatively, the configuration message can be embedded within an activation PDCCH message (PDCCH-A) and signaled to the UE**" and Para. 32: "**TABLE-US-00001 TABLE 1 Contents of PDCCH-1 message with DCI Format 1 Field identifier Number of bits Resource allocation header 1 Resource Block assignment 25 MCS 5 HARQ process number 3 New Data Indicator 1 RV 2 TPC command for PUCCH 2 CRC (scrambled with Rel-8 C-RNTI) 16 Total 55**").

Secondary reference, Pan also related to resource allocation on downlink and uplink communication system (Para. 102: "**Referring to FIG. 13, there is shown an example flowchart 600 for transmitting UCI from a WTRU to a base station. The WTRU receives configuration information regarding DL component carriers and an UL primary component carrier (605). The WTRU may also receive feedback mode information from the base station (610). Alternatively, the feedback mode information may be part of the configuration information (615). The WTRU uses the configuration information to associate the DL component carriers with a control channel or channel carrying UCI (620). The UCI corresponding to the associated DL component carriers-UL component carriers may then be jointly coded…**") and (Fig. 1: WTRU-110 is the user equipment).

iii. On page 14, applicant also arguing that "Second, in Nory, the base station transmits control messages on both the two sets of resources on the anchor carrier [see Fig. 3] while in the claimed invention, the user terminal transmits control information on either the first set of resources or the second set of resources on the uplink".

Examiner disagrees with the applicant arguments. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e. **either the first set of resources or the second set of resources on the uplink**) are not recited in the rejected claim. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

iv. In this case, the references are selected as being reasonably pertinent to the problem based on the judgment of a person having ordinary skill in the art. It is necessary to consider the reality of the circumstances, in other words, common sense in deciding in which fields a person of ordinary skill would reasonably be expected to look for a solution to the problem facing the inventor. In re Wood, 599 F.2d 1032, 1036, (C.C.P.A. 1979).

v. The Examiner has pointed out particular references contained in the prior art of record within the body of this action for the convenience of the Applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages, paragraph and figures may apply. Applicant, in preparing the response, should consider fully the entire reference as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MD TALUKDER whose telephone number is (571)270-3222. The examiner can normally be reached on Monday to Friday (Alt Friday off) from (9:30 to 4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ghebretinsae Temesghen can be reached on 5712723017. 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.

/MD TALUKDER/
Examiner, Art Unit 2648

/TEMESGHEN GHEBRETINSAE/

Supervisory Patent Examiner, Art Unit 2648

5/1/14B

Notice of References Cited	Application/Control No. 12/896,993	Applicant(s)/Patent Under Reexamination ASTELY ET AL.	
	Examiner MD TALUKDER	Art Unit 2648	Page 1 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2010/0003997 A1	01-2010	KOYANAGI, Kenichiro	455/450
*	B	US-2010/0098012 A1	04-2010	Bala et al.	370/329
*	C	US-2010/0208679 A1	08-2010	Papasakellariou et al.	370/329
*	D	US-2010/0232373 A1	09-2010	Nory et al.	370/329
*	E	US-2010/0271970 A1	10-2010	Pan et al.	370/252
*	F	US-2010/0296389 A1	11-2010	Khandekar et al.	370/216
*	G	US-2010/0285809 A1	11-2010	Lindstrom et al.	455/450
*	H	US-2010/0322173 A1	12-2010	Marinier et al.	370/329
*	I	US-2011/0007695 A1	01-2011	Choi et al.	370/329
*	J	US-2011/0007699 A1	01-2011	Moon et al.	370/329
*	K	US-2011/0081932 A1	04-2011	Astely et al.	455/509
*	L	US-2011/0081913 A1	04-2011	Lee et al.	455/450
*	M	US-2011/0243039 A1	10-2011	PAPASAKELLARIOU et al.	370/280

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
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	R					
	S					
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
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	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.

Notice of References Cited	Application/Control No. 12/896,993	Applicant(s)/Patent Under Reexamination ASTELY ET AL.	
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U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2011/0310856 A1	12-2011	Hariharan et al.	370/336
*	B	US-2012/0020317 A1	01-2012	Ishii et al.	370/329
*	C	US-2012/0051306 A1	03-2012	Chung et al.	370/329
*	D	US-2012/0082125 A1	04-2012	Huang, Yada	370/329
*	E	US-2012/0140708 A1	06-2012	Choudhury et al.	370/328
*	F	US-8,265,030 B2	09-2012	Miki et al.	370/330
*	G	US-2012/0314675 A1	12-2012	Vujcic, Dragan	370/329
*	H	US-2013/0003700 A1	01-2013	Zhang et al.	370/331
*	I	US-2013/0010721 A1	01-2013	Aiba et al.	370/329
*	J	US-2013/0034073 A1	02-2013	Aiba et al.	370/329
*	K	US-8,447,343 B2	05-2013	Gerstenberger et al.	455/522
*	L	US-2013/0136084 A1	05-2013	ZHANG et al.	370/329
*	M	US-8,472,368 B2	06-2013	Baldemair et al.	370/318

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-8,634,358 B2	01-2014	Damnjanovic et al.	370/329
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12896993	ASTELY ET AL.
	Examiner	Art Unit
	MD TALUKDER	2648

✓	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	12/13/2012	06/27/2013	04/30/2014						
	1	✓	✓	✓						
	2	✓	✓	✓						
	3	✓	✓	✓						
	4	✓	✓	✓						
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	33	✓	✓	✓						
	34	✓	✓	✓						

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	allocation with (PUSCH PUCCH UL (up$1link)) and "20100232373"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 14:19
L2	1	allocation and (PUSCH PUCCH UL (up$1link)) and "20100232373"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 14:21
L3	2	"20100271970"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 14:32
S1	1	"12896993"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 17:09
S2	367	((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:04
S3	176	S2 and (radio near3 resource)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:09
S4	28	S2 and (radio near3 resource) and (component with carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:09
S5	173	(downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:04
S6	137	S5 and (scheduling)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:04
S7	36	("20120263121" | "20110310856" | "20120127950" | "20110310819 " | "20120275395" | "20120287828" | "20120039291" | "20100271970" | "20120307781" | "20110286436" |	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:15

		"20120224535" | "20120140708" | "20110310820" | "20120163288" | "20110299486" | "20100098012" | "20120082125 " | "20120294273" | "20110268048" | "20120113910").pn.				
S8	127	(downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (carrier adj aggregation)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 10:16
S9	2	"20110292887"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:17
S11	25	((first 1st) adj6 component adj3 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:22
S12	1718	((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:47
S13	66	(carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:47
S14	10842	455/509,522,456.6,137,103,575.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:41
S15	28232	370/329,252,331.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:41
S16	102	(S14 S15) and (downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:42
S17	1	"13140333"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:18
S18	2	"20110310856"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:18
S19	38	((first 1st) adj6 component adj3 carrier) same ((radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:31

S20	38	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:31
S21	27	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj4 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:32
S22	38	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:32
S23	24	(carrier adj aggregation) and (schedul$3 near3 (downlink DL) with ((first primary initial) near6 (resource radio frequency frame)))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:48
S24	8	("7551898" | "7649960" | "7656843" | "7773699").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:14
S25	2	"20110292900"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:36
S26	2	"20100271970"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:37
S27	3	"8050202"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:38
S28	1	"20120307689"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:45
S29	2	"8160017"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:48
S30	2	"20100232373"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:48
S31	2	"20090016278"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 17:16

S32	2	"8265030"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 17:19
S33	3	"2008139923"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 18:17
S34	14	("20100098012" | "20100232373" | "20110310856" | "20120020317" | "20120082125" | "20120140708" | "8265030").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/29 17:19
S35	7	"455"/$.ccls. and (carrier adj aggregation) and (schedul$3 near3 (downlink DL) with ((first primary initial) near6 (resource radio frequency frame)))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/29 17:22
S36	9	"455"/$.ccls. and (((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/29 21:37
S37	57	((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/30 12:21
S38	4	("20070053294" | "20100290405").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/30 12:42
S39	16	("7596114" | "20050013279" | "20030219028" | "20070217406" | "20020105970" | "20060050664" | "20090303938" | "20070064669").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/30 12:42
S40	290	(first 1st) with (component near2 carrier) with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 10:07
S41	114	(first 1st) with (component near2 carrier) with down$1link and receiv$3 near3 control near3 information	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 10:09
S42	47	(first 1st) near3 (radio adj resource) and (second other another 2nd) near3 (radio adj resource) and component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:29
S43	26	S42 and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT;	OR	ON	2013/06/17 12:31

			IBM_TDB			
S44	5	(first 1st) near3 (radio adj resource) and (second other another 2nd) near3 (radio adj resource) same (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:46
S45	26	(first 1st) near3 (radio adj resource) and (second other another 2nd) near3 (radio adj resource) and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:47
S46	31	(second other another 2nd) near3 (radio adj resource) and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:49
S47	0	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:51
S48	0	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:52
S49	1	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component) and ((down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:53
S50	1	@ad<"20091005" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component) and ((down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:55
S51	1	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:56
S52	20	(second other another 2nd) near3 (radio adj resource) and (carrier adj component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 13:31
S53	16	(set near3 radio near3 resource) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:14
S54	27	(set near3 ((radio near3 resource) (resource adj block))) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:19
S55	755	(((radio near3 resource) (resource adj block))) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT;	OR	ON	2013/06/17 14:25

			IBM_TDB			
S56	70	((second 2nd other) with ((radio near3 resource) (resource adj block))) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:26
S57	327	(((radio near3 resource) (resource adj block))) same component adj carrier and (schedul$3 near3 downlink reverse)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:27
S58	29	((second 2nd other) with ((radio near3 resource) (resource adj block))) same component adj carrier and (schedul$3 near3 down$1link reverse$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:27
S59	24	((second 2nd other) with ((radio near3 resource) (resource adj block))) same (component adj carrier) same (down$1link reverse$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:31
S60	10	("20090097447" | "20110081856" | "20090116427" | "20100232373" | "8331307").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:49
S61	2562	(schedul$3 near3 downlink) and ((radio adj resource) (resource adj block)) and component	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:16
S62	739	(schedul$3 near3 downlink) and ((radio adj resource) (resource adj block)) and component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:17
S63	259	(schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) and component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:17
S64	39	(schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (component adj carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:18
S65	1	@ad<"20091005" and (schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (component adj carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:18
S66	1	@ad<"20091005" and (schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:20
S67	47	(schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT;	OR	ON	2013/06/17 15:20

			IBM_TDB			
S68	356	"455"/$.ccls. and ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 17:10
S70	19	"455"/$.ccls. and (carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 17:17
S71	0	("2013/0107855").URPN.	USPAT	OR	ON	2013/06/18 09:15
S72	0	("2013/0107855").URPN.	US-PGPUB; USPAT	OR	ON	2013/06/18 09:16
S73	408	set near3 (radio frequency) near2 (resource band) same downlink and component	US-PGPUB; USPAT	OR	ON	2013/06/18 09:18
S74	17	set near3 (radio frequency) near2 (resource band) same downlink same (component adj carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 09:19
S75	19	(set group Cluster) near3 (radio frequency) near2 (resource band) same downlink same (component adj carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 09:21
S76	12	("8457060" | "20110310819" | "20100271970" | "20130034073" | "20100098012" | "20110310856" | "20110317653" | "20130083742" | "20130083741" | "20120114021" | "20120275395" | "20110317645" | "20110310856").pn.	US-PGPUB; USPAT	OR	ON	2013/06/18 09:31
S77	200	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource)	US-PGPUB; USPAT	OR	ON	2013/06/18 10:37
S78	2911	(UL up$link) with (set group) near6 (radio resource)	US-PGPUB; USPAT	OR	ON	2013/06/18 10:38
S79	110	S77 and S78	US-PGPUB; USPAT	OR	ON	2013/06/18 10:38
S80	3	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (set group) near6 (radio resource) with (2nd second other another) near2 component	US-PGPUB; USPAT	OR	ON	2013/06/18 10:47
S81	28	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 11:17
S82	5	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (second 2nd) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 11:20
S83	4	(1st first first primary initia) near3 (set group) near6 (radio resource) with (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 13:50

S84	3	(set group) near6 (radio resource) with (2nd second other another) near6 (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 13:52
S85	42	(set group) near6 (radio resource) with (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 13:58
S86	30	(set group) near3 ((radio resource)(resource near2 block)) with (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 14:07
S87	2	(second 2nd) near3 (down$1link DL) with ((component near3 carrier) CC) same (set group) with ((radio near2 resource) (resource near2 block))	US-PGPUB; USPAT	OR	ON	2013/06/18 14:14
S88	21	reserv$3 with component near3 carrier and (second near2 (radio frequency band))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/25 15:31
S89	36	"739528"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 09:34
S90	30	"5754138"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 09:35
S91	2046	(carrier near3 aggregation) and up$1link with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 10:24
S92	1052	(carrier near3 aggregation) and (component near3 carrier) same up$1link with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 10:26
S93	110	(carrier near3 aggregation) and (component near3 carrier) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 10:27
S95	17	("370"/$.ccls "455"/$.ccls.) and (aggregation) and (CC (component near3 carrier)) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 15:22
S96	67	370/329,341,348,395.4.ccls. and (carrier near3 aggregation) and (component near3 carrier) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 15:26
S97	345368	schedule (DL (down adj link) down$1link) and (carrier near3 aggregation) and ((UL up$link) adj6 associat$4 near4 (DL down$link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 16:45

S98	9	schedule near3 (DL (down adj link) down$1link) and (carrier near3 aggregation) same((UL up$link) adj6 associat$4 near4 (DL down$link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 16:46
S99	35	(schedule allocat$4) near3 (DL (down adj link) down$1link) and (carrier near3 aggregation) same((UL up$link) adj6 associat$4 near4 (DL down$link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 16:48
S100	0	(1st first) near3 (radio band resource frequency) with (1st first) near3 (CCcomponent adj carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 17:14
S101	216	(1st first) near3 (radio band resource frequency) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 17:14
S102	43	(1st first) near3 (radio band resource frequency) with (reserv$3 schedul$3 allocat$3) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 17:15
S103	22	("20100142455" | "20120009923" | "20100254329" | "20100091678" | "20110194501" | "20130010619" | "20080310359" | "20060274712" | "20100227569" | "20120208583" | "20110267978").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/27 09:57
S104	10	("20100254329" | "20100195624" | "20100023282" | "20090274100" | "20080316957").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/27 10:15
S105	50	("20100322173" | "20110081913" | "20130010721" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:25
S106	13348	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:40
S107	4330	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR;	OR	ON	2014/04/22 13:42

			DERWENT; IBM_TDB			
S108	4200	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:43
S109	3823	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:44
S110	6130	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:44
S111	370	(S106 S107 S108 S109 S110) and (schedul$4 near3 down$1link) and (component near3 carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:45
S112	365	(S106 S107 S108 S109 S110) and (schedul$4 near3 down$1link) and (component near3 carrier) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:46
S113	357	(S106 S107 S108 S109 S110) and (schedul$4 near3 down$1link) and (component near carrier) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:47
S114	13	(S106 S107 S108 S109 S110) and (DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (component near3 carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:47
S115	40	(H03F3/211, H04B7/0617, H04B7/0669, H04B1/3833, H04M1/0247, H04M1/0237, H04L29/08657, G01S5/0252, G01S5/02, H04W52/367, H04W52/12, H04W52/40, H04W88/08, H04W72/044, H04W72/042).cpc. and (carrier near3 aggregation) and (component near3 carrier) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 14:17
S116	8750	(H04W88/08, H04W72/044, H04W72/042l).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:21
S117	4336	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:22
S118	4205	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT;	OR	ON	2014/04/26 14:23

			USOCR; DERWENT; IBM_TDB			
S119	4144	(H04L29/08657, G01S19/14, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:23
S120	3826	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:24
S121	47	(H04W88/08, H04W72/044, H04W72/042).cpc. and (1st first) near3 (radio band resource frequency) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:27
S122	25	(S116 S117 S118 S119 S120).cpc. and (1st first) near3 (radio band resource frequency) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 15:35
S123	13432	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S124	4341	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S125	4208	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S126	3833	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S127	6154	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S128	98	(S123 S124 S125 S126 S127) and (schedul$4 near3 down$1link) and (component near3 carrier) and single with carrier same (plurality multiple several) with (DL down$1link) with carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S129	52	(S123 S124 S125 S126 S127) and (schedul$4 near3 down$1link) and (component near3 carrier) and single near6 carrier same (plurality multiple several) near3 (DL down$1link) with carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04

S130	4	(S123 S124 S125 S126 S127) and (schedul$4) with component near3 carrier and (single near3 (DL down$1link)) with (first with resource) and (multiple plurality several) near3 (DL downlink) with second with resource	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:37
S131	2	(up$1link UL) and (schedul$4) with component near3 carrier same (single near3 (DL down$1link)) with (first with resource) same (multiple plurality several) near3 (DL downlink) with second with resource	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:40
S132	2	(schedul$4) with component near3 carrier same (single near3 (DL down$1link)) with (first with resource) same (multiple plurality several) near3 (DL downlink) with second with resource	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:42
S133	2	(schedul$4) same (single near3 (DL down$1link)) with (first with resource) same (multiple plurality several) near3 (DL downlink) with second with resource	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:44
S134	2	(schedul$4) same (single near3 (DL down$1link)) with (first with (frequency resource block)) same (multiple plurality several) near3 (DL downlink) with second with (frequency block resource)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:45
S135	16	(single near3 (DL down$1link)) with (first with (frequency resource block)) same (multiple plurality several) near3 (DL downlink) with second with (frequency block resource)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:45

EAST Search History (Interference)

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4/30/2014 2:59:21 PM
C:\Users\mtalukder\Documents\EAST\Workspaces\12896993.wsp

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12896993	ASTELY ET AL.
	Examiner	Art Unit
	MD TALUKDER	2648

CPC- SEARCHED		
Symbol	Date	Examiner
H04W88/08, H04W72/044, H04W72/042	4/22/2014 & 4/30/2014	
H04W52/367, H04W52/12, H04W52/40	4/22/2014 & 4/30/2014	Talukder
H04L29/08657, G01S5/0252, G01S5/02	4/22/2014 & 4/30/2014	Talukder
H04B1/3833, H04M1/0247, H04M1/0237	4/22/2014 & 4/30/2014	Talukder
H03F3/211, H04B7/0617, H04B7/0669	4/22/2014 & 4/30/2014	

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
455	509,522,456.6,137,103,575	12/11/2012	Talukder
370	329,252,331	12/11/2012	Talukder
455	Text	6/17/2013	
370	329,341,348,395.4	6/26/2013	

SEARCH NOTES		
Search Notes	Date	Examiner
East Search	12/10/2012	talukder
East Search	12/11/2012	talukder
East Search	6/17/2013	talukder
East Search	6/18/2013	talukder
East Search	6/26/2013	talukder
East Search	6/27/2013	

SEARCH NOTES		
Search Notes	**Date**	**Examiner**
East Search	4/22/2014 & 4/30/2014	

INTERFERENCE SEARCH			
US Class/ CPC Symbol	**US Subclass / CPC Group**	**Date**	**Examiner**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: ASTELY, David *et al.*		
Serial No.: 12/896,993		Examiner: TALUKDER, MD K.
Filed: October 4, 2010		Group Art Unit: 2648
For: PUCCH RESOURCE ALLOCATION FOR CARRIER AGGREGATION FOR LTE-ADVANCED		Confirmation No.: 1015
Docket No: 4015-6942		

RESPONSE AND AMENDMENT TO NON-FINAL OFFICE ACTION

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Honorable Sir:

In response to the May 5, 2014 Non-Final Office Action from Examiner M.D. K. Talukder of Art Unit 2648, Applicants timely submit this Response and Amendment to Non-Final Office Action ("*Response*"). In view of this *Response*, Applicants believe that all pending claims are in condition for allowance and issuance.

Amendments to the Claims are reflected in the listing, which begins on page 2 of this paper.

Remarks/Arguments begin on page 11 of this paper.

AMENDMENTS TO THE CLAIMS

This listing of the claims replaces all prior versions and listings of claims in the Application:

1. (Currently amended) A method implemented by a base station of receiving control information from a user terminal, the method comprising:

scheduling downlink transmissions to said user terminal on one or more downlink component carriers;

if the user terminal is scheduled to receive downlink transmissions on a ~~first~~ single downlink component carrier associated with **a primary cell**~~an uplink primary component carrier~~, receiving control information associated with the downlink transmissions to the user terminal on a first set of radio resources on **an**~~the~~ uplink ~~primary~~ component carrier associated with **the primary cell**~~said first downlink component carrier~~, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the ~~first~~ **single** downlink component carrier **associated with the primary cell**; and

if the user terminal is scheduled to receive downlink transmissions on ~~a second single downlink component carrier or~~ multiple downlink component carriers **including the single downlink component carrier associated with the primary cell**, receiving control information associated with the downlink transmissions to the user terminal on a second set of radio resources on the uplink ~~primary~~ component carrier **associated with the primary cell**, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the ~~second downlink component carrier and/or~~ multiple **downlink** component carriers **and the second set of resources are additional resources as compared to the first set of resources**.

2. (Currently amended) The method of claim 1 further comprising transmitting control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink ~~primary~~ component carrier **associated with the primary cell**.

3. (Currently amended) The method of claim 2 further comprising transmitting control information to the user terminal on a downlink component carrier to implicitly or explicitly

indicate the second set radio resources on the uplink ~~primary~~ component carrier **associated with the primary cell**.

4. (Original) The method of claim 3 wherein at least one of the first and second sets of radio resources are indicated implicitly by at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier.

5. (Original) The method of claim 3 wherein at least one of the first and second sets of radio resources are indicated explicitly by an uplink control channel index.

6. (Original) The method of claim 5 wherein the explicit indication is transmitted as radio resource control signaling.

7. (Currently amended) The method of claim 1 further comprising transmitting an acknowledgement resource indication on **the single**[[a]] downlink component carrier **associated with the primary cell** to dynamically assign said second set of radio resources on the uplink ~~primary~~ component carrier **associated with the primary cell** to the user terminal when the user terminal is scheduled to receive downlink transmissions on the ~~second single downlink component carrier or~~ multiple downlink component carriers.

8. (Original) The method of claim 7 wherein the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources.

9. (Currently amended) A base station comprising:

a transmitter to transmit user data on one or more downlink component carriers to a user terminal; and

a controller to schedule downlink transmissions to said user terminal, the downlink controller configured to**:**

schedule downlink transmissions to a user terminal on one or more downlink component carriers;

if the user terminal is scheduled to receive downlink transmissions on a ~~first~~ single downlink component carrier associated with **a primary cell**~~an uplink primary component carrier~~, receive control information associated with the downlink transmissions to the user terminal on a first set of radio resources on **an**~~the~~ uplink ~~primary~~ component carrier associated with **the primary cell**~~said first downlink component carrier~~, wherein the first set of

radio resources is reserved for user terminals scheduled to receive downlink transmissions on the ~~first~~ **single**downlink component carrier **associated with the primary cell**; and

if the user terminal is scheduled to receive downlink transmissions on ~~a second single downlink component carrier or~~ multiple downlink component carriers **including the single downlink component carrier associated with the primary cell**, receive control information associated with the downlink transmissions to the user terminal on a second set of radio resources on the uplink ~~primary~~ component carrier **associated with the primary cell**, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the ~~second downlink component carrier and/or~~ multiple **downlink** component carriers **and the second set of resources are additional resources as compared to the first set of resources**.

10. (Currently amended) The base station of claim 9 wherein the controller is further configured to transmit control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink ~~primary~~ component carrier **associated with the primary cell**.

11. (Currently amended) The base station of claim 10 wherein the controller is further configured to transmit control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the second set of radio resources on the uplink ~~primary~~ component carrier **associated with the primary cell**.

12. (Original) The base station of claim 11 wherein the controller is further configured to indicate at least one of the first and second sets of radio resources implicitly by sending at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier.

13. (Original) The base station of claim 11 wherein the controller is further configured to indicate at least one of the first and second sets of radio resources explicitly by sending an uplink control channel index.

14. (Original) The base station of claim 13 wherein the controller is further configured to send the explicit indication as radio resource control signaling.

15. (Currently amended) The base station of claim 9 wherein the controller is further configured to transmit an acknowledgement resource indication on a downlink component carrier to dynamically assign said second set of radio resources on the uplink ~~primary~~ component carrier **associated with the primary cell** to the user terminal when the user terminal is scheduled to receive downlink transmissions on the ~~second single downlink component carrier or~~ multiple downlink component carriers.

16. (Original) The base station of claim 15 wherein the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources.

17. (Currently amended) A method implemented by a user terminal of transmitting control information in a mobile communication network, the method comprising:

receiving an assignment of radio resources for downlink transmissions from a base station;

transmitting**, on a first set of radio resources on an uplink component carrier associated with a primary cell,** control information associated with the downlink transmissions ~~on a first set of radio resources on an uplink primary component carrier~~ if an assignment of a single downlink component carrier associated with the **primary cell**~~uplink primary component carrier~~ is received for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the **single**~~first~~ downlink component carrier **associated with the primary cell**; and

transmitting**, on a second set of radio resources on the uplink component carrier associated with the primary cell,** control information associated with the downlink transmissions ~~on a second set of radio resources on the uplink component carrier~~ if an assignment of multiple downlink component carriers **including the single downlink component carrier associated with the primary cell** for the downlink transmission is received, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the ~~second downlink component carrier and/or~~ multiple **downlink** component carriers **and the second set of resources are additional resources as compared to the first set of resources**.

18. (Currently amended) The method of claim 17 further comprising transmitting user data on the second set of radio resources if a single downlink component carrier **associated with a non-primary cell** is assigned for the downlink transmission.

19. (Currently amended) The method of claim 17 further comprising receiving control information from the base station on a downlink component carrier implicitly or explicitly indicating the second set of radio resources on the uplink ~~primary~~ component carrier **associated with the primary cell**.

20. (Currently amended) The method of claim 19 wherein receiving control information comprises receiving **at least** one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying said second set of resources.

21. (Original) The method of claim 19 wherein receiving control information comprises receiving an uplink control channel index explicitly identifying said second set of resources.

22. (Original) The method of claim 21 wherein the explicit indication is received as radio resource control signaling.

23. (Currently amended) The method of claim 17**,** further comprising receiving, from a base station, an acknowledgement resource indication on **the single[[a]]** downlink component carrier **associated with the primary cell to** dynamically assign**[[ing]]** said second set of radio resources on the uplink ~~primary~~ component carrier **associated with the primary cell** when the user terminal is scheduled to receive downlink transmissions on the ~~second single downlink component carrier or~~ multiple downlink component carriers.

24. (Original) The method of claim 23 further comprising selecting the second set of resources from a semi-static set of uplink resources responsive to the acknowledgement resource indication.

25. (Currently amended) A user terminal for mobile communications, the user terminal comprising:

a receiver to receive downlink transmissions from a base station;

a transmitter to transmit control information associated with the downlink transmission to a base station; and

a controller to select radio resources for transmission of control information associated with the downlink transmissions, the controller configured to:

select a first set of radio resources on an uplink ~~primary~~ component carrier **associated with a primary cell** if an assignment of a single downlink component carrier associated with the **primary cell**~~uplink primary component carrier~~ is received for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the **single**~~first~~ downlink component carrier **associated with the primary cell**; and

select a second set of radio resources on the uplink component carrier **associated with the primary cell** if an assignment of multiple downlink component carriers **including the single downlink component carrier associated with the primary cell** for the downlink transmission is received, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the ~~second downlink component carrier and/or~~ multiple **downlink** component carriers **and the second set of resources are additional resources as compared to the first set of resources**.

26. (Currently amended) The user terminal of claim 25 configured to transmit user data on the second set of radio resources if a single downlink component carrier **associated with a non-primary cell** is assigned for the downlink transmission.

27. (Currently amended) The user terminal of claim 25 wherein the controller is further configured to receive control information from the base station on a downlink component carrier implicitly or explicitly identifying the second set of radio resources on the uplink ~~primary~~ component carrier **associated with the primary cell**.

28. (Original) The user terminal of claim 27 wherein the controller is further configured to receive at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying the second set of radio resources.

29. (Currently amended) The user terminal of claim 27 wherein the controller is further configured to receive an uplink control channel index explicitly identifying the second set of radio resources on the uplink ~~primary~~ component carrier **associated with the primary cell**.

30. (Original) The user terminal of claim 29 wherein the controller is further configured to receive the explicit indication as radio resource control signaling.

31. (Currently amended) The user terminal of claim 25 wherein the controller is further configured to receive, from a base station, an acknowledgement resource indication on a downlink component carrier dynamically assigning said second set of radio resources on the uplink ~~primary~~ component carrier **associated with the primary cell** when the user terminal is scheduled to receive downlink transmissions on the ~~second single downlink component carrier or~~ multiple downlink component carriers.

32. (Original) The user terminal of claim 31 wherein the controller is configured to select the second set of resources from a semi-static set of uplink resources responsive to the acknowledgement resource indication.

33. (Currently amended) A method implemented by a user terminal in a mobile communication network, the method comprising:

receiving an assignment of radio resources for a downlink transmissions from a base station;

transmitting control information associated with the downlink transmission on a first set of radio resources on an uplink ~~primary~~ component carrier **associated with a primary cell** if an assignment of a first downlink component carrier associated with the **primary cell**~~uplink primary component carrier~~ is received for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier **associated with the primary cell**; and

transmitting control information associated with the downlink transmission on a second set of radio resources on the uplink component carrier **associated with the primary cell** if an assignment of **the first downlink component carrier associated with the primary cell and** a second **single** downlink component carrier **associated with a non-primary cell** for the downlink transmission is received, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on **the first downlink component carrier and** the second **single** downlink component carrier ~~and/or multiple component carriers~~ **and the second set of resources are additional resources as compared to the first set of resources**.

34. (Currently amended) A user terminal for mobile communications, the user terminal comprising:

a receiver to receive downlink transmissions from a base station;

a transmitter to transmit control information associated with the downlink transmission to a base station; and

a controller to select radio resources for transmission of control information associated with downlink transmission**s**, the controller configured to:

select a first set of radio resources on an uplink ~~**primary**~~ component carrier **associated with a primary cell** if an assignment of a first downlink component carrier associated with the **primary cell**~~**uplink primary component carrier**~~ is received for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier **associated with the primary cell**; and

select a second set of radio resources on the uplink component carrier **associated with the primary cell** if an assignment of **the first downlink component carrier associated with the primary cell and** a second **single** downlink component carrier **associated with a non-primary cell** for the downlink transmission is received, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on **the first downlink component carrier and** the second **single** downlink component carrier ~~**and/or multiple component carriers**~~ **and the second set of resources are additional resources as compared to the first set of resources**.

35. (New) The method of claim 1, further comprising:

receiving user data on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

36. (New) The method of claim 1, further comprising:

receiving control signaling on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

37. (New) The base station of claim 9, further configured to:

receive user data on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

38. (New) The base station of claim 9, further configured to:

receive control signaling on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

39. (New) The method of claim 17, further comprising:

transmitting control signaling on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

40. (New) The user terminal of claim 25, further configured to:

transmit control signaling on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

41. (New) The method of claim 1, further comprising:

if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier associated with a non-primary cell, receiving control information associated with the downlink transmissions to the user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second single downlink component carrier.

42. (New) The base station of claim 9, further configured to:

if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier associated with a non-primary cell, receive control information associated with the downlink transmissions to the user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second single downlink component carrier.

REMARKS/ARGUMENTS

THE CURRENT REJECTION

In the Non-Final Office Action mailed May 5, 2014, Claims 1-34 have received a non-final rejection. Claims 1-34 have received an obviousness rejection as being unpatentable over U.S. Pat. App. Pub. No. 2010/0232373 by Nory *et al.* ("*Nory*") in view of U.S. Pat. App. Pub. No. 2010/0271970 by Pan *et al.* ("*Pan*").

After entry of this *Response*, Claims 1-42 are pending. Claims 1-3, 7, 9-11, 15, 17-20, 23, 25-27, 28, 31 and 33-34 are amended. Claims 35-42 are newly added. No new matter is introduced by the present *Response*. Applicants respectfully assert that the pending claims are in condition for allowance and respectfully request reconsideration of the claims in light of the following remarks.

THE EXAMINER INTERVIEW

Pursuant to the provisions of 37 C.F.R. § 1.133(b), Applicants wish to make of record the substance of the interview between Applicants' undersigned representative, Edward M. Roney of Coats & Bennett PLLC, and Examiner M.D. Talukder conducted telephonically on August 27, 2014. In the interview, the attendees discussed distinctions of the present disclosure over the cited prior art but no agreement was reached.

THE OBVIOUSNESS REJECTIONS

Claims 1-34 are rejected as being unpatentable over *Nory* in view of *Pan*. For at least the reasons set forth in this *Response*, Applicants respectfully submit that *Nory* and *Pan* fail to teach one or more of the claim elements of amended Claims 1-34. Applicants have amended Claim 1 to include "if the user terminal is scheduled to receive downlink transmissions on a single downlink component carrier associated with a primary cell, receiving control information associated with the downlink transmissions to the user terminal on a first set of radio resources on an uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell," as described in the listing of claims. Further, Applicants have amended Claim 1 to include "if the user terminal is scheduled to receive downlink transmissions on multiple downlink component carriers including

the single downlink component carrier associated with the primary cell, receiving control information associated with the downlink transmissions to the user terminal on a second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources," as described in the listing of claims (emphasis added).

Applicants submit that amended Claim 1 is allowable at least because *Nory* and *Pan* fail to teach the method of amended Claim 1. Instead, *Nory* teaches that "if the UE is configured to receive PDSCH on a set of two component carriers, a first set of [bits] in the RB assignment field can signal the resource block allocation for the first component carrier and the remaining [bits] can signal the resource block allocation for the second component carrier." *Nory*, para. [0036], lns. 9-14. *Nory* fails to teach, among other things, using "a first set of radio resources on an uplink component carrier associated with the primary cell," "a second set of radio resources on the uplink component carrier associated with the primary cell," and "the second set of resources are additional resources as compared to the first set of resources." Thus, *Nory* fails to teach amended Claim 1.

Pan also fails to teach amended Claim 1. *Pan* teaches that "[f]or asymmetric carrier aggregation in which there are more configured DL carriers than UL component carriers, the WTRU may use UCI grouping in conjunction with single or multiple PUCCH(s) . . . to transmit the UCI." *Pan*, para. [0036], lns. 1-7. Further, *Pan* teaches that "the WTRU may use a two step procedure to send the UCI" consisting of "[f]irst, the WTRU associates UL component carriers with DL component carriers and creates UCI groups with different types for UCI transmission . . . " and "[s]econd, the WTRU uses periodic PUCCH for type 1 UCI groups and uses periodic PUSCH, PUCCH or combinations of PUCCH/PUSCH for transmitting UCIs corresponding to multiple DL carriers for type 2 UCI groups." *Pan*, para. [0036], lns. 8-14 and FIGS. 4, 5, 6, 7 and 10 (below). *Pan* fails to teach, among other things, using the same "uplink component carrier" for both "a single downlink component carrier" and "multiple downlink component carriers." Thus, *Pan* also fails to teach amended Claim 1.

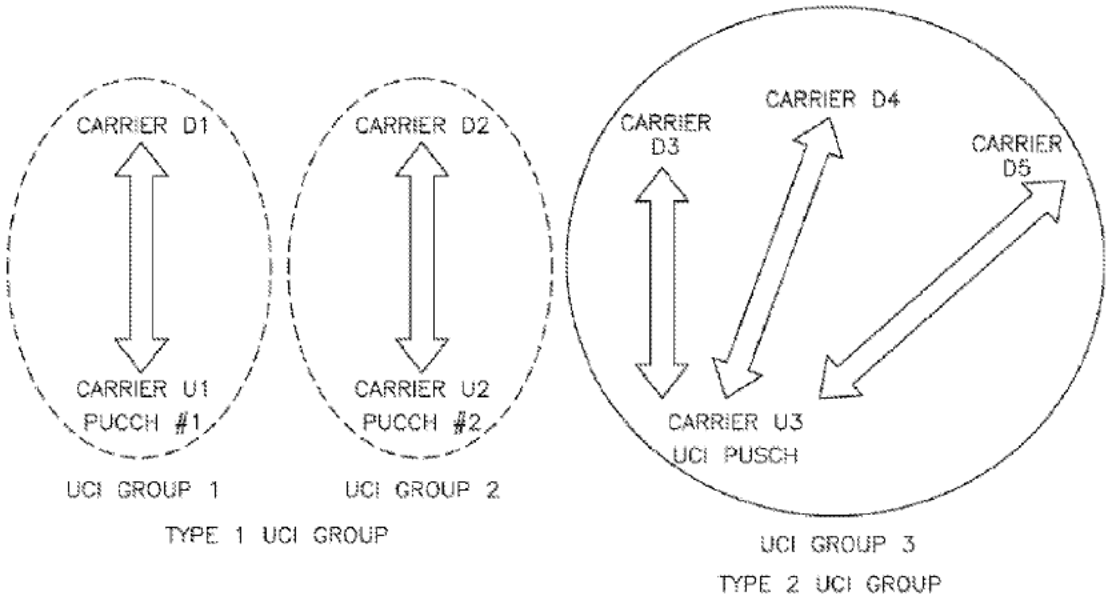


FIG. 10

Therefore, for at least the reasons given in this *Response*, Applicants submit that Claims 1-34 are allowable over *Nory* in view of *Pan* and respectfully request that the rejection of Claims 1-34 be withdrawn.

THE FEES

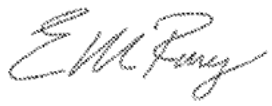
This *Response* is being filed within four months of the May 5, 2014 Non-Final Office Action. Thus, a one month extension of time fee is believed due with this submission. Claim fees for eight (8) additional dependent claims are believed due, as the total claim count has increased from thirty-four (34) claims to forty-two (42) claims. The number of independent claims remain covered under the original filing fee. Applicants authorize the Commissioner to charge deposit account No. 18-1167 for any fees deemed due.

CONCLUSION

In view of the distinctions herein between the subject matter of the present claims and the teachings of the cited references, Applicants respectfully request reconsideration and allowance of the present application. By the present *Response*, the application has been placed in full condition for allowance. Accordingly, Applicants respectfully request early and favorable action. Should the Examiner disagree or have any questions or issues regarding this submission, Applicants respectfully request that the Examiner telephone the undersigned at (919) 719-4870.

Favorable consideration is respectfully and earnestly solicited.

Respectfully submitted,



Edward M. Roney
Registration No. 62,048

Dated: September 5, 2014

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Certificate of E-Filing/Transmission under 37 CFR § 1.8:

In accordance with 37 CFR § 1.8, I certify that this correspondence is being deposited and electronically filed with the USPTO via the USPTO's EFS-Web Electronic Filing System.

Dated: September 5, 2014

/Edward M. Roney/
Edward M. Roney
Registration No. 62,048

Electronic Patent Application Fee Transmittal

Application Number:	12896993
Filing Date:	04-Oct-2010
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Filer:	Edward Milton Roney/Kenyatta Upchurch
Attorney Docket Number:	4015-6942

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Claims in Excess of 20	1202	8	80	640
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 $0 paid	1251	1	200	200
Miscellaneous:				
		Total in USD ($)		**840**

Electronic Acknowledgement Receipt

EFS ID:	20055453
Application Number:	12896993
International Application Number:	
Confirmation Number:	1015
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Customer Number:	24112
Filer:	Edward Milton Roney/Kenyatta Upchurch
Filer Authorized By:	Edward Milton Roney
Attorney Docket Number:	4015-6942
Receipt Date:	05-SEP-2014
Filing Date:	04-OCT-2010
Time Stamp:	11:26:25
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	$840
RAM confirmation Number	9010
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1		P30138-US2_Response_to_Non-Final_OA.pdf	115837 8270ecb420ca91ba54bfef10bcacc048ebb218f4	yes	14

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	10
	Applicant Arguments/Remarks Made in an Amendment	11	14

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	32060 efeb78c1fccaef0ff76743bf2a559391d13c7ec7	no	2

Warnings:

Information:

Total Files Size (in bytes):	147897

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.

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
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/896,993	Filing Date 10/04/2010	☐ 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	09/05/2014	(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))	* 42	Minus	** 34	= 8	X $80 =	640
	Independent (37 CFR 1.16(h))	* 6	Minus	***6	= 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	**640**

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
/eugenia v. hardy/

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.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/896,993	10/04/2010	David Astely	4015-6942	1015

24112 7590 09/08/2014
COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

EXAMINER	
TALUKDER, MD K	
ART UNIT	PAPER NUMBER
2648	
MAIL DATE	DELIVERY MODE
09/08/2014	PAPER

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.

Applicant-Initiated Interview Summary	Application No.	Applicant(s)	
	12/896,993	ASTELY ET AL.	
	Examiner	Art Unit	
	MD TALUKDER	2648	

All participants (applicant, applicant's representative, PTO personnel):

(1) *MD TALUKDER*. (3)_____.

(2) *ED Roni*. (4)_____.

Date of Interview: *27 August 2014*.

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: *Nory*.

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...)

During the interview various aspects of the claimed invention were discussed and compared with the cited reference in view of the pending claim rejections. The foregoing amendments to the claims were made in consideration of the topics of discussion during the interview; while no agreement was reached with respect to allowability..

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

/MD TALUKDER/ Examiner, Art Unit 2648	/YUWEN PAN/ Supervisory Patent Examiner, Art Unit 2649

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.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/896,993	10/04/2010	David Astely	4015-6942	1015

24112 7590 11/26/2014

COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

EXAMINER
TALUKDER, MD K

ART UNIT	PAPER NUMBER
2648	

MAIL DATE	DELIVERY MODE
11/26/2014	PAPER

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.

Office Action Summary	Application No. 12/896,993	Applicant(s) ASTELY ET AL.	
	Examiner MD TALUKDER	Art Unit 2648	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 *09/05/2014*.

☐ 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) *1-42* 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) *1-42* 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 _____.

3) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

1. The present application is being examined under the pre-AIA first to invent provisions.

2. It would be of great assistance to the office if all incoming papers pertaining to a filed application carried the following items:

i. Application number (checked for accuracy, including series code and serial no.).
ii. Group art unit number (copied from most recent Office communication).
iii. Filing date.
iv. Name of the examiner who prepared the most recent Office action.
v. Title of invention.
vi. Confirmation number (See MPEP § 503).

REMARKS

3. Examiner wish to make of record the substance of the examiner initiated interview between examiner and applicant's undersigned representative, Edward M. Roney of Coats & Bennett PLLC, conducted telephonically. In the interview, Examiner was able to point out the allowable subject matter but the applicant was reluctant to amend the claims according to examiner's proposal.

Response to Arguments

4. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

5. The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

a. Claims 1-34 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 claim 1, claims recites the limitation "if the user terminal…single downlink component carrier…" in line 5-6 & "If the user…multiple downlink component carriers…" in line 12-13. It is not clear if the functional language recited afterwards is optional steps or required functionality. Examiner read the functional language recited afterwards (after "IF") is optional step (broadest reasonable interpretation being applied). The second "If statement" will never occur; according to the broadest reasonable interpretation by the examiner since it is optional. Other independent claims having the same "If statement". For the purpose of expediting the processing of the application, Claims have been rejected in view of the prior art (see below) based on a broader interpretation that meets the claimed subject matter as interpreted by the Examiner.

b. New claims 35-42 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. It is not clear if the functional language recited afterwards is optional steps or required

functionality. The functional language recited afterwards (After "If") is optional (interpret by the examiner). The "If statement" will never occur; according to the broadest reasonable interpretation by the examiner since it is optional. Therefore, those claims do not have any patentable weight.

Claim Rejection- 35 USC § 103

6. 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.

Claims 1-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nory (Pub No. 2010/0232373) and further in view of Marinier (Pub No. 2010/0322173).

Regarding claim 1, Nory teaches a method implemented by a base station of receiving control information from a user terminal (**Fig. 3 & 1: BS-101 receives control information from user terminals**), the method comprising: scheduling downlink transmissions to said user terminal on one or more downlink component carriers (scheduling- Para. 49: **"…If a sub frame n+1 with single component carrier allocation must follow a sub frame n with multi-component carrier allocation, both PDCCH-1 and PDCCH-2 can be transmitted in a sub-frame n+1 to only schedule the single component carrier resource assignment…");** if the user terminal is scheduled to receive downlink transmissions on a single downlink component carrier (Para. 17: **resource assignment for one component carrier**), receiving control

information on a first set of radio resources on an uplink component carrier, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on downlink component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier…if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier) & (Para. 26: "Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted…") (also Para. 13-17).** (Note: The other part of "If statement" has no patentable weight because that is optional and the second "If statement" will never occur; according to the broadest reasonable interpretation by the examiner since it is optional).

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

Therefore, it would have been obvious to one of the ordinary skilled in the art to which this invention pertains at the time it was made to use a primary cell in a downlink transmission process of Marinier's disclosure with resource allocation system for multiple component carriers,

as taught by Nory. Doing so would have resulted in efficiently using and assigning resource blocks in uplink and downlink transmission system.

Regarding claim 2, 10, Nory teaches that the control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink primary component carrier (abstract: "**…The transceiver is also configured to receive a second control message on the anchor carrier, the second control message associated with a set of component carriers, the set of component carriers are distinct from the anchor carrier. The controller determines a resource assignment for at least one component carrier in the set of component carriers using both the first and the second control messages**").

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

At the time of the invention, it would have been obvious to one of the ordinary skilled in the art to use a primary cell in a downlink transmission process with resource allocation system for multiple component carriers for assigning resource blocks in uplink and downlink transmission system.

Regarding claim 3, 11, Nory teaches transmitting control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the second set radio resources on the uplink primary component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the**

RB assignment field can signal the resource block allocation for the first component carrier and the remaining ten bits can signal the resource block allocation for the second component carrier…").

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

At the time of the invention, it would have been obvious to one of the ordinary skilled in the art to use a primary cell in a downlink transmission process with resource allocation system for multiple component carriers for assigning resource blocks in uplink and downlink transmission system.

Regarding claim 4, 12, Nory teaches at least one of the first and second sets of radio resources are indicated implicitly by at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier (**Fig. 3**).

Regarding claim 5, 13, Nory teaches one of the first and second sets of radio resources are indicated explicitly by an uplink control channel index (Para. 26: "**…Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted. When a PDSCH is also scheduled to the UE in the same sub-frame as the PDCCH-A, multiple ACK/NACKs (one each for PDCCH-A and the PDSCH) can be transmitted using multiple PUCCH resources…**").

Regarding claim 6, 14, Nory teaches the explicit indication is transmitted as radio resource control signaling (Para. 22: "**In first exemplary implementation, the base station configures UE via radio resource control (RRC) signaling with an anchor carrier. The UE is expected to only monitor PDCCH messages from the anchor carrier after initial access. Before assigning resources on non-anchor component carriers via individual PDCCH in each component carrier, base unit sends a configuration message to the UE instructing the UE, the set of component carriers, whose PDCCH messages are also expected to be monitored…").**

Regarding claim 7, 15, Nory teaches transmitting an acknowledgement resource indication on a downlink component carrier to dynamically assign said second set of radio resources on the uplink primary component carrier to the user terminal when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers (Para. 25: "**…The PDCCH-A can also include or indicate resources for acknowledging the transmission of the configuration message to increase reliability of signaling of the configuration message. Optionally, the base unit can also instruct the UE to send CQI for the set of component carriers identified in the long term bitmap by signaling a CQI-only uplink grant in the same sub-frame where PDCCH-A is transmitted. The configuration message can also optionally include a time offset limit before which UE should configure its receiver to monitor PDCCH messages from multiple component carriers**") and (Para. **26, 36 & 40**).

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

At the time of the invention, it would have been obvious to one of the ordinary skilled in the art to use a primary cell in a downlink transmission process with resource allocation system for multiple component carriers for assigning resource blocks in uplink and downlink transmission system.

Regarding claim 8, 16, Nory teaches the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources (Para. 27: "**In a third exemplary implementation, the base station configures UE via radio resource control (RRC) signaling with an anchor carrier. The UE is expected to only monitor the anchor carrier after initial access. Before assigning resources on component carriers other than the anchor carrier, base unit sends a configuration message to the UE, instructing it, the set of component carriers, where PDSCH resource allocations are expected. The configuration message allows the UE to semi-statically configure its receiver to receive PDSCH on the set of component carriers**").

Regarding claim 9, Nory teaches a base station comprising: a transmitter to transmit user data on one or more downlink component carriers to a user terminal (**Fig. 1: transmission from BS-101 to remote unit-110**); and a controller to schedule downlink transmissions to said user terminal, the downlink controller configured to schedule downlink transmissions to a user terminal on one or more downlink component carriers (scheduling- Para. 49: **"…If a sub frame**

n+1 with single component carrier allocation must follow a sub frame n with multi-component carrier allocation, both PDCCH-1 and PDCCH-2 can be transmitted in a sub-frame n+1 to only schedule the single component carrier resource assignment…"); if the user terminal is scheduled to receive downlink transmissions on a single downlink component carrier (Para. 17: **resource assignment for one component carrier**), receiving control information on a first set of radio resources on an uplink component carrier, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on downlink component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier…if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier) & (Para. 26: "Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted…") (also Para. 13-17).** (Note: The other part of "If statement" has no patentable weight because that is optional and the second "If statement" will never occur; according to the broadest reasonable interpretation by the examiner since it is optional).

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

Therefore, it would have been obvious to one of the ordinary skilled in the art to which this invention pertains at the time it was made to use a primary cell in a downlink transmission process of Marinier's disclosure with resource allocation system for multiple component carriers, as taught by Nory. Doing so would have resulted in efficiently using and assigning resource blocks in uplink and downlink transmission system.

Regarding claim 17, Nory teaches a user terminal of transmitting control information in a mobile communication network, the method comprising: receiving an assignment of radio resources for downlink transmissions from a base station (**Fig. 3 & 4 and Abstract: "A wireless communication terminal including a controller coupled to a wireless transceiver wherein the transceiver is configured to receive a first control message on an anchor carrier, the first control message including a resource assignment for the anchor carrier"**); transmitting on a first set of radio resources on an uplink component carrier, control information with the downlink transmission if the user terminal is scheduled to receive downlink transmissions on a single downlink component carrier (Para. 17: **resource assignment for one component carrier**) & (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier…if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier.**

In addition to this, if the UE is configured to receive PDSCH on only one component carrier), wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on downlink component carrier **(Para. 26: "Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted…") (also Para. 13-17).** (Note: The other part of "If statement" has no patentable weight because that is optional and the second "If statement" will never occur; according to the broadest reasonable interpretation by the examiner since it is optional).

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

Therefore, it would have been obvious to one of the ordinary skilled in the art to which this invention pertains at the time it was made to use a primary cell in a downlink transmission process of Marinier's disclosure with resource allocation system for multiple component carriers, as taught by Nory. Doing so would have resulted in efficiently using and assigning resource blocks in uplink and downlink transmission system.

Regarding claim 18, Nory teaches transmitting user data on the second set of radio resources if a single downlink component carrier is assigned for the downlink transmission (Para. **36**: **"Alternately, if the UE is configured to receive PDSCH on only one component carrier**

then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier, UE can interpret that the Resource Block assignment bits are signaling a resource block assignment in groups of 4 resource blocks each").

Regarding claim 19, Claim 19 corresponds to claim 2 and is analyzed accordingly.

Regarding claim 20, Claim 20 corresponds to claim 3 and is analyzed accordingly.

Regarding claim 21, Claim 21 corresponds to claim 5 and is analyzed accordingly.

Regarding claim 22, Claim 22 corresponds to claim 6 and is analyzed accordingly.

Regarding claim 23, Claim 23 corresponds to claim 7 and is analyzed accordingly.

Regarding claim 24, Claim 24 corresponds to claim 8 and is analyzed accordingly.

Regarding claim 25 & 33 & 34, claim **25 & 33 & 34** corresponds to claim 17and/or 1, and is analyzed accordingly.

Regarding claim 26, Nory teaches transmitting user data on the second set of radio resources if a single downlink component carrier is assigned for the downlink transmission (Para. **36**: **"Alternately, if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier, UE can interpret that the Resource Block assignment bits are signaling a resource block assignment in groups of 4 resource blocks each"**).

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

At the time of the invention, it would have been obvious to one of the ordinary skilled in the art to use a primary cell in a downlink transmission process with resource allocation system for multiple component carriers for assigning resource blocks in uplink and downlink transmission system.

Regarding claim 27, Nory teaches the controller is further configured to receive control information from the base station on a downlink component carrier implicitly or explicitly identifying the second set of radio resources on the uplink primary component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier and the remaining ten bits can signal the resource block allocation for the second component carrier…**").

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

At the time of the invention, it would have been obvious to one of the ordinary skilled in the art to use a primary cell in a downlink transmission process with resource allocation system for multiple component carriers for assigning resource blocks in uplink and downlink transmission system.

Regarding claim 28, Nory teaches the controller is further configured to receive at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying the second set of radio resources (**Fig. 3**).

Regarding claim 29, Nory teaches one of the first and second sets of radio resources are indicated explicitly by an uplink control channel index (Para. 26: "**…Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted. When a PDSCH is also scheduled to the UE in the same sub-frame as the PDCCH-A, multiple ACK/NACKs (one each for PDCCH-A and the PDSCH) can be transmitted using multiple PUCCH resources…**").

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

At the time of the invention, it would have been obvious to one of the ordinary skilled in the art to use a primary cell in a downlink transmission process with resource allocation system for multiple component carriers for assigning resource blocks in uplink and downlink transmission system.

Regarding claim 30, Nory teaches the explicit indication is transmitted as radio resource control signaling (Para. 22: "**In first exemplary implementation, the base station configures UE via radio resource control (RRC) signaling with an anchor carrier. The UE is expected**

to only monitor PDCCH messages from the anchor carrier after initial access. Before assigning resources on non-anchor component carriers via individual PDCCH in each component carrier, base unit sends a configuration message to the UE instructing the UE, the set of component carriers, whose PDCCH messages are also expected to be monitored…").

Regarding claim 31, Nory teaches the controller is further configured to receive, from a base station, an acknowledgement resource indication on a downlink component carrier dynamically assigning said second set of radio resources on the uplink primary component carrier when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers (Para. 25: "**…The PDCCH-A can also include or indicate resources for acknowledging the transmission of the configuration message to increase reliability of signaling of the configuration message. Optionally, the base unit can also instruct the UE to send CQI for the set of component carriers identified in the long term bitmap by signaling a CQI-only uplink grant in the same sub-frame where PDCCH-A is transmitted. The configuration message can also optionally include a time offset limit before which UE should configure its receiver to monitor PDCCH messages from multiple component carriers**") and (Para. **26, 36 & 40**).

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

At the time of the invention, it would have been obvious to one of the ordinary skilled in

the art to use a primary cell in a downlink transmission process with resource allocation system for multiple component carriers for assigning resource blocks in uplink and downlink transmission system.

Regarding claim 32, Nory teaches the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources (Para. 27: "**In a third exemplary implementation, the base station configures UE via radio resource control (RRC) signaling with an anchor carrier. The UE is expected to only monitor the anchor carrier after initial access. Before assigning resources on component carriers other than the anchor carrier, base unit sends a configuration message to the UE, instructing it, the set of component carriers, where PDSCH resource allocations are expected. The configuration message allows the UE to semi-statically configure its receiver to receive PDSCH on the set of component carriers**").

Regarding Claims 35 to 42, The functional language recited afterwards (After "If") is optional. The "If statement" will never occur; according to the broadest reasonable interpretation by the examiner since it is optional. Therefore, those claims do not have any patentable weight.

CONCLUSION

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 from the examiner should be directed to Patent Examiner Md Talukder whose telephone number is (571) 270-3222. The examiner can normally be reached on Mon-Th 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisors, Wesley Kim can be reached on 571-272-7867.

Information regarding the status of an application may be obtaining from the patent application information retrieval (PAIR) system. Status information for the published applications may be obtained from either private PAIR or public PAIR. Status information for unpublished application is available through private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have any questions on access to the

private PAIR system, contract the Electronics Business Center (EBC) at 866-217-9197. If you would like assistance from USPTO customer service representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA).

/ Md. Talukder /

/ Art Unit # 2648 /

/WESLEY KIM/
Supervisory Patent Examiner, Art Unit 2648

Examiner-Initiated Interview Summary	Application No.	Applicant(s)	
	12/896,993	ASTELY ET AL.	
	Examiner	Art Unit	
	MD TALUKDER	2648	

All participants (applicant, applicant's representative, PTO personnel):

(1) *MD TALUKDER*.

(2) *Wesley Kim*.

(3) *Edward Roney*.

(4) _____.

Date of Interview: *31 October 2014*.

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: _____.

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...)

Examiner proposed amendments to expedite prosecution by amending to overcome the 112 issues directed to the "IF" conditions. The applicants' representative was reluctant to amend the claims according to examiner's proposal..

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of 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

/MD TALUKDER/ Examiner, Art Unit 2648	/WESLEY KIM/ Supervisory Patent Examiner, Art Unit 2648

Notice of References Cited	Application/Control No. 12/896,993	Applicant(s)/Patent Under Reexamination ASTELY ET AL.	
	Examiner MD TALUKDER	Art Unit 2648	Page 1 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2002/0160784 A1	10-2002	Kuwahara et al.	455/452
*	B	US-2010/0003997 A1	01-2010	KOYANAGI, Kenichiro	455/450
*	C	US-2010/0098012 A1	04-2010	Bala et al.	370/329
*	D	US-2010/0208679 A1	08-2010	Papasakellariou et al.	370/329
*	E	US-2010/0232373 A1	09-2010	Nory et al.	370/329
*	F	US-2010/0271970 A1	10-2010	Pan et al.	370/252
*	G	US-2010/0285809 A1	11-2010	Lindstrom et al.	455/450
*	H	US-2010/0296389 A1	11-2010	Khandekar et al.	370/216
*	I	US-2010/0322173 A1	12-2010	Marinier et al.	370/329
*	J	US-2011/0007695 A1	01-2011	Choi et al.	370/329
*	K	US-2011/0007699 A1	01-2011	Moon et al.	370/329
*	L	US-2011/0081913 A1	04-2011	Lee et al.	455/450
*	M	US-2011/0081932 A1	04-2011	Astely et al.	455/509

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.

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U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2011/0243039 A1	10-2011	PAPASAKELLARIOU et al.	370/280
*	B	US-2011/0310856 A1	12-2011	Hariharan et al.	370/336
*	C	US-2012/0020317 A1	01-2012	Ishii et al.	370/329
*	D	US-2012/0051306 A1	03-2012	Chung et al.	370/329
*	E	US-2012/0082125 A1	04-2012	Huang, Yada	370/329
*	F	US-2012/0140708 A1	06-2012	Choudhury et al.	370/328
*	G	US-8,265,030 B2	09-2012	Miki et al.	370/330
*	H	US-2012/0314675 A1	12-2012	Vujcic, Dragan	370/329
*	I	US-2013/0010721 A1	01-2013	Aiba et al.	370/329
*	J	US-2013/0003700 A1	01-2013	Zhang et al.	370/331
*	K	US-2013/0034073 A1	02-2013	Aiba et al.	370/329
*	L	US-8,447,343 B2	05-2013	Gerstenberger et al.	455/522
*	M	US-2013/0136084 A1	05-2013	ZHANG et al.	370/329

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
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	X	

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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-8,472,368 B2	06-2013	Baldemair et al.	370/318
*	B	US-8,634,358 B2	01-2014	Damnjanovic et al.	370/329
*	C	US-8,792,830 B2	07-2014	Lim et al.	455/59
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

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NON-PATENT DOCUMENTS

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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12896993	ASTELY ET AL.
	Examiner	Art Unit
	MD TALUKDER	2648

CPC- SEARCHED		
Symbol	Date	Examiner
H04W88/08, H04W72/044, H04W72/042	4/22/2014 & 4/30/2014 & 10/31/2014	
H04W52/367, H04W52/12, H04W52/40	4/22/2014 & 4/30/2014 & 10/31/2014	Talukder
H04L29/08657, G01S5/0252, G01S5/02	4/22/2014 & 4/30/2014 & 10/31/2014	Talukder
H04B1/3833, H04M1/0247, H04M1/0237	4/22/2014 & 4/30/2014	Talukder
H03F3/211, H04B7/0617, H04B7/0669	4/22/2014 & 4/30/2014	

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
455	509,522,456.6,137,103,575	12/11/2012	
370	329,252,331	12/11/2012	Talukder
455	Text	6/17/2013	
370	329,341,348,395.4	6/26/2013	

SEARCH NOTES		
Search Notes	Date	Examiner
East Search	12/10/2012	talukder
East Search	12/11/2012	talukder
East Search	6/17/2013	talukder
East Search	6/18/2013	talukder

SEARCH NOTES		
Search Notes	**Date**	**Examiner**
East Search	6/26/2013	talukder
East Search	6/27/2013	
East Search	4/22/2014 & 4/30/2014	
Text Srarched	10/31/2014	Talukder

INTERFERENCE SEARCH			
US Class/ CPC Symbol	**US Subclass / CPC Group**	**Date**	**Examiner**

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"12896993"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 17:09
S2	367	((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:04
S3	176	S2 and (radio near3 resource)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:09
S4	28	S2 and (radio near3 resource) and (component with carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:09
S5	173	(downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:04
S6	137	S5 and (scheduling)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:04
S7	36	("20120263121" | "20110310856" | "20120127950" | "20110310819 " | "20120275395" | "20120287828" | "20120039291" | "20100271970" | "20120307781" | "20110286436" | "20120224535" | "20120140708" | "20110310820" | "20120163288" | "20110299486" | "20100098012" | "20120082125 " | "20120294273" | "20110268048" | "20120113910").pn.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:15
S8	127	(downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (carrier adj aggregation)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 10:16
S9	2	"20110292887"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:17

S11	25	((first 1st) adj6 component adj3 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:22
S12	1718	((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:47
S13	66	(carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:47
S14	10842	455/509,522,456.6,137,103,575.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:41
S15	28232	370/329,252,331.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:41
S16	102	(S14 S15) and (downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:42
S17	1	"13140333"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:18
S18	2	"20110310856"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:18
S19	38	((first 1st) adj6 component adj3 carrier) same ((radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:31
S20	38	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:31
S21	27	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj4 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:32
S22	38	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:32

S23	24	(carrier adj aggregation) and (schedul$3 near3 (downlink DL) with ((first primary initial) near6 (resource radio frequency frame)))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:48
S24	8	("7551898" | "7649960" | "7656843" | "7773699").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:14
S25	2	"20110292900"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:36
S26	2	"20100271970"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:37
S27	3	"8050202"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:38
S28	1	"20120307689"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:45
S29	2	"8160017"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:48
S30	2	"20100232373"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:48
S31	2	"20090016278"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 17:16
S32	2	"8265030"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 17:19
S33	3	"2008139923"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 18:17
S34	14	("20100098012" | "20100232373" | "20110310856" | "20120020317" | "20120082125" | "20120140708" | "8265030").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/29 17:19

S35	7	"455"/$.ccls. and (carrier adj aggregation) and (schedul$3 near3 (downlink DL) with ((first primary initial) near6 (resource radio frequency frame)))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/29 17:22
S36	9	"455"/$.ccls. and (((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/29 21:37
S37	57	((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/30 12:21
S38	4	("20070053294" | "20100290405").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/30 12:42
S39	16	("7596114" | "20050013279" | "20030219028" | "20070217406" | "20020105970" | "20060050664" | "20090303938" | "20070064669").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/30 12:42
S40	290	(first 1st) with (component near2 carrier) with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 10:07
S41	114	(first 1st) with (component near2 carrier) with down$1link and receiv$3 near3 control near3 information	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 10:09
S42	47	(first 1st) near3 (radio adj resource) and (second other another 2nd) near3 (radio adj resource) and component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:29
S43	26	S42 and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:31
S44	5	(first 1st) near3 (radio adj resource) and (second other another 2nd) near3 (radio adj resource) same (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:46
S45	26	(first 1st) near3 (radio adj resource) and (second other another 2nd) near3 (radio adj resource) and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:47
S46	31	(second other another 2nd) near3 (radio adj resource) and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:49

S47	0	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:51
S48	0	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:52
S49	1	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component) and ((down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:53
S50	1	@ad<"20091005" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component) and ((down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:55
S51	1	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:56
S52	20	(second other another 2nd) near3 (radio adj resource) and (carrier adj component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 13:31
S53	16	(set near3 radio near3 resource) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:14
S54	27	(set near3 ((radio near3 resource) (resource adj block))) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:19
S55	755	(((radio near3 resource) (resource adj block))) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:25
S56	70	((second 2nd other) with ((radio near3 resource) (resource adj block))) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:26
S57	327	(((radio near3 resource) (resource adj block))) same component adj carrier and (schedul$3 near3 downlink reverse)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:27
S58	29	((second 2nd other) with ((radio near3 resource) (resource adj block))) same component adj carrier and (schedul$3 near3 down$1link reverse$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:27

S59	24	((second 2nd other) with ((radio near3 resource) (resource adj block))) same (component adj carrier) same (down$1link reverse$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:31
S60	10	("20090097447" | "20110081856" | "20090116427" | "20100232373" | "8331307").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:49
S61	2562	(schedul$3 near3 downlink) and ((radio adj resource) (resource adj block)) and component	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:16
S62	739	(schedul$3 near3 downlink) and ((radio adj resource) (resource adj block)) and component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:17
S63	259	(schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) and component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:17
S64	39	(schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (component adj carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:18
S65	1	@ad<"20091005" and (schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (component adj carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:18
S66	1	@ad<"20091005" and (schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:20
S67	47	(schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:20
S68	356	"455"/$.ccls. and ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 17:10
S70	19	"455"/$.ccls. and (carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 17:17
S71	0	("2013/0107855").URPN.	USPAT	OR	ON	2013/06/18 09:15
S72	0	("2013/0107855").URPN.	US-PGPUB; USPAT	OR	ON	2013/06/18 09:16

S73	408	set near3 (radio frequency) near2 (resource band) same downlink and component	US-PGPUB; USPAT	OR	ON	2013/06/18 09:18
S74	17	set near3 (radio frequency) near2 (resource band) same downlink same (component adj carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 09:19
S75	19	(set group Cluster) near3 (radio frequency) near2 (resource band) same downlink same (component adj carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 09:21
S76	12	("8457060" | "20110310819" | "20100271970" | "20130034073" | "20100098012" | "20110310856" | "20110317653" | "20130083742" | "20130083741" | "20120114021" | "20120275395" | "20110317645" | "20110310856").pn.	US-PGPUB; USPAT	OR	ON	2013/06/18 09:31
S77	200	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource)	US-PGPUB; USPAT	OR	ON	2013/06/18 10:37
S78	2911	(UL up$link) with (set group) near6 (radio resource)	US-PGPUB; USPAT	OR	ON	2013/06/18 10:38
S79	110	S77 and S78	US-PGPUB; USPAT	OR	ON	2013/06/18 10:38
S80	3	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (set group) near6 (radio resource) with (2nd second other another) near2 component	US-PGPUB; USPAT	OR	ON	2013/06/18 10:47
S81	28	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 11:17
S82	5	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (second 2nd) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 11:20
S83	4	(1st first first primary initia) near3 (set group) near6 (radio resource) with (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 13:50
S84	3	(set group) near6 (radio resource) with (2nd second other another) near6 (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 13:52
S85	42	(set group) near6 (radio resource) with (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 13:58
S86	30	(set group) near3 ((radio resource)(resource near2 block)) with (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 14:07
S87	2	(second 2nd) near3 (down$1link DL) with ((component near3 carrier) CC) same (set group) with ((radio near2 resource) (resource near2 block))	US-PGPUB; USPAT	OR	ON	2013/06/18 14:14
S88	21	reserv$3 with component near3 carrier and (second near2 (radio frequency band))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/25 15:31
S89	36	"739528"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 09:34

S90	30	"5754138"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 09:35
S91	2046	(carrier near3 aggregation) and up$1link with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 10:24
S92	1052	(carrier near3 aggregation) and (component near3 carrier) same up$1link with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 10:26
S93	110	(carrier near3 aggregation) and (component near3 carrier) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 10:27
S95	17	("370"/$.ccls "455"/$.ccls.) and (aggregation) and (CC (component near3 carrier)) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 15:22
S96	67	370/329,341,348,395.4.ccls. and (carrier near3 aggregation) and (component near3 carrier) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 15:26
S97	345368	schedule (DL (down adj link) down$1link) and (carrier near3 aggregation) and ((UL up$link) adj6 associat$4 near4 (DL down$link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 16:45
S98	9	schedule near3 (DL (down adj link) down$1link) and (carrier near3 aggregation) same((UL up$link) adj6 associat$4 near4 (DL down$link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 16:46
S99	35	(schedule allocat$4) near3 (DL (down adj link) down$1link) and (carrier near3 aggregation) same((UL up$link) adj6 associat$4 near4 (DL down$link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 16:48
S100	0	(1st first) near3 (radio band resource frequency) with (1st first) near3 (CCcomponent adj carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 17:14
S101	216	(1st first) near3 (radio band resource frequency) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 17:14
S102	43	(1st first) near3 (radio band resource frequency) with (reserv$3 schedul$3 allocat$3) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 17:15

S103	22	("20100142455" | "20120009923" | "20100254329" | "20100091678" | "20110194501" | "20130010619" | "20080310359" | "20060274712" | "20100227569" | "20120208583" | "20110267978").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/27 09:57
S104	10	("20100254329" | "20100195624" | "20100023282" | "20090274100" | "20080316957").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/27 10:15
S105	50	("20100322173" | "20110081913" | "20130010721" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:25
S106	13348	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:40
S107	4330	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:42
S108	4200	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:43
S109	3823	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:44
S110	6130	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:44
S111	370	(S106 S107 S108 S109 S110) and (schedul$4 near3 down$1link) and (component near3 carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:45
S112	365	(S106 S107 S108 S109 S110) and (schedul$4 near3 down$1link) and (component near3 carrier) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:46

S113	357	(S106 S107 S108 S109 S110) and (schedul$4 near3 down$1link) and (component near carrier) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:47
S114	13	(S106 S107 S108 S109 S110) and (DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (component near3 carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:47
S115	40	(H03F3/211, H04B7/0617, H04B7/0669, H04B1/3833, H04M1/0247, H04M1/0237, H04L29/08657, G01S5/0252, G01S5/02, H04W52/367, H04W52/12, H04W52/40, H04W88/08, H04W72/044, H04W72/042).cpc. and (carrier near3 aggregation) and (component near3 carrier) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 14:17
S116	8750	(H04W88/08, H04W72/044, H04W72/042I).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:21
S117	4336	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:22
S118	4205	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:23
S119	4144	(H04L29/08657, G01S19/14, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:23
S120	3826	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:24
S121	47	(H04W88/08, H04W72/044, H04W72/042).cpc. and (1st first) near3 (radio band resource frequency) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:27
S122	25	(S116 S117 S118 S119 S120).cpc. and (1st first) near3 (radio band resource frequency) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 15:35
S123	13432	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S124	4341	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT;	OR	ON	2014/04/30 11:04

			USOCR; DERWENT; IBM_TDB			
S125	4208	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S126	3833	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S127	6154	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S128	98	(S123 S124 S125 S126 S127) and (schedul$4 near3 down$1link) and (component near3 carrier) and single with carrier same (plurality multiple several) with (DL down$1link) with carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S129	52	(S123 S124 S125 S126 S127) and (schedul$4 near3 down$1link) and (component near3 carrier) and single near6 carrier same (plurality multiple several) near3 (DL down$1link) with carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S130	4	(S123 S124 S125 S126 S127) and (schedul$4) with component near3 carrier and (single near3 (DL down$1link)) with (first with resource) and (multiple plurality several) near3 (DL downlink) with second with resource	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:37
S131	2	(up$1link UL) and (schedul$4) with component near3 carrier same (single near3 (DL down$1link)) with (first with resource) same (multiple plurality several) near3 (DL downlink) with second with resource	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:40
S132	2	(schedul$4) with component near3 carrier same (single near3 (DL down$1link)) with (first with resource) same (multiple plurality several) near3 (DL downlink) with second with resource	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:42
S133	2	(schedul$4) same (single near3 (DL down$1link)) with (first with resource) same (multiple plurality several) near3 (DL downlink) with second with resource	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:44
S134	2	(schedul$4) same (single near3 (DL down$1link)) with (first with (frequency resource block)) same (multiple plurality several) near3 (DL downlink) with second with (frequency block resource)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:45
S135	16	(single near3 (DL down$1link)) with (first with (frequency resource block)) same (multiple plurality several) near3 (DL downlink) with second with (frequency block resource)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:45
S136	1	allocation with (PUSCH PUCCH UL (up$1link)) and "20100232373"	US-PGPUB; USPAT;	OR	ON	2014/04/30 14:19

			USOCR; DERWENT; IBM_TDB			
S137	1	allocation and (PUSCH PUCCH UL (up$1link)) and "20100232373"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 14:21
S138	2	"20100271970"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 14:32
S139	54	("20100322173" | "20110081913" | "20130010721" | "8634358" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20110243039" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 11:49
S140	15049	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S141	4737	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S142	4341	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S143	4030	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S144	6785	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S145	96	(S140 S141 S142 S143 S144) and (schedul$4 near3 down$1link) and (component near3 carrier) and single with carrier same (plurality multiple several) with (DL down$1link) with carrier same (frequency resources)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S146	1	"13315135"	US-PGPUB; USPAT;	OR	ON	2014/10/15 13:54

			USOCR; DERWENT; IBM_TDB			
S147	2	"20080151845"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 14:58
S148	41	"455"/$.ccls. and (carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 15:45
S149	3	"455"/451,452.1.ccls. and (carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 18:01
S150	33889	455/451,452.1,509,456.1,522,137,103,575.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:25
S151	0	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel Bin) same (sererv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:32
S152	0	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel Bin) same (rererv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:33
S153	4	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel Bin) same (reserv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:34
S154	3	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel Bin) same (reserv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin) and (CC component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:37
S155	4	"455"/$.ccls. and (((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj6 (radio resource frame)) and (reserv$4 sav$4 us$3) near3 (other 2nd second another) adj3 (resource frequency channel Bin) and (CC component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:39
S156	15	("20050013279" | "20030219028" | "20070217406" | "20020105970" | "20060050664" | "20090303938" | "20070064669").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 12:07
S157	10	"455"/$.ccls. and (schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT;	OR	ON	2014/10/23 12:07

			IBM_TDB			
S158	0	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel) same (rererv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 15:22
S161	15374	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S162	4758	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S163	4377	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S164	4042	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S165	6867	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S166	99	(S161 S162 S163 S164 S165) and (schedul$4 near3 down$1link) and (component near3 carrier) and single with carrier same (plurality multiple several) with (DL down$1link) with carrier same (frequency)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S167	1	"14170939"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/17 09:46
S168	499	(component near2 carrier) with (primary near2 cell)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:07
S169	401	"370"/$.ccls. and (component near2 carrier) with (primary near2 cell)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:07
S170	378	"370"/$.ccls. and (component adj2 carrier) with (primary adj2 cell)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:07
S171	185	"370"/$.ccls. and (component adj2 carrier) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT;	OR	ON	2014/11/18 14:08

			IBM_TDB			
S172	4	"370"/$.ccls. and single near3 (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:17
S173	4	single near4 (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:19
S174	287	"370"/$.ccls. and (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:21
S175	1	@ad<"20091004" and "370"/$.ccls. and (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:22
S176	287	"370"/$.ccls. and (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:22

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S159	0	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel) same (rerev$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin)	US-PGPUB; USPAT; UPAD	OR	ON	2014/10/31 15:24
S160	5	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (set group) near6 (radio resource) with (2nd second other another) near2 component	US-PGPUB; USPAT; UPAD	OR	ON	2014/10/31 15:26

11/18/2014 6:02:16 PM
C:\Users\mtalukder\Documents\EAST\Workspaces\12896993.wsp

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12896993	ASTELY ET AL.
	Examiner	Art Unit
	MD TALUKDER	2648

✓	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	12/13/2012	06/27/2013	04/30/2014	11/18/2014					
	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
	12896993	ASTELY ET AL.
	Examiner	**Art Unit**
	MD TALUKDER	2648

✓	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	12/13/2012	06/27/2013	04/30/2014	11/18/2014					
	37				✓					
	38				✓					
	39				✓					
	40				✓					
	41				✓					
	42				✓					

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	12896993	Filing Date	2010-10-04	Docket Number (if applicable)	4015-6942 / P30138-US2	Art Unit	2648
First Named Inventor	David Astely et al.			Examiner Name	Md K Talukder		

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, 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 181167

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Signature of Registered U.S. Patent Practitioner			
Signature	/Edward M. Roney/	Date (YYYY-MM-DD)	2015-03-06
Name	Edward M. Roney	Registration Number	62048

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.

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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.

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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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: David Astely *et al.*			
Serial No.:	12/896,993	Examiner:	MD K. Talukder
Filed:	October 4, 2010	Art Unit:	2648
For:	PUCCH RESOURCE ALLOCATION FOR CARRIER AGGREGATION FOR LTE-ADVANCED	Conf. No.:	1015

RESPONSE AND AMENDMENT WITH REQUEST FOR CONTINUED EXAMINATION

Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

This paper is being filed in Response to the Final Office Action mailed November 26, 2014 with an express Request for Continued Examination (RCE) under 37 C.F.R. § 1.114. Reconsideration is respectfully requested in light of the remarks below. The Office is hereby authorized to charge any fees required for entry of this paper to Deposit Account 18-1167.

AMENDMENTS TO THE CLAIMS

1. (Previously presented) A method implemented by a base station of receiving control information from a user terminal, the method comprising:

scheduling downlink transmissions to said user terminal on one or more downlink component carriers;

if the user terminal is scheduled to receive downlink transmissions on a single downlink component carrier associated with a primary cell, receiving control information associated with the downlink transmissions to the user terminal on a first set of radio resources on an uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; and

if the user terminal is scheduled to receive downlink transmissions on multiple downlink component carriers including the single downlink component carrier associated with the primary cell, receiving control information associated with the downlink transmissions to the user terminal on a second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources.

2. (Previously presented) The method of claim 1 further comprising transmitting control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink component carrier associated with the primary cell.

3. (Previously presented) The method of claim 2 further comprising transmitting control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the second set radio resources on the uplink component carrier associated with the primary cell.

4. (Original) The method of claim 3 wherein at least one of the first and second sets of radio resources are indicated implicitly by at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier.

5. (Original) The method of claim 3 wherein at least one of the first and second sets of radio resources are indicated explicitly by an uplink control channel index.

6. (Original) The method of claim 5 wherein the explicit indication is transmitted as radio resource control signaling.

7. (Previously presented) The method of claim 1 further comprising transmitting an acknowledgement resource indication on the single downlink component carrier associated with the primary cell to dynamically assign said second set of radio resources on the uplink component carrier associated with the primary cell to the user terminal when the user terminal is scheduled to receive downlink transmissions on the multiple downlink component carriers.

8. (Original) The method of claim 7 wherein the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources.

9. (Previously presented) A base station comprising:
a transmitter to transmit user data on one or more downlink component carriers to a user terminal; and
a controller to schedule downlink transmissions to said user terminal, the downlink controller configured to:
schedule downlink transmissions to a user terminal on one or more downlink component carriers;
if the user terminal is scheduled to receive downlink transmissions on a single downlink component carrier associated with a primary cell, receive control information associated with the downlink transmissions to the user terminal on a first set of radio resources on an uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions

on the single downlink component carrier associated with the primary cell; and

if the user terminal is scheduled to receive downlink transmissions on multiple downlink component carriers including the single downlink component carrier associated with the primary cell, receive control information associated with the downlink transmissions to the user terminal on a second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources.

10. (Previously presented) The base station of claim 9 wherein the controller is further configured to transmit control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink component carrier associated with the primary cell.

11. (Previously presented) The base station of claim 10 wherein the controller is further configured to transmit control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the second set of radio resources on the uplink component carrier associated with the primary cell.

12. (Original) The base station of claim 11 wherein the controller is further configured to indicate at least one of the first and second sets of radio resources implicitly by sending at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier.

13. (Original) The base station of claim 11 wherein the controller is further configured to indicate at least one of the first and second sets of radio resources explicitly by sending an uplink control channel index.

14. (Original) The base station of claim 13 wherein the controller is further configured to send the explicit indication as radio resource control signaling.

15. (Previously presented) The base station of claim 9 wherein the controller is further configured to transmit an acknowledgement resource indication on a downlink component carrier to dynamically assign said second set of radio resources on the uplink component carrier associated with the primary cell to the user terminal when the user terminal is scheduled to receive downlink transmissions on the multiple downlink component carriers.

16. (Original) The base station of claim 15 wherein the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources.

17. (Previously presented) A method implemented by a user terminal of transmitting control information in a mobile communication network, the method comprising:

receiving an assignment of radio resources for downlink transmissions from a base station;

transmitting, on a first set of radio resources on an uplink component carrier associated with a primary cell, control information associated with the downlink transmissions if an assignment of a single downlink component carrier associated with the primary cell is received for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; and

transmitting, on a second set of radio resources on the uplink component carrier associated with the primary cell, control information associated with the downlink transmissions if an assignment of multiple downlink component carriers including the single downlink component carrier associated with the primary cell for the downlink transmission is received, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources.

18. (Previously presented) The method of claim 17 further comprising transmitting user data on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

19. (Previously presented) The method of claim 17 further comprising receiving control information from the base station on a downlink component carrier implicitly or explicitly indicating the second set of radio resources on the uplink component carrier associated with the primary cell.

20. (Previously presented) The method of claim 19 wherein receiving control information comprises receiving at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying said second set of resources.

21. (Original) The method of claim 19 wherein receiving control information comprises receiving an uplink control channel index explicitly identifying said second set of resources.

22. (Original) The method of claim 21 wherein the explicit indication is received as radio resource control signaling.

23. (Previously presented) The method of claim 17, further comprising receiving, from a base station, an acknowledgement resource indication on the single downlink component carrier associated with the primary cell to dynamically assign said second set of radio resources on the uplink component carrier associated with the primary cell when the user terminal is scheduled to receive downlink transmissions on the multiple downlink component carriers.

24. (Original) The method of claim 23 further comprising selecting the second set of resources from a semi-static set of uplink resources responsive to the acknowledgement resource indication.

25. (Previously presented) A user terminal for mobile communications, the user terminal comprising:

a receiver to receive downlink transmissions from a base station;

a transmitter to transmit control information associated with the downlink transmission to a base station; and

a controller to select radio resources for transmission of control information associated with the downlink transmissions, the controller configured to:

select a first set of radio resources on an uplink component carrier associated with a primary cell if an assignment of a single downlink component carrier associated with the primary cell is received for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; and

select a second set of radio resources on the uplink component carrier associated with the primary cell if an assignment of multiple downlink component carriers including the single downlink component carrier associated with the primary cell for the downlink transmission is received, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources.

26. (Previously presented) The user terminal of claim 25 configured to transmit user data on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

27. (Previously presented) The user terminal of claim 25 wherein the controller is further configured to receive control information from the base station on a downlink component carrier implicitly or explicitly identifying the second set of radio resources on the uplink component carrier associated with the primary cell.

28. (Original) The user terminal of claim 27 wherein the controller is further configured to receive at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying the second set of radio resources.

29. (Previously presented) The user terminal of claim 27 wherein the controller is further configured to receive an uplink control channel index explicitly identifying the second set of radio resources on the uplink component carrier associated with the primary cell.

30. (Original) The user terminal of claim 29 wherein the controller is further configured to receive the explicit indication as radio resource control signaling.

31. (Previously presented) The user terminal of claim 25 wherein the controller is further configured to receive, from a base station, an acknowledgement resource indication on a downlink component carrier dynamically assigning said second set of radio resources on the uplink component carrier associated with the primary cell when the user terminal is scheduled to receive downlink transmissions on the multiple downlink component carriers.

32. (Original) The user terminal of claim 31 wherein the controller is configured to select the second set of resources from a semi-static set of uplink resources responsive to the acknowledgement resource indication.

33. (Previously presented) A method implemented by a user terminal in a mobile communication network, the method comprising:

receiving an assignment of radio resources for a downlink transmissions from a base station;

transmitting control information associated with the downlink transmission on a first set of radio resources on an uplink component carrier associated with a primary cell if an assignment of a first downlink component carrier associated with the primary cell is received for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier associated with the primary cell; and

transmitting control information associated with the downlink transmission on a second set of radio resources on the uplink component carrier associated with the primary cell if an assignment of the first downlink component carrier associated with the primary cell and a second single downlink component carrier associated with a non-primary cell for the downlink transmission is received,

wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier and the second single downlink component carrier-and the second set of resources are additional resources as compared to the first set of resources.

34. (Previously presented) A user terminal for mobile communications, the user terminal comprising:

a receiver to receive downlink transmissions from a base station;

a transmitter to transmit control information associated with the downlink transmission to a base station; and

a controller to select radio resources for transmission of control information associated with downlink transmissions, the controller configured to:

select a first set of radio resources on an uplink component carrier associated with a primary cell if an assignment of a first downlink component carrier associated with the primary cell is received for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier associated with the primary cell; and

select a second set of radio resources on the uplink component carrier associated with the primary cell if an assignment of the first downlink component carrier associated with the primary cell and a second single downlink component carrier associated with a non-primary cell for the downlink transmission is received, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier and the second single downlink component carrier-and the second set of resources are additional resources as compared to the first set of resources.

35. (Previously presented) The method of claim 1, further comprising:

receiving user data on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

36. (Previously presented) The method of claim 1, further comprising:
receiving control signaling on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

37. (Previously presented) The base station of claim 9, further configured to:
receive user data on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

38. (Previously presented) The base station of claim 9, further configured to:
receive control signaling on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

39. (Previously presented) The method of claim 17, further comprising:
transmitting control signaling on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

40. (Previously presented) The user terminal of claim 25, further configured to:
transmit control signaling on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

41. (Previously presented) The method of claim 1, further comprising:
if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier associated with a non-primary cell, receiving control information associated with the downlink transmissions to the user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second single downlink component carrier.

42. (Previously presented) The base station of claim 9, further configured to:

if the user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier associated with a non-primary cell, receive control information associated with the downlink transmissions to the user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second single downlink component carrier.

43. (New) A method implemented by a base station of receiving control information from a user terminal, the method comprising:

scheduling downlink transmissions to said user terminal on one or more downlink component carriers; and

receiving on a first set or a second set of resources on an uplink component carrier associated with a primary cell, including:

if the user terminal is scheduled to receive downlink transmissions on a single downlink component carrier associated with a primary cell, receiving control information associated with the downlink transmissions to the user terminal on the first set of radio resources on the uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; and

if the user terminal is scheduled to receive downlink transmissions on multiple downlink component carriers including the single downlink component carrier associated with the primary cell, receiving control information associated with the downlink transmissions to the user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of

resources are additional resources as compared to the first set of resources.

44. (New) A base station comprising:

a transmitter to transmit user data on one or more downlink component carriers to a user terminal; and

a controller to schedule downlink transmissions to said user terminal, the downlink controller configured to:

schedule downlink transmissions to a user terminal on one or more downlink component carriers; and

receiving on a first set or a second set of resources on an uplink component carrier associated with a primary cell, including:

if the user terminal is scheduled to receive downlink transmissions on a single downlink component carrier associated with the primary cell, receive control information associated with the downlink transmissions to the user terminal on the first set of radio resources on the uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; and

if the user terminal is scheduled to receive downlink transmissions on multiple downlink component carriers including the single downlink component carrier associated with the primary cell, receive control information associated with the downlink transmissions to the user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources.

REMARKS

After entry of this Response, Claims 1-44 are pending. Claims 43 and 44 are newly added. No new matter is introduced by the present Response.

Pursuant to the provisions of 37 C.F.R. § 1.133(b), Applicant wishes to make of record the substance of an interview between Applicant's undersigned representative, Edward M. Roney of Coats & Bennett PLLC, and Examiner MD K Talukder conducted telephonically on October 31, 2014. In the interview, the attendees discussed but did not agree to proposed amendments to overcome the indefiniteness rejection.

Claims 1-42 are rejected for failing to comply with the definiteness requirement. The Office argues that the functional language recited after the limitation "if" is not a required step or required functionality. Office Action, pg. 3. Applicant respectfully disagrees with this line of reasoning. The essential inquiry for determining compliance with the definiteness requirement is whether the claims "set out and circumscribe a particular subject matter with a reasonable degree of clarity and particularity." MPEP § 2173.02. The definiteness of a claim is not to be analyzed in a vacuum, but rather in light of the content of the particular application's disclosure, the teachings of the prior art, and the claim interpretation that would be given by one of skill in the art at the time the invention was made. *Id.* The test for definiteness is "**whether those skilled in the art would understand what is claimed** when the claim is read in light of the specification." *Orthokinetics, Inc. v. Safety Travel Chairs*, Inc., 806 F.2d 1565, 1576, 1 USPQ2d 1081, 1088 (Fed. Cir. 1986). Further, **the claim as a whole must be considered** "to determine whether the claim apprises one of ordinary skill in the art of its scope and, therefore, serves the notice function required by 35 U.S.C. 112, second paragraph, by providing clear warning to others as to what constitutes infringement of the patent." *Solomon v. Kimberly-Clark Corp.*, 216 F.3d 1372, 1379, 55 USPQ2d 1279, 1283 (Fed. Cir. 2000).

The Office has not asserted, let alone established, why the claimed features are believed to be indefinite from the perspective of one of ordinary skill in the art. As such, the Office does not make a *prima facie* rejection of the claims. Further, Applicant respectfully submits that the claims are indeed definite at least because a person of ordinary skill in the art would readily recognize that Applicant is claiming **conditional logic**. For instance, Claim 1 includes conditional logic associated with two "if" statements. Each "if" statement is used to introduce conditional language that when true performs functional language.

For instance, in the first "if" statement of claim 1, the conditional language of "the user terminal is scheduled to receive downlink transmissions on a single downlink component carrier associated with a primary cell" is checked and when true, the functional language of "receiving control information associated with the downlink transmissions to the user terminal on a first set of radio resources on an uplink component carrier associated with the primary cell" is performed. And, in the second "if" statement of claim 1, the conditional language of "the user terminal is scheduled to receive downlink transmissions on multiple downlink component carriers including the single downlink component carrier associated with the primary cell" is checked and when true, the functional language of "receiving control information associated with the downlink transmissions to the user terminal on a second set of radio resources on the uplink component carrier associated with the primary cell" is performed. Hence, the claimed features of claim 1 include a **causal relationship** between the conditional language and the functional language of each "if" statement.

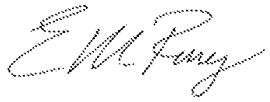
Furthermore, another claimed feature of claim 1 includes checking the conditional language of the first "if" statement **and** the conditional language of the second "if" statement. Hence, a person of ordinary skill in viewing claim 1 as a whole would understand what is claimed. Thus, claim 1 complies with the definiteness requirement. Accordingly, Applicant respectfully submits that claims 1-42 comply with the definiteness requirement, and requests that the rejection be withdrawn.

Claims 1-42 are rejected as being unpatentable over Nory in view of Marinier. For at least the reasons set forth in this Response, Applicant respectfully submits that Nory and Maranier fail to teach one or more of the claim elements of claims 1-42. Nory teaches that "if the UE is configured to receive PDSCH on a set of two component carriers, a first set of [bits] in the RB assignment field can signal the resource block allocation for the first component carrier and the remaining [bits] can signal the resource block allocation for the second component carrier." Nory, para. [0036], lns. 9-14. Nory fails to teach using "a first set of radio resources on an uplink component carrier associated with the primary cell," "a second set of radio resources on the uplink component carrier associated with the primary cell," and "the second set of resources are additional resources as compared to the first set of resources," as claimed. In addition, the subject matter of Nory is directed to the downlink and NOT to the uplink. Further, Marinier is not relied on to disclose these deficiencies. Thus, the combination of Nory and

Marinier do not teach claim 1. Therefore, Applicant submits that claims 1-42 are allowable over Nory in view of Marinier.

Favorable consideration is respectfully and earnestly solicited.

Respectfully submitted,



Dated: March 6, 2015

Edward M. Roney
Registration No. 62,048
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Electronic Patent Application Fee Transmittal

Application Number:	12896993
Filing Date:	04-Oct-2010
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Filer:	Edward Milton Roney/Kenyatta Upchurch
Attorney Docket Number:	4015-6942 / P30138-US2

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:				
Claims in Excess of 20	1202	2	80	160
Independent claims in excess of 3	1201	2	420	840
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 1 month with $0 paid	1251	1	200	200
Miscellaneous:				
RCE- 2nd and Subsequent Request	1820	1	1700	1700
		Total in USD ($)		**2900**

Electronic Acknowledgement Receipt	
EFS ID:	21694886
Application Number:	12896993
International Application Number:	
Confirmation Number:	1015
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Customer Number:	24112
Filer:	Edward Milton Roney/Kenyatta Upchurch
Filer Authorized By:	Edward Milton Roney
Attorney Docket Number:	4015-6942 / P30138-US2
Receipt Date:	06-MAR-2015
Filing Date:	04-OCT-2010
Time Stamp:	12:41:17
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	$2900
RAM confirmation Number	21596
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	P30138_US2_RCE_Transmittal.pdf	697930 f29c05c69b82f40388cd2c61496513e03532126b	no	3
Warnings:					
Information:					
2		P30138_US2_Amendment_Accompanying_RCE.pdf	81668 48920b36c29533d21583f1a33ce35815d8ea9090	yes	15

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment Submitted/Entered with Filing of CPA/RCE	1	1
	Claims	2	12
	Applicant Arguments/Remarks Made in an Amendment	13	15

Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	35580 245ebfacb4b8bbe2b0428046fd92789c97b15baa	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	815178		

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 12/896,993	Filing Date 10/04/2010	☐ 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	03/06/2015	(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))	* 44	Minus	** 42	= 2	X $80 =	160
	Independent (37 CFR 1.16(h))	* 6	Minus	***6	= 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	**160**

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
/ANDREA FREEMAN/

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/896,993	10/04/2010	David Astely	4015-6942 / P30138-US2	1015

24112 7590 10/15/2015

COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

EXAMINER
TALUKDER, MD K

ART UNIT	PAPER NUMBER
2648	

MAIL DATE	DELIVERY MODE
10/15/2015	PAPER

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.

Office Action Summary	Application No. 12/896,993	Applicant(s) ASTELY ET AL.	
	Examiner MD TALUKDER	Art Unit 2648	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 *03/06/2015*.

☐ 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) *1-44* 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) *1-44* 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 _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

1. The present application is being examined under the pre-AIA first to invent provisions.

2. It would be of great assistance to the office if all incoming papers pertaining to a filed application carried the following items:

i. Application number (checked for accuracy, including series code and serial no.).
ii. Group art unit number (copied from most recent Office communication).
iii. Filing date.
iv. Name of the examiner who prepared the most recent Office action.
v. Title of invention.
vi. Confirmation number (See MPEP § 503).

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 03/06/2015 has been entered.

4. The Examiner has pointed out particular references contained in the prior art of record within the body of this action for the convenience of the Applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages, paragraph and figures may apply. Applicant, in preparing the response, should consider fully the entire reference as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

Claim Interpretation

5. Examiner read the functional language recited afterwards (after "IF") is optional step (broadest reasonable interpretation being applied). One of the "If statement" will never occur; according to the broadest reasonable interpretation by the examiner since it is optional. All the independent claims having the same "If statement". For the purpose of expediting the processing of the application, Claims have been rejected in view of the prior art (see below) based on a broader interpretation that meets the claimed subject matter as interpreted by the Examiner.

Claim Rejection- 35 USC § 103

6. 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.

Claims 1-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nory (Pub No. 2010/0232373) and further in view of Marinier (Pub No. 2010/0322173).

Regarding claim 1, Nory teaches a method implemented by a base station of receiving control information from a user terminal (**Fig. 3 & 1: BS-101 receives control information from user terminals**), the method comprising: scheduling downlink transmissions to said user terminal on one or more downlink component carriers (scheduling- Para. 49: **"...If a sub frame n+1 with single component carrier allocation must follow a sub frame n with multi-component carrier allocation, both PDCCH-1 and PDCCH-2 can be transmitted in a sub-**

frame n+1 to only schedule the single component carrier resource assignment…"); if the user terminal is scheduled to receive downlink transmissions on a single downlink component carrier (Para. 17: **resource assignment for one component carrier**), receiving control information on a first set of radio resources on an uplink component carrier, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on downlink component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier…if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier) & (Para. 26: "Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted…") (also Para. 13-17) & (Para. 40-41, 44-47.** (Note: The other part of "If statement" has no patentable weight because that is optional and the second "If statement" will never occur; according to the broadest reasonable interpretation by the examiner since it is optional).

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

Therefore, it would have been obvious to one of the ordinary skilled in the art to which this invention pertains at the time it was made to use a primary cell in a downlink transmission process of Marinier's disclosure with resource allocation system for multiple component carriers, as taught by Nory. Doing so would have resulted in efficiently using and assigning resource blocks in uplink and downlink transmission system.

Regarding claim 2, 10, Nory teaches that the control information to the user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink primary component carrier (abstract: "**…The transceiver is also configured to receive a second control message on the anchor carrier, the second control message associated with a set of component carriers, the set of component carriers are distinct from the anchor carrier. The controller determines a resource assignment for at least one component carrier in the set of component carriers using both the first and the second control messages**").

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

At the time of the invention, it would have been obvious to one of the ordinary skilled in the art to use a primary cell in a downlink transmission process with resource allocation system for multiple component carriers for assigning resource blocks in uplink and downlink transmission system.

Regarding claim 3, 11, Nory teaches transmitting control information to the user

terminal on a downlink component carrier to implicitly or explicitly indicate the second set radio resources on the uplink primary component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier and the remaining ten bits can signal the resource block allocation for the second component carrier…**").

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

At the time of the invention, it would have been obvious to one of the ordinary skilled in the art to use a primary cell in a downlink transmission process with resource allocation system for multiple component carriers for assigning resource blocks in uplink and downlink transmission system.

Regarding claim 4, 12, Nory teaches at least one of the first and second sets of radio resources are indicated implicitly by at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier (**Fig. 3**).

Regarding claim 5, 13, Nory teaches one of the first and second sets of radio resources are indicated explicitly by an uplink control channel index (Para. 26: "**…Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE)**

on which PDCCH-A is transmitted. When a PDSCH is also scheduled to the UE in the same sub-frame as the PDCCH-A, multiple ACK/NACKs (one each for PDCCH-A and the PDSCH) can be transmitted using multiple PUCCH resources…").

Regarding claim 6, 14, Nory teaches the explicit indication is transmitted as radio resource control signaling (Para. 22: "**In first exemplary implementation, the base station configures UE via radio resource control (RRC) signaling with an anchor carrier. The UE is expected to only monitor PDCCH messages from the anchor carrier after initial access. Before assigning resources on non-anchor component carriers via individual PDCCH in each component carrier, base unit sends a configuration message to the UE instructing the UE, the set of component carriers, whose PDCCH messages are also expected to be monitored…").**

Regarding claim 7, 15, Nory teaches transmitting an acknowledgement resource indication on a downlink component carrier to dynamically assign said second set of radio resources on the uplink primary component carrier to the user terminal when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers (Para. 25: "**…The PDCCH-A can also include or indicate resources for acknowledging the transmission of the configuration message to increase reliability of signaling of the configuration message. Optionally, the base unit can also instruct the UE to send CQI for the set of component carriers identified in the long term bitmap by signaling a CQI-only uplink grant in the same sub-frame where PDCCH-A is transmitted. The configuration message can also optionally include a time offset limit before which UE should configure its receiver to monitor PDCCH messages from multiple**

component carriers") and (Para. **26, 36 & 40**).

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

At the time of the invention, it would have been obvious to one of the ordinary skilled in the art to use a primary cell in a downlink transmission process with resource allocation system for multiple component carriers for assigning resource blocks in uplink and downlink transmission system.

Regarding claim 8, 16, Nory teaches the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources (Para. 27: "**In a third exemplary implementation, the base station configures UE via radio resource control (RRC) signaling with an anchor carrier. The UE is expected to only monitor the anchor carrier after initial access. Before assigning resources on component carriers other than the anchor carrier, base unit sends a configuration message to the UE, instructing it, the set of component carriers, where PDSCH resource allocations are expected. The configuration message allows the UE to semi-statically configure its receiver to receive PDSCH on the set of component carriers**").

Regarding claim 9, Nory teaches a base station comprising: a transmitter to transmit user data on one or more downlink component carriers to a user terminal (**Fig. 1: transmission from BS-101 to remote unit-110**); and a controller to schedule downlink transmissions to said user

terminal, the downlink controller configured to schedule downlink transmissions to a user terminal on one or more downlink component carriers (scheduling- Para. 49: **"…If a sub frame n+1 with single component carrier allocation must follow a sub frame n with multi-component carrier allocation, both PDCCH-1 and PDCCH-2 can be transmitted in a sub-frame n+1 to only schedule the single component carrier resource assignment…");** if the user terminal is scheduled to receive downlink transmissions on a single downlink component carrier (Para. 17: **resource assignment for one component carrier**), receiving control information on a first set of radio resources on an uplink component carrier, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on downlink component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier…if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier) & (Para. 26: "Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted…") (also Para. 13-17).** (Note: The other part of "If statement" has no patentable weight because that is optional and the second "If statement" will never occur; according to the broadest reasonable interpretation by the examiner since it is optional).

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

Therefore, it would have been obvious to one of the ordinary skilled in the art to which this invention pertains at the time it was made to use a primary cell in a downlink transmission process of Marinier's disclosure with resource allocation system for multiple component carriers, as taught by Nory. Doing so would have resulted in efficiently using and assigning resource blocks in uplink and downlink transmission system.

Regarding claim 17, Nory teaches a user terminal of transmitting control information in a mobile communication network, the method comprising: receiving an assignment of radio resources for downlink transmissions from a base station (**Fig. 3 & 4 and Abstract: "A wireless communication terminal including a controller coupled to a wireless transceiver wherein the transceiver is configured to receive a first control message on an anchor carrier, the first control message including a resource assignment for the anchor carrier"**); transmitting on a first set of radio resources on an uplink component carrier, control information with the downlink transmission if the user terminal is scheduled to receive downlink transmissions on a single downlink component carrier (Para. 17: **resource assignment for one component carrier**) & (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier…if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB**

assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier), wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on downlink component carrier **(Para. 26: "Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted…") (also Para. 13-17).** (Note: The other part of "If statement" has no patentable weight because that is optional and the second "If statement" will never occur; according to the broadest reasonable interpretation by the examiner since it is optional).

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

Therefore, it would have been obvious to one of the ordinary skilled in the art to which this invention pertains at the time it was made to use a primary cell in a downlink transmission process of Marinier's disclosure with resource allocation system for multiple component carriers, as taught by Nory. Doing so would have resulted in efficiently using and assigning resource blocks in uplink and downlink transmission system.

Regarding claim 18, Nory teaches transmitting user data on the second set of radio resources if a single downlink component carrier is assigned for the downlink transmission (Para.

36: **"Alternately, if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier, UE can interpret that the Resource Block assignment bits are signaling a resource block assignment in groups of 4 resource blocks each"**).

Regarding claim 19, Claim 19 corresponds to claim 2 and is analyzed accordingly.

Regarding claim 20, Claim 20 corresponds to claim 3 and is analyzed accordingly.

Regarding claim 21, Claim 21 corresponds to claim 5 and is analyzed accordingly.

Regarding claim 22, Claim 22 corresponds to claim 6 and is analyzed accordingly.

Regarding claim 23, Claim 23 corresponds to claim 7 and is analyzed accordingly.

Regarding claim 24, Claim 24 corresponds to claim 8 and is analyzed accordingly.

Regarding claim 25 & 33 & 34, claim **25 & 33 & 34** corresponds to claim 17and/or 1, and is analyzed accordingly.

Regarding claim 26, Nory teaches transmitting user data on the second set of radio resources if a single downlink component carrier is assigned for the downlink transmission (Para. **36**: **"Alternately, if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier, UE can interpret that the Resource Block assignment bits are signaling a resource block assignment in groups of 4 resource blocks each"**).

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

At the time of the invention, it would have been obvious to one of the ordinary skilled in the art to use a primary cell in a downlink transmission process with resource allocation system for multiple component carriers for assigning resource blocks in uplink and downlink transmission system.

Regarding claim 27, Nory teaches the controller is further configured to receive control information from the base station on a downlink component carrier implicitly or explicitly identifying the second set of radio resources on the uplink primary component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier and the remaining ten bits can signal the resource block allocation for the second component carrier…**").

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

At the time of the invention, it would have been obvious to one of the ordinary skilled in the art to use a primary cell in a downlink transmission process with resource allocation system for multiple component carriers for assigning resource blocks in uplink and downlink

transmission system.

Regarding claim 28, Nory teaches the controller is further configured to receive at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying the second set of radio resources (**Fig. 3**).

Regarding claim 29, Nory teaches one of the first and second sets of radio resources are indicated explicitly by an uplink control channel index (Para. 26: "**…Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted. When a PDSCH is also scheduled to the UE in the same sub-frame as the PDCCH-A, multiple ACK/NACKs (one each for PDCCH-A and the PDSCH) can be transmitted using multiple PUCCH resources…**").

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

At the time of the invention, it would have been obvious to one of the ordinary skilled in the art to use a primary cell in a downlink transmission process with resource allocation system for multiple component carriers for assigning resource blocks in uplink and downlink transmission system.

Regarding claim 30, Nory teaches the explicit indication is transmitted as radio resource control signaling (Para. 22: "**In first exemplary implementation, the base station configures**

UE via radio resource control (RRC) signaling with an anchor carrier. The UE is expected to only monitor PDCCH messages from the anchor carrier after initial access. Before assigning resources on non-anchor component carriers via individual PDCCH in each component carrier, base unit sends a configuration message to the UE instructing the UE, the set of component carriers, whose PDCCH messages are also expected to be monitored…").

Regarding claim 31, Nory teaches the controller is further configured to receive, from a base station, an acknowledgement resource indication on a downlink component carrier dynamically assigning said second set of radio resources on the uplink primary component carrier when the user terminal is scheduled to receive downlink transmissions on the second single downlink component carrier or multiple downlink component carriers (Para. 25: "**…The PDCCH-A can also include or indicate resources for acknowledging the transmission of the configuration message to increase reliability of signaling of the configuration message. Optionally, the base unit can also instruct the UE to send CQI for the set of component carriers identified in the long term bitmap by signaling a CQI-only uplink grant in the same sub-frame where PDCCH-A is transmitted. The configuration message can also optionally include a time offset limit before which UE should configure its receiver to monitor PDCCH messages from multiple component carriers**") and (Para. **26, 36 & 40**).

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

At the time of the invention, it would have been obvious to one of the ordinary skilled in the art to use a primary cell in a downlink transmission process with resource allocation system for multiple component carriers for assigning resource blocks in uplink and downlink transmission system.

Regarding claim 32, Nory teaches the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources (Para. 27: "**In a third exemplary implementation, the base station configures UE via radio resource control (RRC) signaling with an anchor carrier. The UE is expected to only monitor the anchor carrier after initial access. Before assigning resources on component carriers other than the anchor carrier, base unit sends a configuration message to the UE, instructing it, the set of component carriers, where PDSCH resource allocations are expected. The configuration message allows the UE to semi-statically configure its receiver to receive PDSCH on the set of component carriers**").

Regarding Claims 35 to 42, The functional language recited afterwards (After "If") is optional. The "If statement" will never occur; according to the broadest reasonable interpretation by the examiner since it is optional. Therefore, those claims do not have any patentable weight.

Regarding claim 43, Nory teaches a method implemented by a base station of receiving control information from a user terminal, the method comprising: scheduling downlink transmissions to said user terminal on one or more downlink component carriers; and receiving on a first set or a second set of resources on an uplink component carrier associated with a primary cell (**Fig. 3 & 1: BS-101 receives control information from user terminals**) including: scheduling downlink transmissions to said user terminal on one or more downlink component

carriers (scheduling- Para. 49: **"…If a sub frame n+1 with single component carrier allocation must follow a sub frame n with multi-component carrier allocation, both PDCCH-1 and PDCCH-2 can be transmitted in a sub-frame n+1 to only schedule the single component carrier resource assignment…");** if the user terminal is scheduled to receive downlink transmissions on a single downlink component carrier (Para. 17: **resource assignment for one component carrier**), receiving control information on a first set of radio resources on an uplink component carrier, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on downlink component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier…if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier) & (Para. 26: "Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted…") (also Para. 13-17) & (Para. 40-41, 44-47.** (Note: The other part of "If statement" has no patentable weight because that is optional and the second "If statement" will never occur; according to the broadest reasonable interpretation by the examiner since it is optional).

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

Therefore, it would have been obvious to one of the ordinary skilled in the art to which this invention pertains at the time it was made to use a primary cell in a downlink transmission process of Marinier's disclosure with resource allocation system for multiple component carriers, as taught by Nory. Doing so would have resulted in efficiently using and assigning resource blocks in uplink and downlink transmission system.

Regarding claim 44, Nory teaches a base station comprising: a transmitter to transmit user data on one or more downlink component carriers to a user terminal; and a controller to schedule downlink transmissions to said user terminal, the downlink controller configured to: schedule downlink transmissions to a user terminal on one or more downlink component carriers; and receiving on a first set or a second set of resources on an uplink component carrier associated with a primary cell (**Fig. 3 & 1: BS-101 receives control information from user terminals)** including: scheduling downlink transmissions to said user terminal on one or more downlink component carriers (scheduling- Para. 49: **"…If a sub frame n+1 with single component carrier allocation must follow a sub frame n with multi-component carrier allocation, both PDCCH-1 and PDCCH-2 can be transmitted in a sub-frame n+1 to only schedule the single component carrier resource assignment…");** if the user terminal is scheduled to receive downlink transmissions on a single downlink component carrier (Para. 17: **resource assignment for one component carrier**), receiving control information on a first set of radio resources on an uplink component carrier, wherein the first set of radio resources is

reserved for user terminals scheduled to receive downlink transmissions on downlink component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier…if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier) & (Para. 26: "Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted…") (also Para. 13-17) & (Para. 40-41, 44-47.** (Note: The other part of "If statement" has no patentable weight because that is optional and the second "If statement" will never occur; according to the broadest reasonable interpretation by the examiner since it is optional).

Nory is silent regarding "the component carrier associated with a primary cell".

In a same field of endeavor, Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

Therefore, it would have been obvious to one of the ordinary skilled in the art to which this invention pertains at the time it was made to use a primary cell in a downlink transmission process of Marinier's disclosure with resource allocation system for multiple component carriers, as taught by Nory. Doing so would have resulted in efficiently using and assigning resource

blocks in uplink and downlink transmission system.

Response to Arguments

7. i. Applicant's arguments, with regards to claims have been fully considered but they are not persuasive.

ii. Applicant argument regarding "If" statement: Examiner fully consider the applicant arguments regarding "If" statement, however, they are not persuasive.

When there are multiple "If" statements in a claim, Examiner read one of the "If" statement is optional. If applicant want the examiner to consider all the limitation after "If" statement; then examiner would like to recommend the applicant to replace "If" with "When". Otherwise, examiner will maintain his interpretations (**broadest reasonable interpretation**) regarding claims.

iii. On Para 14-15, Applicant is arguing that prior art fails to teach "a first set of radio resources on an uplink component carrier associated with the primary cell".

Examiner respectfully disagrees with the applicant arguments because prior art either expressly or inherently teaches a first set of radio resources on an uplink component carrier associated with the primary cell. Nory teaches receiving control information on a first set of radio resources on an uplink component carrier, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on downlink component carrier (Para. 36: "**…if the UE is configured to receive PDSCH on a set of two component**

carrier, a first set of ten of the twenty bits in the RB assignment field can signal the resource block allocation for the first component carrier…if the UE is configured to receive PDSCH on only one component carrier then twenty eight bits can be used for RB assignment field to signal the resource block allocation for that single component carrier. In addition to this, if the UE is configured to receive PDSCH on only one component carrier) & (Para. 26: "Feedback transmission from the UE is possible on physical uplink control channel/physical uplink shared channel (PUCCH/PUSCH) of the anchor carrier. The PUCCH resource index implicitly assigned to the UE by the base station based on the lowest index of the Control Channel element (CCE) on which PDCCH-A is transmitted…") (also Para. 13-17) & (Para. 40-41, 44-47). Marinier teaches that the component carrier associated with the primary cell (Para. 16: **Down Link Component Carrier may include a primary serving cell).**

iv. According to KSR "Prior art is not limited just to the references being applied, but includes the understanding of one of ordinary skill in the art. The prior art reference (or references when combined) need not teach or suggest all the claim limitations, however, Office personnel must explain why the difference(s) between the prior art and the claimed invention would have been obvious to one of ordinary skill in the art. **The "mere existence of differences between the prior art and an invention does not establish the invention's nonobviousness." Dann v. Johnston, 425 U.S. 219, 230, 189 USPQ 257, 261 (1976).** The gap between the prior art and the claimed invention may not be "so great as to render the [claim] nonobvious to one reasonably skilled in the art." **In determining obviousness, neither the particular motivation to make the claimed invention nor the problem the inventor is solving controls**. The proper

analysis is whether the claimed invention would have been obvious to one of ordinary skill in the art after consideration of all the facts. See 35 U.S.C. 103(a). **Factors other than the disclosures of the cited prior art may provide a basis for concluding that it would have been obvious to one of ordinary skill in the art to bridge the gap**." *MPEP § 2141 (III)* **RATIONALES TO SUPPORT REJECTIONS UNDER 35 U.S.C. 103 (emphasis added).**

v. Therefore, in view of above reasons, examiner maintains the rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MD TALUKDER whose telephone number is (571)270-3222. The examiner can normally be reached on Monday to Friday (Alt Friday off) from (9:30 to 4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wesley Kim can be reached on 571-272-7867. 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.

/MD TALUKDER/
Examiner, Art Unit 2648

Notice of References Cited	Application/Control No. 12/896,993	Applicant(s)/Patent Under Reexamination ASTELY ET AL.	
	Examiner MD TALUKDER	Art Unit 2648	Page 1 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2002/0160784 A1	10-2002	Kuwahara, Soichi	H04W28/26	455/452.1
*	B	US-2010/0003997 A1	01-2010	KOYANAGI; Kenichiro	H04L1/0003	455/450
*	C	US-2010/0098012 A1	04-2010	Bala; Erdem	H04L5/001	370/329
*	D	US-2010/0208679 A1	08-2010	Papasakellariou; Aris	H04L1/1614	370/329
*	E	US-2010/0232373 A1	09-2010	Nory; Ravikiran	H04W72/1289	370/329
*	F	US-2010/0271970 A1	10-2010	Pan; Kyle Jung-Lin	H04L1/0026	370/252
*	G	US-2010/0285809 A1	11-2010	Lindstrom; Magnus	H04L5/001	455/450
*	H	US-2010/0296389 A1	11-2010	Khandekar; Aamod Dinkar	H04L5/0007	370/216
*	I	US-2010/0322173 A1	12-2010	Marinier; Paul	H04W76/048	370/329
*	J	US-2011/0007695 A1	01-2011	Choi; Hyung-Nam	H04L5/0007	370/329
*	K	US-2011/0007699 A1	01-2011	Moon; Sung Ho	H04L5/0053	370/329
*	L	US-2011/0081913 A1	04-2011	Lee; Jung A.	H04L5/003	455/450
*	M	US-2011/0081932 A1	04-2011	Astely; David	H04L5/001	455/509

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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	V	
	W	
	X	

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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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	Examiner MD TALUKDER	Art Unit 2648	Page 2 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2011/0243039 A1	10-2011	PAPASAKELLARIOU; Aris	H04L1/1861	370/280
*	B	US-2011/0310856 A1	12-2011	Hariharan; Priya	H04L1/1607	370/336
*	C	US-2012/0020317 A1	01-2012	Ishii; Hiroyuki	H04L1/1854	370/329
*	D	US-2012/0051306 A1	03-2012	Chung; Jae Hoon	H04L1/1893	370/329
*	E	US-2012/0082125 A1	04-2012	Huang; Yada	H04L5/0007	370/329
*	F	US-2012/0140708 A1	06-2012	Choudhury; Sayantan	H04W72/082	370/328
*	G	US-8,265,030 B2	09-2012	Miki; Nobuhiko	H04W72/1257	370/330
*	H	US-2012/0314675 A1	12-2012	Vujcic; Dragan	H04L5/001	370/329
*	I	US-2013/0010721 A1	01-2013	Aiba; Tatsushi	H04W72/0406	370/329
*	J	US-2013/0003700 A1	01-2013	Zhang; Jian	H04W76/028	370/331
*	K	US-2013/0034073 A1	02-2013	Aiba; Tatsushi	H04L1/0026	370/329
*	L	US-8,447,343 B2	05-2013	Gerstenberger; Dirk	H04W52/10	370/248
*	M	US-2013/0136084 A1	05-2013	ZHANG; Yuantao	H04W72/0413	370/329

FOREIGN PATENT DOCUMENTS

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U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-8,472,368 B2	06-2013	Baldemair; Robert	H04L5/0053	370/318
*	B	US-8,634,358 B2	01-2014	Damnjanovic; Jelena M.	H04L1/1861	370/329
*	C	US-8,792,830 B2	07-2014	Lim; Suhwan	H04L25/02	375/260
	D	US-				
	E	US-				
	F	US-				
	G	US-				
	H	US-				
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	L	US-				
	M	US-				

FOREIGN PATENT DOCUMENTS

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12896993	ASTELY ET AL.
	Examiner	Art Unit
	MD TALUKDER	2648

✓	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	12/13/2012	06/27/2013	04/30/2014	11/18/2014	10/13/2015				
	1	✓	✓	✓	✓	✓				
	2	✓	✓	✓	✓	✓				
	3	✓	✓	✓	✓	✓				
	4	✓	✓	✓	✓	✓				
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	36				✓	✓				

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12896993	ASTELY ET AL.
	Examiner	**Art Unit**
	MD TALUKDER	2648

✓	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	12/13/2012	06/27/2013	04/30/2014	11/18/2014	10/13/2015				
	37				✓	✓				
	38				✓	✓				
	39				✓	✓				
	40				✓	✓				
	41				✓	✓				
	42				✓	✓				
	43					✓				
	44					✓				

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	553	((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in. and ericsson.as.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 17:05
L2	553	(((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in.) and ericsson.as.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 17:05
L3	131	(((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in.) and ericsson.as. and carrier adj aggregation	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 17:07
L4	48	"455"/$.ccls. and (carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame)) and carrier adj aggregation	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 17:27
S1	1	"12896993"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 17:09
S2	367	((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:04
S3	176	S2 and (radio near3 resource)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:09
S4	28	S2 and (radio near3 resource) and (component with carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:09
S5	173	(downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:04
S6	137	S5 and (scheduling)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:04

S7	36	("20120263121" | "20110310856" | "20120127950" | "20110310819 " | "20120275395" | "20120287828" | "20120039291" | "20100271970" | "20120307781" | "20110286436" | "20120224535" | "20120140708" | "20110310820" | "20120163288" | "20110299486" | "20100098012" | "20120082125 " | "20120294273" | "20110268048" | "20120113910").pn.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:15
S8	127	(downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (carrier adj aggregation)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 10:16
S9	2	"20110292887"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:17
S11	25	((first 1st) adj6 component adj3 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:22
S12	1718	((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:47
S13	66	(carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:47
S14	10842	455/509,522,456.6,137,103,575.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:41
S15	28232	370/329,252,331.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:41
S16	102	(S14 S15) and (downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:42
S17	1	"13140333"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:18
S18	2	"20110310856"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:18

S19	38	((first 1st) adj6 component adj3 carrier) same ((radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:31
S20	38	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:31
S21	27	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj4 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:32
S22	38	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:32
S23	24	(carrier adj aggregation) and (schedul$3 near3 (downlink DL) with ((first primary initial) near6 (resource radio frequency frame)))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:48
S24	8	("7551898" | "7649960" | "7656843" | "7773699").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:14
S25	2	"20110292900"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:36
S26	2	"20100271970"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:37
S27	3	"8050202"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:38
S28	1	"20120307689"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:45
S29	2	"8160017"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:48
S30	2	"20100232373"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:48

S31	2	"20090016278"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 17:16
S32	2	"8265030"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 17:19
S33	3	"2008139923"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 18:17
S34	14	("20100098012" | "20100232373" | "20110310856" | "20120020317" | "20120082125" | "20120140708" | "8265030").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/29 17:19
S35	7	"455"/$.ccls. and (carrier adj aggregation) and (schedul$3 near3 (downlink DL) with ((first primary initial) near6 (resource radio frequency frame)))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/29 17:22
S36	9	"455"/$.ccls. and (((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/29 21:37
S38	4	("20070053294" | "20100290405").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/30 12:42
S39	16	("7596114" | "20050013279" | "20030219028" | "20070217406" | "20020105970" | "20060050664" | "20090303938" | "20070064669").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/30 12:42
S40	290	(first 1st) with (component near2 carrier) with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 10:07
S41	114	(first 1st) with (component near2 carrier) with down$1link and receiv$3 near3 control near3 information	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 10:09
S42	47	(first 1st) near3 (radio adj resource) and (second other another 2nd) near3 (radio adj resource) and component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:29
S43	26	S42 and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:31

S44	5	(first 1st) near3 (radio adj resource) and (second other another 2nd) near3 (radio adj resource) same (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:46
S45	26	(first 1st) near3 (radio adj resource) and (second other another 2nd) near3 (radio adj resource) and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:47
S46	31	(second other another 2nd) near3 (radio adj resource) and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:49
S47	0	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:51
S48	0	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:52
S49	1	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component) and ((down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:53
S50	1	@ad<"20091005" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component) and ((down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:55
S51	1	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:56
S52	20	(second other another 2nd) near3 (radio adj resource) and (carrier adj component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 13:31
S53	16	(set near3 radio near3 resource) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:14
S54	27	(set near3 ((radio near3 resource) (resource adj block))) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:19
S55	755	(((radio near3 resource) (resource adj block))) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:25

S56	70	((second 2nd other) with ((radio near3 resource) (resource adj block))) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:26
S57	327	(((radio near3 resource) (resource adj block))) same component adj carrier and (schedul$3 near3 downlink reverse)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:27
S58	29	((second 2nd other) with ((radio near3 resource) (resource adj block))) same component adj carrier and (schedul$3 near3 down$1link reverse$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:27
S59	24	((second 2nd other) with ((radio near3 resource) (resource adj block))) same (component adj carrier) same (down$1link reverse$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:31
S60	10	("20090097447" | "20110081856" | "20090116427" | "20100232373" | "8331307").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:49
S61	2562	(schedul$3 near3 downlink) and ((radio adj resource) (resource adj block)) and component	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:16
S62	739	(schedul$3 near3 downlink) and ((radio adj resource) (resource adj block)) and component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:17
S63	259	(schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) and component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:17
S64	39	(schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (component adj carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:18
S65	1	@ad<"20091005" and (schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (component adj carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:18
S66	1	@ad<"20091005" and (schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:20
S67	47	(schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:20

S68	356	"455"/$.ccls. and ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 17:10
S70	19	"455"/$.ccls. and (carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 17:17
S71	0	("2013/0107855").URPN.	USPAT	OR	ON	2013/06/18 09:15
S72	0	("2013/0107855").URPN.	US-PGPUB; USPAT	OR	ON	2013/06/18 09:16
S73	408	set near3 (radio frequency) near2 (resource band) same downlink and component	US-PGPUB; USPAT	OR	ON	2013/06/18 09:18
S74	17	set near3 (radio frequency) near2 (resource band) same downlink same (component adj carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 09:19
S75	19	(set group Cluster) near3 (radio frequency) near2 (resource band) same downlink same (component adj carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 09:21
S76	12	("8457060" | "20110310819" | "20100271970" | "20130034073" | "20100098012" | "20110310856" | "20110317653" | "20130083742" | "20130083741" | "20120114021" | "20120275395" | "20110317645" | "20110310856").pn.	US-PGPUB; USPAT	OR	ON	2013/06/18 09:31
S77	200	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource)	US-PGPUB; USPAT	OR	ON	2013/06/18 10:37
S78	2911	(UL up$link) with (set group) near6 (radio resource)	US-PGPUB; USPAT	OR	ON	2013/06/18 10:38
S79	110	S77 and S78	US-PGPUB; USPAT	OR	ON	2013/06/18 10:38
S80	3	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (set group) near6 (radio resource) with (2nd second other another) near2 component	US-PGPUB; USPAT	OR	ON	2013/06/18 10:47
S81	28	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 11:17
S82	5	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (second 2nd) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 11:20
S83	4	(1st first first primary initia) near3 (set group) near6 (radio resource) with (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 13:50
S84	3	(set group) near6 (radio resource) with (2nd second other another) near6 (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 13:52
S85	42	(set group) near6 (radio resource) with (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 13:58
S86	30	(set group) near3 ((radio resource)(resource near2 block)) with (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 14:07

S87	2	(second 2nd) near3 (down$1link DL) with ((component near3 carrier) CC) same (set group) with ((radio near2 resource) (resource near2 block))	US-PGPUB; USPAT	OR	ON	2013/06/18 14:14
S88	21	reserv$3 with component near3 carrier and (second near2 (radio frequency band))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/25 15:31
S89	36	"739528"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 09:34
S90	30	"5754138"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 09:35
S91	2046	(carrier near3 aggregation) and up$1link with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 10:24
S92	1052	(carrier near3 aggregation) and (component near3 carrier) same up$1link with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 10:26
S93	110	(carrier near3 aggregation) and (component near3 carrier) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 10:27
S95	17	("370"/$.ccls "455"/$.ccls.) and (aggregation) and (CC (component near3 carrier)) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 15:22
S96	67	370/329,341,348,395.4.ccls. and (carrier near3 aggregation) and (component near3 carrier) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 15:26
S97	345368	schedule (DL (down adj link) down$1link) and (carrier near3 aggregation) and ((UL up$link) adj6 associat$4 near4 (DL down$link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 16:45
S98	9	schedule near3 (DL (down adj link) down$1link) and (carrier near3 aggregation) same((UL up$link) adj6 associat$4 near4 (DL down$link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 16:46
S99	35	(schedule allocat$4) near3 (DL (down adj link) down$1link) and (carrier near3 aggregation) same((UL up$link) adj6 associat$4 near4 (DL down$link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 16:48

S100	0	(1st first) near3 (radio band resource frequency) with (1st first) near3 (CCcomponent adj carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 17:14
S101	216	(1st first) near3 (radio band resource frequency) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 17:14
S102	43	(1st first) near3 (radio band resource frequency) with (reserv$3 schedul$3 allocat$3) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 17:15
S103	22	("20100142455" | "20120009923" | "20100254329" | "20100091678" | "20110194501" | "20130010619" | "20080310359" | "20060274712" | "20100227569" | "20120208583" | "20110267978").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/27 09:57
S104	10	("20100254329" | "20100195624" | "20100023282" | "20090274100" | "20080316957").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/27 10:15
S105	50	("20100322173" | "20110081913" | "20130010721" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:25
S106	13348	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:40
S107	4330	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:42
S108	4200	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:43
S109	3823	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:44

S110	6130	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:44
S111	370	(S106 S107 S108 S109 S110) and (schedul$4 near3 down$1link) and (component near3 carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:45
S112	365	(S106 S107 S108 S109 S110) and (schedul$4 near3 down$1link) and (component near3 carrier) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:46
S113	357	(S106 S107 S108 S109 S110) and (schedul$4 near3 down$1link) and (component near carrier) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:47
S114	13	(S106 S107 S108 S109 S110) and (DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (component near3 carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:47
S115	40	(H03F3/211, H04B7/0617, H04B7/0669, H04B1/3833, H04M1/0247, H04M1/0237, H04L29/08657, G01S5/0252, G01S5/02, H04W52/367, H04W52/12, H04W52/40, H04W88/08, H04W72/044, H04W72/042).cpc. and (carrier near3 aggregation) and (component near3 carrier) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 14:17
S116	8750	(H04W88/08, H04W72/044, H04W72/042l).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:21
S117	4336	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:22
S118	4205	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:23
S119	4144	(H04L29/08657, G01S19/14, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:23
S120	3826	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:24
S121	47	(H04W88/08, H04W72/044, H04W72/042).cpc. and (1st first) near3 (radio band resource	US-PGPUB; USPAT;	OR	ON	2014/04/26 14:27

		frequency) with (1st first) near3 (CC (component adj carrier))	USOCR; DERWENT; IBM_TDB			
S122	25	(S116 S117 S118 S119 S120).cpc. and (1st first) near3 (radio band resource frequency) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 15:35
S123	13432	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S124	4341	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S125	4208	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S126	3833	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S127	6154	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S128	98	(S123 S124 S125 S126 S127) and (schedul$4 near3 down$1link) and (component near3 carrier) and single with carrier same (plurality multiple several) with (DL down$1link) with carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S129	52	(S123 S124 S125 S126 S127) and (schedul$4 near3 down$1link) and (component near3 carrier) and single near6 carrier same (plurality multiple several) near3 (DL down$1link) with carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S130	4	(S123 S124 S125 S126 S127) and (schedul$4) with component near3 carrier and (single near3 (DL down$1link)) with (first with resource) and (multiple plurality several) near3 (DL downlink) with second with resource	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:37
S131	2	(up$1link UL) and (schedul$4) with component near3 carrier same (single near3 (DL down$1link)) with (first with resource) same (multiple plurality several) near3 (DL downlink) with second with resource	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:40
S132	2	(schedul$4) with component near3 carrier same (single near3 (DL down$1link)) with (first with resource) same (multiple plurality several) near3 (DL downlink) with second with resource	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:42
S133	2	(schedul$4) same (single near3 (DL down$1link)) with (first with resource) same	US-PGPUB; USPAT;	OR	ON	2014/04/30 11:44

		(multiple plurality several) near3 (DL downlink) with second with resource	USOCR; DERWENT; IBM_TDB			
S134	2	(schedul$4) same (single near3 (DL down$1link)) with (first with (frequency resource block)) same (multiple plurality several) near3 (DL downlink) with second with (frequency block resource)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:45
S135	16	(single near3 (DL down$1link)) with (first with (frequency resource block)) same (multiple plurality several) near3 (DL downlink) with second with (frequency block resource)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:45
S136	1	allocation with (PUSCH PUCCH UL (up$1link)) and "20100232373"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 14:19
S137	1	allocation and (PUSCH PUCCH UL (up$1link)) and "20100232373"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 14:21
S138	2	"20100271970"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 14:32
S139	54	("20100322173" | "20110081913" | "20130010721" | "8634358" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20110243039" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 11:49
S140	15049	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S141	4737	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S142	4341	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S143	4030	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT;	OR	ON	2014/10/15 13:44

			USOCR; DERWENT; IBM_TDB			
S144	6785	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S145	96	(S140 S141 S142 S143 S144) and (schedul$4 near3 down$1link) and (component near3 carrier) and single with carrier same (plurality multiple several) with (DL down$1link) with carrier same (frequency resources)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S146	1	"13315135"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:54
S147	2	"20080151845"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 14:58
S148	41	"455"/$.ccls. and (carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 15:45
S149	3	"455"/451,452.1.ccls. and (carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 18:01
S150	33889	455/451,452.1,509,456.1,522,137,103,575.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:25
S151	0	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel Bin) same (sererv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:32
S152	0	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel Bin) same (rererv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:33
S153	4	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel Bin) same (reserv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:34
S154	3	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel Bin) same (reserv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin) and (CC component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:37
S155	4	"455"/$.ccls. and (((first 1st) adj6 component adj3 carrier) same ((radio resource frame)))	US-PGPUB; USPAT;	OR	ON	2014/10/23 11:39

		and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj6 (radio resource frame)) and (reserv$4 sav$4 us$3) near3 (other 2nd second another) adj3 (resource frequency channel Bin) and (CC component)	USOCR; DERWENT; IBM_TDB			
S156	15	("20050013279" | "20030219028" | "20070217406" | "20020105970" | "20060050664" | "20090303938" | "20070064669").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 12:07
S157	10	"455"/$.ccls. and (schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 12:07
S158	0	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel) same (rererv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 15:22
S161	15374	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S162	4758	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S163	4377	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S164	4042	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S165	6867	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S167	1	"14170939"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/17 09:46
S168	499	(component near2 carrier) with (primary near2 cell)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:07
S169	401	"370"/$.ccls. and (component near2 carrier) with (primary near2 cell)	US-PGPUB; USPAT; USOCR; DERWENT;	OR	ON	2014/11/18 14:07

			IBM_TDB			
S170	378	"370"/$.ccls. and (component adj2 carrier) with (primary adj2 cell)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:07
S171	185	"370"/$.ccls. and (component adj2 carrier) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:08
S172	4	"370"/$.ccls. and single near3 (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:17
S173	4	single near4 (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:19
S174	287	"370"/$.ccls. and (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:21
S175	1	@ad<"20091004" and "370"/$.ccls. and (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:22
S176	287	"370"/$.ccls. and (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:22
S177	29	("20100322173" | "20110081913" | "20130010721" | "8634358" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20110243039" | "8792830" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20020160784" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT	OR	OFF	2015/10/01 11:34
S178	21250	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:24
S179	5857	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR;	OR	ON	2015/10/01 17:24

			DERWENT; IBM_TDB			
S180	5079	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:24
S181	4391	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:24
S182	8620	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:24
S183	221	(S178 S179 S180 S181 S182) and (schedul$4 near3 down$1link) and (component near3 carrier) and single with carrier same (plurality multiple several) with (DL down$1link) with carrier same (frequency)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:24
S184	552	((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in. and ericsson.as.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:56
S185	1	S183 and S184	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:56
S186	21	455/$.ccls. and ((first 1st) adj6 component adj3 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 18:11
S187	24	("20100322173" | "20110081913" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20110243039" | "8792830" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20020160784" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT	OR	OFF	2015/10/02 12:23
S188	1	"14030298"	US-PGPUB; USPAT	OR	OFF	2015/10/02 15:41
S189	198	((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/03 16:15
S190	1	"14102508"	US-PGPUB; USPAT;	OR	ON	2015/10/13 14:17

			USOCR; DERWENT; IBM_TDB			
S191	0	"14158378"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:17
S192	1	"14097736"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:17
S193	2	"14006545"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:17
S194	1	"13875620"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:18
S195	1	"13905342"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:18
S196	1	"13477988"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:18
S197	2	"13293245"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:18
S198	1	"13875620"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:19
S199	2	"13993807"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:19
S200	1	"13898465"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:19
S201	1	"13883792"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:19
S202	1	"13996405"	US-PGPUB; USPAT;	OR	ON	2015/10/13 14:19

			USOCR; DERWENT; IBM_TDB			
S203	1	"13883002"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:20
S204	0	"14812058"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:20
S205	7	"8915660"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:20
S206	1	"13909538"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:21
S207	1	"13924238"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:22
S208	1	"13898465"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:23
S209	2	"13993807"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:23
S210	58	("20100322173" | "20110081913" | "20130010721" | "8634358" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20110243039" | "8792830" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20020160784" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:25
S211	1	"13906370"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:38
S212	58	("20100322173" | "20110081913" |	US-PGPUB;	OR	ON	2015/10/13

		"20130010721" | "8634358" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20110243039" | "8792830" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20020160784" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	USPAT; USOCR; DERWENT; IBM_TDB			14:51
S213	0	(H04W88/08, H04W72/044, H04W72/042).cpc. and (H04W52/367, H04W52/12, H04W52/40).cpc. and (H04L29/08657, G01S5/0252, G01S5/02).cpc. and (H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:55
S214	36289	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:56
S215	3	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and single near3 (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:56

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S159	0	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel) same (rerev$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin)	US-PGPUB; USPAT; * No UPAD	OR	ON	2014/10/31 15:24
S160	5	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (set group) near6 (radio resource) with (2nd second other another) near2 component	US-PGPUB; USPAT; * No UPAD	OR	ON	2014/10/31 15:26

10/ 13/ 2015 5:34:12 PM
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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12896993	ASTELY ET AL.
	Examiner	Art Unit
	MD TALUKDER	2648

CPC- SEARCHED		
Symbol	Date	Examiner
H04W88/08, H04W72/044, H04W72/042	4/22/2014 & 4/30/2014 & 10/31/2014	
H04W52/367, H04W52/12, H04W52/40	4/22/2014 & 4/30/2014 & 10/31/2014	Talukder
H04L29/08657, G01S5/0252, G01S5/02	4/22/2014 & 4/30/2014 & 10/31/2014	Talukder
H04B1/3833, H04M1/0247, H04M1/0237	4/22/2014 & 4/30/2014	Talukder
H03F3/211, H04B7/0617, H04B7/0669	4/22/2014 & 4/30/2014	
H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237	10/13/2015	Talukder

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
455	509,522,456.6,137,103,575	12/11/2012	
370	329,252,331	12/11/2012	Talukder
455	Text	6/17/2013	
370	329,341,348,395.4	6/26/2013	
455	All	10/13/2015	Talukder

SEARCH NOTES		
Search Notes	Date	Examiner

SEARCH NOTES		
Search Notes	**Date**	**Examiner**
East Search	12/10/2012	talukder
East Search	12/11/2012	talukder
East Search	6/17/2013	talukder
East Search	6/18/2013	talukder
East Search	6/26/2013	talukder
East Search	6/27/2013	
East Search	4/22/2014 & 4/30/2014	
Text Srarched	10/31/2014	Talukder
Assignee Searched	10/13/2015	Talukder
Inventor Searched	10/13/2015	Talukder
East Searched	10/13/2015	Talukder

INTERFERENCE SEARCH			
US Class/ CPC Symbol	**US Subclass / CPC Group**	**Date**	**Examiner**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/896,993	10/04/2010	David Astely	4015-6942 / P30138-US2	1015

24112 7590 02/01/2016
COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

EXAMINER	
TALUKDER, MD K	

ART UNIT	PAPER NUMBER
2648	

MAIL DATE	DELIVERY MODE
02/01/2016	PAPER

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.

Applicant-Initiated Interview Summary	Application No.	Applicant(s)	
	12/896,993	ASTELY ET AL.	
	Examiner	Art Unit	
	MD TALUKDER	2648	

All participants (applicant, applicant's representative, PTO personnel):

(1) *MD TALUKDER*. (3)_____.

(2) *Edward Roney*. (4)_____.

Date of Interview: *26 January 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: *1*.

Identification of prior art discussed: _____.

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...)

During the interview claim 1 was discussed in view of the oustanding rejection. Examiner further clarified his position of the pending rejection in the interview while no agreement was reached with respect to allowability..

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

/MD TALUKDER/ Examiner, Art Unit 2648	

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 Application of **David Astely et al.**	
Serial No.: **12/896,993**	Examiner: Md K. Talukder
Filed: **October 4, 2010**	Group Art Unit: 2648
For: **PUCCH Resource Allocation for Carrier Aggregation for LTE-Advanced**	Confirmation No.: 1015
Docket No: **4015-6942 / P30138-US2**	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO NON-FINAL OFFICE ACTION

This paper is being filed in response to the Non-Final Office Action mailed October 15, 2016. Reconsideration is respectfully requested in light of the amendments and/or remarks below. The Office is hereby authorized to charge any fees required for entry of this paper to Deposit Account 18-1167.

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method implemented by a base station of receiving control information from a user terminal, the method comprising:

scheduling downlink transmissions to **a first**~~said~~ user terminal **on a single downlink component carrier associated with a primary cell and a second user terminal on multiple downlink component carriers including the single downlink component carrier associated with the primary cell**~~on one or more downlink component carriers~~;

~~if the user terminal is scheduled to receive downlink transmissions on a single downlink component carrier associated with a primary cell,~~ receiving control information associated with the downlink transmissions to the **first** user terminal on a first set of radio resources on an uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; and

~~if the user terminal is scheduled to receive downlink transmissions on multiple downlink component carriers including the single downlink component carrier associated with the primary cell,~~ receiving control information associated with the downlink transmissions to the **second** user terminal on a second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources.

2. (Currently amended) The method of claim 1 further comprising transmitting control information to the **first** user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink component carrier associated with the primary cell.

3. (Currently amended) The method of claim **1[[2]]** further comprising transmitting control information to the **second** user terminal on a downlink component carrier to implicitly or explicitly indicate the second set radio resources on the uplink component carrier associated with the primary cell.

4. (Original) The method of claim 3 wherein at least one of the first and second sets of radio resources are indicated implicitly by at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier.

5. (Original) The method of claim 3 wherein at least one of the first and second sets of radio resources are indicated explicitly by an uplink control channel index.

6. (Original) The method of claim 5 wherein the explicit indication is transmitted as radio resource control signaling.

7. (Currently amended) The method of claim 1 further comprising transmitting an acknowledgement resource indication on the single downlink component carrier associated with the primary cell to dynamically assign said second set of radio resources on the uplink component carrier associated with the primary cell to the **second** user terminal when the **second** user terminal is scheduled to receive downlink transmissions on the multiple downlink component carriers.

8. (Original) The method of claim 7 wherein the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources.

9. (Currently amended) A base station comprising:

a transmitter to transmit user data on one or more downlink component carriers to a **first** user terminal **and a second user terminal**; and

a controller to schedule downlink transmissions to **the first**~~said~~ user terminal **and the second user terminal**, the ~~downlink~~ controller configured to:

schedule downlink transmissions to **the first[[a]]** user terminal **on a single downlink component carrier associated with a primary cell and the second user terminal on multiple downlink component carriers including the single downlink component carrier associated with the primary cell**~~on one or more downlink component carriers~~;

~~if the user terminal is scheduled to receive downlink transmissions on a single downlink component carrier associated with a primary cell,~~ receive control information associated with the downlink transmissions to the **first** user terminal on a first set of radio resources on an uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; and

~~if the user terminal is scheduled to receive downlink transmissions on multiple downlink component carriers including the single downlink component carrier associated with the primary cell,~~ receive control information associated with the downlink transmissions to the **second** user terminal on a second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources.

10. (Currently amended) The base station of claim 9 wherein the controller is further configured to transmit control information to the **first** user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink component carrier associated with the primary cell.

11. (Currently amended) The base station of claim **9[[10]]** wherein the controller is further configured to transmit control information to the **second** user terminal on a downlink component carrier to implicitly or explicitly indicate the second set of radio resources on the uplink component carrier associated with the primary cell.

12. (Original) The base station of claim 11 wherein the controller is further configured to indicate at least one of the first and second sets of radio resources implicitly by sending at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier.

13. (Original) The base station of claim 11 wherein the controller is further configured to indicate at least one of the first and second sets of radio resources explicitly by sending an uplink control channel index.

14. (Original) The base station of claim 13 wherein the controller is further configured to send the explicit indication as radio resource control signaling.

15. (Currently amended) The base station of claim 9 wherein the controller is further configured to transmit an acknowledgement resource indication on a downlink component carrier to dynamically assign said second set of radio resources on the uplink component carrier associated with the primary cell to the **second** user terminal when the **second** user terminal is scheduled to receive downlink transmissions on the multiple downlink component carriers.

16. (Original) The base station of claim 15 wherein the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources.

17. (Currently amended) A method implemented by a user terminal of transmitting control information in a mobile communication network, the method comprising:

receiving an assignment of radio resources for downlink transmissions from a base station;

transmitting, on a first set of radio resources on an uplink component carrier associated with a primary cell, control information associated with the downlink transmissions **[[if]]**<u>**responsive to receiving**</u> an assignment of a single downlink component carrier associated with the primary cell ~~**is received**~~ for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; and

transmitting, on a second set of radio resources on the uplink component carrier associated with the primary cell, control information associated with the downlink transmissions **[[if]]**<u>**responsive to receiving**</u> an assignment of multiple downlink component carriers including the single downlink component carrier associated with the primary cell for the downlink transmission ~~**is received**~~, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources.

18. (Previously presented) The method of claim 17 further comprising transmitting user data on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

19. (Previously presented) The method of claim 17 further comprising receiving control information from the base station on a downlink component carrier implicitly or explicitly indicating the second set of radio resources on the uplink component carrier associated with the primary cell.

20. (Previously presented) The method of claim 19 wherein receiving control information comprises receiving at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying said second set of resources.

21. (Original) The method of claim 19 wherein receiving control information comprises receiving an uplink control channel index explicitly identifying said second set of resources.

22. (Original) The method of claim 21 wherein the explicit indication is received as radio resource control signaling.

23. (Previously presented) The method of claim 17, further comprising receiving, from a base station, an acknowledgement resource indication on the single downlink component carrier associated with the primary cell to dynamically assign said second set of radio resources on the uplink component carrier associated with the primary cell when the user terminal is scheduled to receive downlink transmissions on the multiple downlink component carriers.

24. (Original) The method of claim 23 further comprising selecting the second set of resources from a semi-static set of uplink resources responsive to the acknowledgement resource indication.

25. (Currently amended) A user terminal for mobile communications, the user terminal comprising:

a receiver to receive downlink transmissions from a base station;

a transmitter to transmit control information associated with the downlink transmission to a base station; and

a controller to select radio resources for transmission of control information associated with the downlink transmissions, the controller configured to:

select a first set of radio resources on an uplink component carrier associated with a primary cell **[[if]]responsive to receiving** an assignment of a single downlink component carrier associated with the primary cell ~~**is received**~~ for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; and

select a second set of radio resources on the uplink component carrier associated with the primary cell **[[if]]responsive to receiving** an assignment of multiple downlink component carriers including the single downlink component carrier associated with the primary cell for the downlink transmission ~~**is received**~~, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources.

26. (Previously presented) The user terminal of claim 25 configured to transmit user data on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

27. (Previously presented) The user terminal of claim 25 wherein the controller is further configured to receive control information from the base station on a downlink component carrier implicitly or explicitly identifying the second set of radio resources on the uplink component carrier associated with the primary cell.

28. (Original) The user terminal of claim 27 wherein the controller is further configured to receive at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying the second set of radio resources.

29. (Previously presented) The user terminal of claim 27 wherein the controller is further configured to receive an uplink control channel index explicitly identifying the second set of radio resources on the uplink component carrier associated with the primary cell.

30. (Original) The user terminal of claim 29 wherein the controller is further configured to receive the explicit indication as radio resource control signaling.

31. (Previously presented) The user terminal of claim 25 wherein the controller is further configured to receive, from a base station, an acknowledgement resource indication on a downlink component carrier dynamically assigning said second set of radio resources on the uplink component carrier associated with the primary cell when the user terminal is scheduled to receive downlink transmissions on the multiple downlink component carriers.

32. (Original) The user terminal of claim 31 wherein the controller is configured to select the second set of resources from a semi-static set of uplink resources responsive to the acknowledgement resource indication.

33. (Currently amended) A method implemented by a user terminal in a mobile communication network, the method comprising:

receiving an assignment of radio resources for a downlink transmissions from a base station;

transmitting control information associated with the downlink transmission on a first set of radio resources on an uplink component carrier associated with a primary cell **[[if]]**<u>**responsive to receiving**</u> an assignment of a first downlink component carrier associated with the primary cell ~~**is received**~~ for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier associated with the primary cell; and

transmitting control information associated with the downlink transmission on a second set of radio resources on the uplink component carrier associated with the primary cell **[[if]]**<u>**responsive to receiving**</u> an assignment of the first downlink component carrier associated with the primary cell and a second single downlink component carrier associated with a non-primary cell for the downlink transmission ~~**is received**~~, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier and the second single downlink component carrier and the second set of resources are additional resources as compared to the first set of resources.

34. (Currently amended) A user terminal for mobile communications, the user terminal comprising:

a receiver to receive downlink transmissions from a base station;

a transmitter to transmit control information associated with the downlink transmission to a base station; and

a controller to select radio resources for transmission of control information associated with downlink transmissions, the controller configured to:

select a first set of radio resources on an uplink component carrier associated with a primary cell **[[if]]**<u>**responsive to receiving**</u> an assignment of a first downlink component carrier associated with the primary cell ~~**is received**~~ for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier associated with the primary cell; and

select a second set of radio resources on the uplink component carrier associated with the primary cell **[[if]]**<u>**responsive to receiving**</u> an assignment of the first downlink component carrier associated with the primary cell and a second single downlink component carrier associated with a non-primary cell for the downlink transmission ~~**is received**~~, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier and the second single downlink component carrier and the second set of resources are additional resources as compared to the first set of resources.

35. (Previously presented) The method of claim 1, further comprising:

receiving user data on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

36. (Previously presented) The method of claim 1, further comprising:

receiving control signaling on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

37. (Previously presented) The base station of claim 9, further configured to:
receive user data on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

38. (Previously presented) The base station of claim 9, further configured to:
receive control signaling on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

39. (Previously presented) The method of claim 17, further comprising:
transmitting control signaling on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

40. (Previously presented) The user terminal of claim 25, further configured to:
transmit control signaling on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

41. (Currently amended) The method of claim 1, further comprising:
if the **first** user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier associated with a non-primary cell, receiving control information associated with the downlink transmissions to the **first** user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second single downlink component carrier.

42. (Currently amended) The base station of claim 9, further configured to:

if the **first** user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier associated with a non-primary cell, receive control information associated with the downlink transmissions to the **first** user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second single downlink component carrier.

43. (Currently amended) A method implemented by a base station of receiving control information from a **first** user terminal **and a second user terminal**, the method comprising:

scheduling downlink transmissions to **the first** ~~said~~ user terminal **on a single downlink component carrier associated with a primary cell and the second user terminal on multiple downlink component carriers including the single downlink component carrier associated with the primary cell** ~~on one or more downlink component carriers~~; and

receiving on a first set or a second set of resources on an uplink component carrier associated with a primary cell, including:

~~if the user terminal is scheduled to receive downlink transmissions on a single downlink component carrier associated with a primary cell,~~ receiving control information associated with the downlink transmissions to the **first** user terminal on the first set of radio resources on the uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; and

~~if the user terminal is scheduled to receive downlink transmissions on multiple downlink component carriers including the single downlink component carrier associated with the primary cell,~~ receiving control information associated with the downlink transmissions to the **second** user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources.

44. (Currently amended) A base station comprising:

a transmitter to transmit user data on one or more downlink component carriers to a **first** user terminal **and a second user terminal**; and

a controller to schedule downlink transmissions to **the first**~~said~~ user terminal **and the second user terminal**, the ~~downlink~~ controller configured to:

schedule downlink transmissions to **the first[[a]]** user terminal **on a single downlink component carrier associated with the primary cell and the second user terminal on multiple downlink component carriers including the single downlink component carrier associated with the primary cell**~~on one or more downlink component carriers~~; and

receiving on a first set or a second set of resources on an uplink component carrier associated with a primary cell, including:

~~if the user terminal is scheduled to receive downlink transmissions on a single downlink component carrier associated with the primary cell,~~ receive control information associated with the downlink transmissions to the **first** user terminal on the first set of radio resources on the uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; and

~~if the user terminal is scheduled to receive downlink transmissions on multiple downlink component carriers including the single downlink component carrier associated with the primary cell,~~ receive control information associated with the downlink transmissions to the **second** user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources.

45. (New) The method of claim 1, wherein the first user equipment is the same as the second user equipment.

46. (New) The method of claim 1, wherein the first user equipment is different from the second user equipment.

47. (New) The base station of claim 9, wherein the first user equipment is the same as the second user equipment.

48. (New) The base station of claim 9, wherein the first user equipment is different from the second user equipment.

49. (New) The method of claim 43, wherein the first user equipment is the same as the second user equipment.

50. (New) The method of claim 43, wherein the first user equipment is different from the second user equipment.

51. (New) The base station of claim 44, wherein the first user equipment is the same as the second user equipment.

52. (New) The base station of claim 44, wherein the first user equipment is different from the second user equipment.

REMARKS

After entry of this Response, Claims 1-44 are pending. Claims 1-3, 7, 9-11, 15, 17, 25, 33-34 and 41-44 are amended. Claims 45-52 are newly added. No new matter is introduced by the present Response.

THE EXAMINER INTERVIEW

Pursuant to the provisions of 37 C.F.R. § 1.133(b), Applicant wishes to make of record the substance of an interview between Applicant's undersigned representative, Edward M. Roney of Coats & Bennett PLLC, and Examiner MD K Talukder conducted telephonically on January 26, 2016. In the interview, the attendees discussed differences between the cited art and the claimed invention but no agreement was reached.

THE OBVIOUSNESS REJECTION

Without limiting the claims, the present application relates to assigning either a first set of resources on an uplink component carrier for a single downlink component carrier or a second set of resources on multiple downlink component carriers that includes the single downlink component carrier.

Independent claims 1, 9, 43 and 44 are rejected as being obvious over Nory (US 2010/232,373) and Marinier (2010/322,173). Applicant respectfully submits that Nory and Maranier fail to teach one or more of the claim elements of amended independent claims 1, 9, 43 and 44. For instance, amended claim 1 is allowable at least because Nory and Maranier fail to teach the claim limitations of "scheduling downlink transmissions to a first user terminal on a single downlink component carrier associated with a primary cell and a second user terminal on multiple downlink component carriers including the single downlink component carrier associated with the primary cell," "receiving control information associated with the downlink transmissions to the first user terminal on a first set of radio resources on an uplink component carrier associated with the primary cell," "receiving control information associated with the downlink transmissions to the second user terminal on a second set of radio resources on the uplink component carrier associated with the primary cell," and "the second set of resources are additional resources as compared to the first set of resources."

Nory teaches that "if the UE is configured to receive PDSCH on a set of two component carriers, a first set of [bits] in the RB assignment field can signal the resource block allocation for the first component carrier and the remaining [bits] can signal the resource block allocation for

the second component carrier." Nory, para. [0036], lns. 9-14. However, Nory fails to teach using "a first set of radio resources on an uplink component carrier associated with the primary cell," "a second set of radio resources on the uplink component carrier associated with the primary cell," and "the second set of resources are additional resources as compared to the first set of resources," as claimed. In addition, the subject matter of Nory is directed to the downlink and NOT to the uplink.

These deficiencies of Nory are not cured by Marinier. In fact, the Office does not rely on Marinier to disclose these limitations. Thus, the combination of Nory and Marinier fails to teach amended claim 1. Therefore, for at least the reasons given in this Response, Applicant submits that amended independent claims 1, 9, 43 and 44 are allowable over Nory in view of Marinier.

Independent claims 17, 25, 33 and 34 are rejected as being obvious over Nory and Marinier. Applicant respectfully submits that Nory and Maranier fail to teach one or more of the claim elements of amended claims 17, 25, 33 and 34. For instance, amended claim 17 is allowable at least because Nory and Maranier fail to teach the claim limitations of "transmitting, on a first set of radio resources on an uplink component carrier associated with a primary cell, control information associated with the downlink transmissions responsive to receiving an assignment of a single downlink component carrier associated with the primary cell for the downlink transmission," "transmitting, on a second set of radio resources on the uplink component carrier associated with the primary cell, control information associated with the downlink transmissions responsive to receiving an assignment of multiple downlink component carriers including the single downlink component carrier associated with the primary cell for the downlink transmission," and "the second set of resources are additional resources as compared to the first set of resources."

Similar to the aforementioned arguments, Nory fails to teach using "a first set of radio resources on an uplink component carrier associated with the primary cell," "a second set of radio resources on the uplink component carrier associated with the primary cell," and "the second set of resources are additional resources as compared to the first set of resources," as claimed. In addition, the subject matter of Nory is directed to the downlink and NOT the uplink. Further, Marinier is not relied on to disclose these limitations. Thus, the combination of Nory and Marinier fails to teach amended claim 17. Therefore, for at least the reasons given in this Response, Applicant submits that amended independent claims 17, 25, 33 and 34 are allowable over Nory in view of Marinier.

The remaining dependent claims are also allowable at least due to their dependence on an allowable independent claim.

Favorable consideration is respectfully and earnestly solicited.

Respectfully submitted,

Dated: February 12, 2016

/Edward M. Roney/
Edward M. Roney
Registration No. 62,048
Phone: 919.719.4870

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	12896993
Filing Date	2010-10-04
First Named Inventor	David Astely et al.
Art Unit	2648
Examiner Name	Md K. Talukder
Attorney Docket Number	4015-6942 / P30138-US2

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12896993
	Filing Date	2010-10-04
	First Named Inventor	David Astely et al.
	Art Unit	2648
	Examiner Name	Md K. Talukder
	Attorney Docket Number	4015-6942 / P30138-US2

	1	NTT DOCOMO, Inc., "UL Layered Control Signal Structure in LTE-Advanced", 3GPP DRAFT RAN WG1 Meeting #54bis; RI-083679 UL LAYERED CONTROL SIGNAL, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. Ran WG1, no. Prague, Czech Republic; 20080929-20081003, 29 September 2008 (2008-09-29), XP050597042, [retrieved on 2008-09-24]

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	12896993
	Filing Date	2010-10-04
	First Named Inventor	David Astely et al.
	Art Unit	2648
	Examiner Name	Md K. Talukder
	Attorney Docket Number	4015-6942 / P30138-US2

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the 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 the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Edward M. Roney, Reg. No. 62048/	Date (YYYY-MM-DD)	2016-02-12
Name/Print	Edward M. Roney	Registration Number	62048

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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.**

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 record s.

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of **Astely** *et al.*	)	
Serial No.: **12/896,993**	)	Examiner: Md K. Talukder
Filed: **October 4, 2010**	)	Group Art Unit: 2648
For: **PUCCH Resource Allocation for Carrier Aggregation for LTE-Advanced**	)	Confirmation No.: 1015
Attorney's Docket No: **4015-6942 / P30138-US2**	)	

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

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

In accordance with 37 C.F.R. 1.56, counsel wishes to make of record the attached items of information for the Examiner's consideration in connection with this application. Also attached is Form PTO/SB/08A for the Examiner's convenience in making such consideration of record. Inclusion herein of any particular item of information is not to be construed as an admission that same is prior art. Each item of information contained in the information disclosure statement:

☐ was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office, and this communication was not received by an individual designated in §1.56(c) more than thirty days prior to the filing of the information disclosure statement; or

☐ is a communication that was issued by a patent office in a counterpart foreign or international application or by the Office, and this communication was not received by any individual designated in § 1.56(c) more than thirty days prior to the filing of the information disclosure statement

☒ No statement re Patent Term Adjustment (PTA).

The Commissioner is hereby authorized to charge any fees that may be required or credit any overpayment to Deposit Account 18-1167.

Respectfully submitted,
COATS & BENNETT, P.L.L.C.

/ Edward M. Roney /
Edward M. Roney
Registration No.: 62,048
Telephone: (919) 854-1844

Dated: February 12, 2016

Electronic Patent Application Fee Transmittal

Application Number:	12896993
Filing Date:	04-Oct-2010
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Filer:	Edward Milton Roney/Robert Sivigny
Attorney Docket Number:	4015-6942 / P30138-US2

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:				
Claims in Excess of 20	1202	8	80	640
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Extension - 1 month with $0 paid	1251	1	200	200
Miscellaneous:				
		Total in USD ($)		**840**

Electronic Acknowledgement Receipt	
EFS ID:	24898101
Application Number:	12896993
International Application Number:	
Confirmation Number:	1015
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Customer Number:	24112
Filer:	Edward Milton Roney/Robert Sivigny
Filer Authorized By:	Edward Milton Roney
Attorney Docket Number:	4015-6942 / P30138-US2
Receipt Date:	12-FEB-2016
Filing Date:	04-OCT-2010
Time Stamp:	10:31:19
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	$840
RAM confirmation Number	7743
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		4015-6942_Response.pdf	94149 c641d1c27e39445104144377a5be59a9f184beb44	yes	19

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment/Req. Reconsideration-After Non-Final Reject	1	1
Claims	2	16
Applicant Arguments/Remarks Made in an Amendment	17	19

Warnings:

Information:

2	Information Disclosure Statement (IDS) Form (SB08)	4015-6942_IDS.pdf	1035428 dfa33b1b8646a5ef46ffe6640eb87a728c2a10e9	no	4

Warnings:

Information:

A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.

3	Transmittal Letter	4015-6942_IDS_Cover.pdf	91703 2cfbb4da64b189d60f408c0a36c0a9d5a7259f02	no	1

Warnings:

Information:

4	Non Patent Literature	R1-083679.pdf	7013378 2717af15354f688c866b9389e048dc9e464217dc	no	14

Warnings:

Information:

5	Fee Worksheet (SB06)	fee-info.pdf	32401 2bd78d1c178a416a3fbfdd6ee8f62fe83bb605c0	no	2

Warnings:

Information:	
Total Files Size (in bytes):	8267059

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 12/896,993	Filing Date 10/04/2010	☐ 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	02/12/2016	(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))	* 52	Minus	** 44	= 8	X $80 =	640
	Independent (37 CFR 1.16(h))	* 8	Minus	***8	= 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	**640**

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
/ROCHELLE GETER/

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
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NOTICE OF ALLOWANCE AND FEE(S) DUE

24112 7590 03/18/2016

COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

EXAMINER	
TALUKDER, MD K	
ART UNIT	PAPER NUMBER
2648	

DATE MAILED: 03/18/2016

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/896,993	10/04/2010	David Astely	4015-6942 / P30138-US2	1015

TITLE OF INVENTION: PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced

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	06/20/2016

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.

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)

24112 7590 03/18/2016
COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

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.
12/896,993	10/04/2010	David Astely	4015-6942 / P30138-US2	1015

TITLE OF INVENTION: PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced

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	06/20/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS
TALUKDER, MD K	2648	455-509000

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

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/896,993	10/04/2010	David Astely	4015-6942 / P30138-US2	1015

24112 7590 03/18/2016

COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

EXAMINER	
TALUKDER, MD K	
ART UNIT	PAPER NUMBER
2648	

DATE MAILED: 03/18/2016

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. 12/896,993	Applicant(s) ASTELY ET AL.	
	Examiner MD TALUKDER	Art Unit 2648	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 *03/09/2016*.
   ☐ 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 *1-52*. 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 _____
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 _____.

/MD TALUKDER/
Examiner, Art Unit 2648

1. The present application is being examined under the pre-AIA first to invent provisions.

2. It would be of great assistance to the office if all incoming papers pertaining to a filed application carried the following items:

i. Application number (checked for accuracy, including series code and serial no.).
ii. Group art unit number (copied from most recent Office communication).
iii. Filing date.
iv. Name of the examiner who prepared the most recent Office action.
v. Title of invention.
vi. Confirmation number (See MPEP § 503).

Examiner's Amendment

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee. Authorization for this examiner's amendment was given in a telephone interview with Edward Roney on March 9th, 2016.

Amended as follows:

1. (Currently amended) A method implemented by a base station of receiving control information from a user terminal, the method comprising:

scheduling downlink transmissions to a first user terminal on a single downlink component carrier associated with a primary cell and a second user terminal on multiple downlink component carriers including the single downlink component carrier associated with the primary cell;

receiving control information associated with the downlink transmissions to the first user terminal on a first set of radio resources on an uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; **[[**and**]]**

receiving control information associated with the downlink transmissions to the second user terminal on a second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources**; and**

transmitting, on the single downlink component carrier, an indication to assign the second set of radio resources when the second user terminal is scheduled to receive the downlink transmissions on the multiple downlink component carriers.

9. (Currently amended) A base station comprising:

a transmitter to transmit user data on one or more downlink component carriers to a first user terminal and a second user terminal; and

a controller to schedule downlink transmissions to the first user terminal and the second user terminal, the controller configured to:

schedule downlink transmissions to the first user terminal on a single downlink component carrier associated with a primary cell and the second user terminal on multiple downlink component carriers including the single downlink component carrier associated with the primary cell;

receive control information associated with the downlink transmissions to the first user terminal on a first set of radio resources on an uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; **[[**and**]]**

receive control information associated with the downlink transmissions to the second user terminal on a second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources**; and**

transmit, on the single downlink component carrier, an indication to assign the second set of radio resources when the second user terminal is scheduled to receive the downlink transmissions on the multiple downlink component carriers.

17. (Currently amended) A method implemented by a user terminal of transmitting control information in a mobile communication network, the method comprising:

receiving an assignment of radio resources for downlink transmissions from a base station;

transmitting, on a first set of radio resources on an uplink component carrier associated with a primary cell, control information associated with the downlink transmissions responsive to receiving an assignment of a single downlink component carrier associated with the primary cell for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; **[[**and**]]**

transmitting, on a second set of radio resources on the uplink component carrier associated with the primary cell, control information associated with the downlink transmissions responsive to receiving an assignment of multiple downlink component carriers including the single downlink component carrier associated with the primary cell for the downlink transmission, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources**; and**

receiving, on the single downlink component carrier, an indication to assign the second set of radio resources when the user terminal is scheduled to receive the downlink transmissions on the multiple downlink component carriers.

25. (Currently amended) A user terminal for mobile communications, the user terminal comprising:

a receiver to receive downlink transmissions from a base station;

a transmitter to transmit control information associated with the downlink transmission to a base station; and

a controller to select radio resources for transmission of control information associated with the downlink transmissions, the controller configured to:

select a first set of radio resources on an uplink component carrier associated with a primary cell responsive to receiving an assignment of a single downlink component carrier associated with the primary cell for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; **[[**and**]]**

select a second set of radio resources on the uplink component carrier associated with the primary cell responsive to receiving an assignment of multiple downlink component carriers including the single downlink component carrier associated with the primary cell for the downlink transmission, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources**; and**

receive, on the single downlink component carrier, an indication to assign the second set of radio resources when the user terminal is scheduled to receive the downlink transmissions on the multiple downlink component carriers.

33. (Currently amended) A method implemented by a user terminal in a mobile communication network, the method comprising:

receiving an assignment of radio resources for a downlink transmissions from a base station;

transmitting control information associated with the downlink transmission on a first set of radio resources on an uplink component carrier associated with a primary cell responsive to receiving an assignment of a first downlink component carrier associated with the primary cell for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier associated with the primary cell; **[[**and**]]**

transmitting control information associated with the downlink transmission on a second set of radio resources on the uplink component carrier associated with the primary cell responsive to receiving an assignment of the first downlink component carrier associated with the primary cell and a second ~~**single**~~ downlink component carrier associated with a non-primary cell for the downlink transmission, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier and the second ~~**single**~~ downlink component carrier and the second set of resources are additional resources as compared to the first set of resources**; and**

receiving, on the first downlink component carrier, an indication to assign the second set of radio resources when the user terminal is scheduled to receive the downlink transmissions on the first and second downlink component carriers.

34. (Currently amended) A user terminal for mobile communications, the user terminal comprising:

a receiver to receive downlink transmissions from a base station;

a transmitter to transmit control information associated with the downlink transmission to a base station; and

a controller to select radio resources for transmission of control information associated with downlink transmissions, the controller configured to:

select a first set of radio resources on an uplink component carrier associated with a primary cell responsive to receiving an assignment of a first downlink component carrier associated with the primary cell for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier associated with the primary cell; **[[**and**]]**

select a second set of radio resources on the uplink component carrier associated with the primary cell responsive to receiving an assignment of the first downlink component carrier associated with the primary cell and a second ~~**single**~~ downlink component carrier associated with a non-primary cell for the downlink transmission, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier and the second ~~**single**~~ downlink component carrier and the second set of resources are additional resources as compared to the first set of resources**; and**

receive, on the first downlink component carrier, an indication to assign the second set of radio resources when the user terminal is scheduled to receive the downlink transmissions on the first and second downlink component carriers.

43. (Currently amended) A method implemented by a base station of receiving control information from a first user terminal and a second user terminal, the method comprising:

scheduling downlink transmissions to the first user terminal on a single downlink component carrier associated with a primary cell and the second user terminal on multiple downlink component carriers including the single downlink component carrier associated with the primary cell; and

receiving on a first set or a second set of resources on an uplink component carrier associated with a primary cell, including:

receiving control information associated with the downlink transmissions to the first user terminal on the first set of radio resources on the uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; **[[**and**]]**

receiving control information associated with the downlink transmissions to the second user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources**; and**

transmitting, on the single downlink component carrier, an indication to assign the second set of radio resources when the second user terminal is scheduled to receive the downlink transmissions on the multiple downlink component carriers.

44. (Currently amended) A base station comprising:

a transmitter to transmit user data on one or more downlink component carriers to a first user terminal and a second user terminal; and

a controller to schedule downlink transmissions to the first user terminal and the second user terminal, the controller configured to:

schedule downlink transmissions to the first user terminal on a single downlink component carrier associated with the primary cell and the second user terminal on multiple downlink component carriers including the single downlink component carrier associated with the primary cell; and

receiving on a first set or a second set of resources on an uplink component carrier associated with a primary cell, including:

receive control information associated with the downlink transmissions to the first user terminal on the first set of radio resources on the uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; **[[**and**]]**

receive control information associated with the downlink transmissions to the second user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources**; and**

transmit, on the single downlink component carrier, an indication to assign the second set of radio resources when the second user terminal is scheduled to receive the downlink transmissions on the multiple downlink component carriers.

Reasons for Allowance

4. Claims 1-52 are allowed over the prior art record.

The following is an examiner's statement of reasons for allowance:

The following is an examiner's statement of reasons for allowance: Interpreting the claims in light of the specification and based on applicant's argument filed on 02/12/2016 examiner finds the claimed invention is patentably distinct from the prior art of record. The prior art does not expressly teach or render obvious the invention as recited in the independent claims.

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

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MD TALUKDER whose telephone number is (571)270-3222. The examiner can normally be reached on Monday to Friday (Alt Friday off) from (9:30 to 4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wesley Kim can be reached on 571-272-7867. 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.

/MD TALUKDER/

Examiner, Art Unit 2648

Notice of References Cited	Application/Control No. 12/896,993	Applicant(s)/Patent Under Reexamination ASTELY ET AL.	
	Examiner MD TALUKDER	Art Unit 2648	Page 1 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2002/0160784 A1	10-2002	Kuwahara, Soichi	H04W28/26	455/452.1
*	B	US-2010/0003997 A1	01-2010	KOYANAGI; Kenichiro	H04L1/0003	455/450
*	C	US-2010/0098012 A1	04-2010	Bala; Erdem	H04L5/001	370/329
*	D	US-2010/0208679 A1	08-2010	Papasakellariou; Aris	H04L1/1614	370/329
*	E	US-2010/0232373 A1	09-2010	Nory; Ravikiran	H04W72/1289	370/329
*	F	US-2010/0271970 A1	10-2010	Pan; Kyle Jung-Lin	H04L1/0026	370/252
*	G	US-2010/0285809 A1	11-2010	Lindstrom; Magnus	H04L5/001	455/450
*	H	US-2010/0296389 A1	11-2010	Khandekar; Aamod Dinkar	H04L5/0007	370/216
*	I	US-2010/0322173 A1	12-2010	Marinier; Paul	H04W76/048	370/329
*	J	US-2011/0007695 A1	01-2011	Choi; Hyung-Nam	H04L5/0007	370/329
*	K	US-2011/0007699 A1	01-2011	Moon; Sung Ho	H04L5/0053	370/329
*	L	US-2011/0081913 A1	04-2011	Lee; Jung A.	H04L5/003	455/450
*	M	US-2011/0081932 A1	04-2011	Astely; David	H04L5/001	455/509

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.

Notice of References Cited	Application/Control No. 12/896,993	Applicant(s)/Patent Under Reexamination ASTELY ET AL.	
	Examiner MD TALUKDER	Art Unit 2648	Page 2 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2011/0243039 A1	10-2011	PAPASAKELLARIOU; Aris	H04L1/1861	370/280
*	B	US-2011/0310856 A1	12-2011	Hariharan; Priya	H04L1/1607	370/336
*	C	US-2012/0020317 A1	01-2012	Ishii; Hiroyuki	H04L1/1854	370/329
*	D	US-2012/0051306 A1	03-2012	Chung; Jae Hoon	H04L1/1893	370/329
*	E	US-2012/0082125 A1	04-2012	Huang; Yada	H04L5/0007	370/329
*	F	US-2012/0140708 A1	06-2012	Choudhury; Sayantan	H04W72/082	370/328
*	G	US-8,265,030 B2	09-2012	Miki; Nobuhiko	H04W72/1257	370/330
*	H	US-2012/0314675 A1	12-2012	Vujcic; Dragan	H04L5/001	370/329
*	I	US-2013/0010721 A1	01-2013	Aiba; Tatsushi	H04W72/0406	370/329
*	J	US-2013/0003700 A1	01-2013	Zhang; Jian	H04W76/028	370/331
*	K	US-2013/0034073 A1	02-2013	Aiba; Tatsushi	H04L1/0026	370/329
*	L	US-8,447,343 B2	05-2013	Gerstenberger; Dirk	H04W52/10	370/248
*	M	US-2013/0136084 A1	05-2013	ZHANG; Yuantao	H04W72/0413	370/329

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

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	U	
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	X	

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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Notice of References Cited	Application/Control No. 12/896,993	Applicant(s)/Patent Under Reexamination ASTELY ET AL.	
	Examiner MD TALUKDER	Art Unit 2648	Page 3 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-8,472,368 B2	06-2013	Baldemair; Robert	H04L5/0053	370/318
*	B	US-8,634,358 B2	01-2014	Damnjanovic; Jelena M.	H04L1/1861	370/329
*	C	US-8,792,830 B2	07-2014	Lim; Suhwan	H04L25/02	375/260
	D	US-				
	E	US-				
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	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					
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	P					
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12896993	ASTELY ET AL.
	Examiner	**Art Unit**
	MD TALUKDER	2648

CPC						
Symbol					**Type**	**Version**
H04L		5	/	0053	F	2013-01-01
H04L		5	/	0005	A	2013-01-01
H04L		5	/	001	I	2013-01-01
H04L		5	/	0094	I	2013-01-01
H04W		8	/	24	A	2013-01-01
H04W		28	/	26	A	2013-01-01
H04W		48	/	16	A	2013-01-01
H04W		72	/	0453	A	2013-01-01
H04W		72	/	1273	A	2013-01-01
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CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
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/MD TALUKDER/ Examiner.Art Unit 2648	03/16/2016	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	52	
/MD TALUKDER/ Examiner.Art Unit 2648	03/16/2016	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	10

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12896993	ASTELY ET AL.
	Examiner	**Art Unit**
	MD TALUKDER	2648

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION	
CLASS	SUBCLASS	CLAIMED	NON-CLAIMED
455	509	H 0 4 B 7 / 00 (2006.01.01)	

CROSS REFERENCE(S)					
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
455	522	456.6	137	103	
370	329	331			

/MD TALUKDER/ Examiner.Art Unit 2648 (Assistant Examiner)	03/16/2016 (Date)	**Total Claims Allowed:** 52	
/MD TALUKDER/ Examiner.Art Unit 2648 (Primary Examiner)	03/16/2016 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 10

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12896993	ASTELY ET AL.
	Examiner	**Art Unit**
	MD TALUKDER	2648

☒ 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

/MD TALUKDER/ Examiner.Art Unit 2648 (Assistant Examiner)	03/16/2016 (Date)	**Total Claims Allowed:** 52	
/MD TALUKDER/ Examiner.Art Unit 2648 (Primary Examiner)	03/16/2016 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 10

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CONFIRMATION NO. 1015

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/896,993	10/04/2010 RULE	455	2648	4015-6942 / P30138-US2

APPLICANTS

INVENTORS

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Lars Lindbom, Karlstad, SWEDEN;
Stefan Parkvall, Stockholm, SWEDEN;

**** CONTINUING DATA ***************************

This appln claims benefit of 61/248,661 10/05/2009

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

10/18/2010

Foreign Priority claimed	☐ Yes ☑ No	☐ Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
35 USC 119(a-d) conditions met	☐ Yes ☑ No					
Verified and Acknowledged	/MD K TALUKDER/ Examiner's Signature	Initials	SWEDEN	12	52 ~~34~~	8 ~~9~~

ADDRESS

COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518
UNITED STATES

TITLE

PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced

FILING FEE RECEIVED		
4888	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

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12896993	ASTELY ET AL.
	Examiner	Art Unit
	MD TALUKDER	2648

CPC- SEARCHED		
Symbol	Date	Examiner
H04W88/08, H04W72/044, H04W72/042	4/22/2014 & 4/30/2014 & 10/31/2014	
H04W52/367, H04W52/12, H04W52/40	4/22/2014 & 4/30/2014 & 10/31/2014	Talukder
H04L29/08657, G01S5/0252, G01S5/02	4/22/2014 & 4/30/2014 & 10/31/2014	Talukder
H04B1/3833, H04M1/0247, H04M1/0237	4/22/2014 & 4/30/2014	Talukder
H03F3/211, H04B7/0617, H04B7/0669	4/22/2014 & 4/30/2014	
H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237	10/13/2015	Talukder
H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237	3/16/2016	Talukder

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
455	509,522,456.6,137,103,575	12/11/2012	Talukder
370	329,252,331	12/11/2012	Talukder
455	Text	6/17/2013	Talukder
370	329,341,348,395.4	6/26/2013	Talukder
455	All	10/13/2015	Talukder
455	509,522,456.6,137,103,575	3/9/2016	Talukder
370	29,252,331	3/9/2016	

SEARCH NOTES		
Search Notes	**Date**	**Examiner**
East Search	12/10/2012	talukder
East Search	12/11/2012	talukder
East Search	6/17/2013	talukder
East Search	6/18/2013	talukder
East Search	6/26/2013	talukder
East Search	6/27/2013	Talukder
East Search	4/22/2014 & 4/30/2014	Talukder
Text Srarched	10/31/2014	Talukder
Assignee Searched	10/13/2015	Talukder
Inventor Searched	10/13/2015	Talukder
East Searched	10/13/2015	Talukder
Assignee Searched	3/9/2016	Talukder
Inventor Searched	3/9/2016	Talukder
East Searched	3/9/2016	Talukder
		Talukder

INTERFERENCE SEARCH			
US Class/ CPC Symbol	**US Subclass / CPC Group**	**Date**	**Examiner**
H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237		3/16/2016	Talukder
455	All	3/16/2016	Talukder

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"12896993"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 17:09
S2	367	((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:04
S3	176	S2 and (radio near3 resource)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:09
S4	28	S2 and (radio near3 resource) and (component with carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:09
S5	173	(downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:04
S6	137	S5 and (scheduling)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:04
S7	36	("20120263121" | "20110310856" | "20120127950" | "20110310819 " | "20120275395" | "20120287828" | "20120039291" | "20100271970" | "20120307781" | "20110286436" | "20120224535" | "20120140708" | "20110310820" | "20120163288" | "20110299486" | "20100098012" | "20120082125 " | "20120294273" | "20110268048" | "20120113910").pn.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:15
S8	127	(downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (carrier adj aggregation)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 10:16
S9	2	"20110292887"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:17

S11	25	((first 1st) adj6 component adj3 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:22
S12	1718	((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:47
S13	66	(carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:47
S14	10842	455/509,522,456.6,137,103,575.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:41
S15	28232	370/329,252,331.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:41
S16	102	(S14 S15) and (downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:42
S17	1	"13140333"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:18
S18	2	"20110310856"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:18
S19	38	((first 1st) adj6 component adj3 carrier) same ((radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:31
S20	38	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:31
S21	27	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj4 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:32
S22	38	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:32

S23	24	(carrier adj aggregation) and (schedul$3 near3 (downlink DL) with ((first primary initial) near6 (resource radio frequency frame)))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:48
S24	8	("7551898" | "7649960" | "7656843" | "7773699").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:14
S25	2	"20110292900"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:36
S26	2	"20100271970"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:37
S27	3	"8050202"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:38
S28	1	"20120307689"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:45
S29	2	"8160017"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:48
S30	2	"20100232373"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:48
S31	2	"20090016278"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 17:16
S32	2	"8265030"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 17:19
S33	3	"2008139923"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 18:17
S34	14	("20100098012" | "20100232373" | "20110310856" | "20120020317" | "20120082125" | "20120140708" | "8265030").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/29 17:19

S35	7	"455"/$.ccls. and (carrier adj aggregation) and (schedul$3 near3 (downlink DL) with ((first primary initial) near6 (resource radio frequency frame)))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/29 17:22
S36	9	"455"/$.ccls. and (((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/29 21:37
S38	4	("20070053294" | "20100290405").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/30 12:42
S39	16	("7596114" | "20050013279" | "20030219028" | "20070217406" | "20020105970" | "20060050664" | "20090303938" | "20070064669").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/30 12:42
S40	290	(first 1st) with (component near2 carrier) with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 10:07
S41	114	(first 1st) with (component near2 carrier) with down$1link and receiv$3 near3 control near3 information	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 10:09
S42	47	(first 1st) near3 (radio adj resource) and (second other another 2nd) near3 (radio adj resource) and component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:29
S43	26	S42 and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:31
S44	5	(first 1st) near3 (radio adj resource) and (second other another 2nd) near3 (radio adj resource) same (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:46
S45	26	(first 1st) near3 (radio adj resource) and (second other another 2nd) near3 (radio adj resource) and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:47
S46	31	(second other another 2nd) near3 (radio adj resource) and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:49
S47	0	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:51

S48	0	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:52
S49	1	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component) and ((down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:53
S50	1	@ad<"20091005" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component) and ((down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:55
S51	1	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:56
S52	20	(second other another 2nd) near3 (radio adj resource) and (carrier adj component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 13:31
S53	16	(set near3 radio near3 resource) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:14
S54	27	(set near3 ((radio near3 resource) (resource adj block))) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:19
S55	755	(((radio near3 resource) (resource adj block))) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:25
S56	70	((second 2nd other) with ((radio near3 resource) (resource adj block))) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:26
S57	327	(((radio near3 resource) (resource adj block))) same component adj carrier and (schedul$3 near3 downlink reverse)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:27
S58	29	((second 2nd other) with ((radio near3 resource) (resource adj block))) same component adj carrier and (schedul$3 near3 down$1link reverse$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:27
S59	24	((second 2nd other) with ((radio near3 resource) (resource adj block))) same (component adj carrier) same (down$1link reverse$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:31

S60	10	("20090097447" | "20110081856" | "20090116427" | "20100232373" | "8331307").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:49
S61	2562	(schedul$3 near3 downlink) and ((radio adj resource) (resource adj block)) and component	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:16
S62	739	(schedul$3 near3 downlink) and ((radio adj resource) (resource adj block)) and component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:17
S63	259	(schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) and component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:17
S64	39	(schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (component adj carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:18
S65	1	@ad<"20091005" and (schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (component adj carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:18
S66	1	@ad<"20091005" and (schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:20
S67	47	(schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:20
S68	356	"455"/$.ccls. and ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 17:10
S70	19	"455"/$.ccls. and (carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 17:17
S71	0	("2013/0107855").URPN.	USPAT	OR	ON	2013/06/18 09:15
S72	0	("2013/0107855").URPN.	US-PGPUB; USPAT	OR	ON	2013/06/18 09:16
S73	408	set near3 (radio frequency) near2 (resource band) same downlink and component	US-PGPUB; USPAT	OR	ON	2013/06/18 09:18
S74	17	set near3 (radio frequency) near2 (resource band) same downlink same (component adj carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 09:19

S75	19	(set group Cluster) near3 (radio frequency) near2 (resource band) same downlink same (component adj carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 09:21
S76	12	("8457060" | "20110310819" | "20100271970" | "20130034073" | "20100098012" | "20110310856" | "20110317653" | "20130083742" | "20130083741" | "20120114021" | "20120275395" | "20110317645" | "20110310856").pn.	US-PGPUB; USPAT	OR	ON	2013/06/18 09:31
S77	200	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource)	US-PGPUB; USPAT	OR	ON	2013/06/18 10:37
S78	2911	(UL up$link) with (set group) near6 (radio resource)	US-PGPUB; USPAT	OR	ON	2013/06/18 10:38
S79	110	S77 and S78	US-PGPUB; USPAT	OR	ON	2013/06/18 10:38
S80	3	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (set group) near6 (radio resource) with (2nd second other another) near2 component	US-PGPUB; USPAT	OR	ON	2013/06/18 10:47
S81	28	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 11:17
S82	5	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (second 2nd) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 11:20
S83	4	(1st first first primary initia) near3 (set group) near6 (radio resource) with (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 13:50
S84	3	(set group) near6 (radio resource) with (2nd second other another) near6 (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 13:52
S85	42	(set group) near6 (radio resource) with (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 13:58
S86	30	(set group) near3 ((radio resource)(resource near2 block)) with (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 14:07
S87	2	(second 2nd) near3 (down$1link DL) with ((component near3 carrier) CC) same (set group) with ((radio near2 resource) (resource near2 block))	US-PGPUB; USPAT	OR	ON	2013/06/18 14:14
S88	21	reserv$3 with component near3 carrier and (second near2 (radio frequency band))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/25 15:31
S89	36	"739528"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 09:34
S90	30	"5754138"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 09:35

S91	2046	(carrier near3 aggregation) and up$1link with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 10:24
S92	1052	(carrier near3 aggregation) and (component near3 carrier) same up$1link with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 10:26
S93	110	(carrier near3 aggregation) and (component near3 carrier) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 10:27
S95	17	("370"/$.ccls "455"/$.ccls.) and (aggregation) and (CC (component near3 carrier)) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 15:22
S96	67	370/329,341,348,395.4.ccls. and (carrier near3 aggregation) and (component near3 carrier) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 15:26
S97	345368	schedule (DL (down adj link) down$1link) and (carrier near3 aggregation) and ((UL up$link) adj6 associat$4 near4 (DL down$link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 16:45
S98	9	schedule near3 (DL (down adj link) down$1link) and (carrier near3 aggregation) same((UL up$link) adj6 associat$4 near4 (DL down$link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 16:46
S99	35	(schedule allocat$4) near3 (DL (down adj link) down$1link) and (carrier near3 aggregation) same((UL up$link) adj6 associat$4 near4 (DL down$link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 16:48
S100	0	(1st first) near3 (radio band resource frequency) with (1st first) near3 (CCcomponent adj carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 17:14
S101	216	(1st first) near3 (radio band resource frequency) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 17:14
S102	43	(1st first) near3 (radio band resource frequency) with (reserv$3 schedul$3 allocat$3) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 17:15
S103	22	("20100142455" | "20120009923" | "20100254329" | "20100091678" | "20110194501" | "20130010619" | "20080310359" | "20060274712" | "20100227569" | "20120208583" |	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/27 09:57

		"20110267978").PN.				
S104	10	("20100254329" | "20100195624" | "20100023282" | "20090274100" | "20080316957").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/27 10:15
S105	50	("20100322173" | "20110081913" | "20130010721" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:25
S106	13348	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:40
S107	4330	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:42
S108	4200	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:43
S109	3823	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:44
S110	6130	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:44
S111	370	(S106 S107 S108 S109 S110) and (schedul$4 near3 down$1link) and (component near3 carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:45
S112	365	(S106 S107 S108 S109 S110) and (schedul$4 near3 down$1link) and (component near3 carrier) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:46
S113	357	(S106 S107 S108 S109 S110) and (schedul$4 near3 down$1link) and (component near carrier) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2014/04/22 13:47

			IBM_TDB			
S114	13	(S106 S107 S108 S109 S110) and (DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (component near3 carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:47
S115	40	(H03F3/211, H04B7/0617, H04B7/0669, H04B1/3833, H04M1/0247, H04M1/0237, H04L29/08657, G01S5/0252, G01S5/02, H04W52/367, H04W52/12, H04W52/40, H04W88/08, H04W72/044, H04W72/042).cpc. and (carrier near3 aggregation) and (component near3 carrier) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 14:17
S116	8750	(H04W88/08, H04W72/044, H04W72/042l).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:21
S117	4336	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:22
S118	4205	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:23
S119	4144	(H04L29/08657, G01S19/14, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:23
S120	3826	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:24
S121	47	(H04W88/08, H04W72/044, H04W72/042).cpc. and (1st first) near3 (radio band resource frequency) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:27
S122	25	(S116 S117 S118 S119 S120).cpc. and (1st first) near3 (radio band resource frequency) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 15:35
S123	13432	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S124	4341	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S125	4208	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB;	OR	ON	2014/04/30

			USPAT; USOCR; DERWENT; IBM_TDB			11:04
S126	3833	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S127	6154	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S128	98	(S123 S124 S125 S126 S127) and (schedul$4 near3 down$1link) and (component near3 carrier) and single with carrier same (plurality multiple several) with (DL down$1link) with carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S129	52	(S123 S124 S125 S126 S127) and (schedul$4 near3 down$1link) and (component near3 carrier) and single near6 carrier same (plurality multiple several) near3 (DL down$1link) with carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S130	4	(S123 S124 S125 S126 S127) and (schedul$4) with component near3 carrier and (single near3 (DL down$1link)) with (first with resource) and (multiple plurality several) near3 (DL downlink) with second with resource	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:37
S131	2	(up$1link UL) and (schedul$4) with component near3 carrier same (single near3 (DL down$1link)) with (first with resource) same (multiple plurality several) near3 (DL downlink) with second with resource	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:40
S132	2	(schedul$4) with component near3 carrier same (single near3 (DL down$1link)) with (first with resource) same (multiple plurality several) near3 (DL downlink) with second with resource	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:42
S133	2	(schedul$4) same (single near3 (DL down$1link)) with (first with resource) same (multiple plurality several) near3 (DL downlink) with second with resource	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:44
S134	2	(schedul$4) same (single near3 (DL down$1link)) with (first with (frequency resource block)) same (multiple plurality several) near3 (DL downlink) with second with (frequency block resource)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:45
S135	16	(single near3 (DL down$1link)) with (first with (frequency resource block)) same (multiple plurality several) near3 (DL downlink) with second with (frequency block resource)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:45
S136	1	allocation with (PUSCH PUCCH UL (up$1link)) and "20100232373"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 14:19
S137	1	allocation and (PUSCH PUCCH UL (up$1link))	US-PGPUB;	OR	ON	2014/04/30

		and "20100232373"	USPAT; USOCR; DERWENT; IBM_TDB			14:21
S138	2	"20100271970"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 14:32
S139	54	("20100322173" | "20110081913" | "20130010721" | "8634358" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20110243039" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 11:49
S140	15049	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S141	4737	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S142	4341	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S143	4030	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S144	6785	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S145	96	(S140 S141 S142 S143 S144) and (schedul$4 near3 down$1link) and (component near3 carrier) and single with carrier same (plurality multiple several) with (DL down$1link) with carrier same (frequency resources)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S146	1	"13315135"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:54
S147	2	"20080151845"	US-PGPUB;	OR	ON	2014/10/15

			USPAT; USOCR; DERWENT; IBM_TDB			14:58
S148	41	"455"/$.ccls. and (carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 15:45
S149	3	"455"/451,452.1.ccls. and (carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 18:01
S150	33889	455/451,452.1,509,456.1,522,137,103,575.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:25
S151	0	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel Bin) same (sererv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:32
S152	0	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel Bin) same (rererv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:33
S153	4	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel Bin) same (reserv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:34
S154	3	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel Bin) same (reserv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin) and (CC component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:37
S155	4	"455"/$.ccls. and (((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj6 (radio resource frame)) and (reserv$4 sav$4 us$3) near3 (other 2nd second another) adj3 (resource frequency channel Bin) and (CC component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:39
S156	15	("20050013279" | "20030219028" | "20070217406" | "20020105970" | "20060050664" | "20090303938" | "20070064669").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 12:07
S157	10	"455"/$.ccls. and (schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 12:07
S158	0	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel) same (rererv$4 sav$4) near3 (other	US-PGPUB; USPAT; USOCR;	OR	ON	2014/10/31 15:22

		2nd second another) adj3 (resource frequency channel Bin)	DERWENT; IBM_TDB			
S161	15374	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S162	4758	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S163	4377	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S164	4042	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S165	6867	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S167	1	"14170939"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/17 09:46
S168	499	(component near2 carrier) with (primary near2 cell)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:07
S169	401	"370"/$.ccls. and (component near2 carrier) with (primary near2 cell)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:07
S170	378	"370"/$.ccls. and (component adj2 carrier) with (primary adj2 cell)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:07
S171	185	"370"/$.ccls. and (component adj2 carrier) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:08
S172	4	"370"/$.ccls. and single near3 (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:17
S173	4	single near4 (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR;	OR	ON	2014/11/18 14:19

			DERWENT; IBM_TDB			
S174	287	"370"/$.ccls. and (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:21
S175	1	@ad<"20091004" and "370"/$.ccls. and (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:22
S176	287	"370"/$.ccls. and (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:22
S177	29	("20100322173" | "20110081913" | "20130010721" | "8634358" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20110243039" | "8792830" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20020160784" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT	OR	OFF	2015/10/01 11:34
S178	21250	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:24
S179	5857	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:24
S180	5079	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:24
S181	4391	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:24
S182	8620	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:24
S183	221	(S178 S179 S180 S181 S182) and (schedul$4 near3 down$1link) and (component near3	US-PGPUB; USPAT;	OR	ON	2015/10/01 17:24

		carrier) and single with carrier same (plurality multiple several) with (DL down$1link) with carrier same (frequency)	USOCR; DERWENT; IBM_TDB			
S184	552	((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in. and ericsson.as.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:56
S185	1	S183 and S184	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:56
S186	21	455/$.ccls. and ((first 1st) adj6 component adj3 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 18:11
S187	24	("20100322173" | "20110081913" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20110243039" | "8792830" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20020160784" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT	OR	OFF	2015/10/02 12:23
S188	1	"14030298"	US-PGPUB; USPAT	OR	OFF	2015/10/02 15:41
S189	198	((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/03 16:15
S190	1	"14102508"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:17
S191	0	"14158378"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:17
S192	1	"14097736"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:17
S193	2	"14006545"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:17
S194	1	"13875620"	US-PGPUB;	OR	ON	2015/10/13

			USPAT; USOCR; DERWENT; IBM_TDB			14:18
S195	1	"13905342"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:18
S196	1	"13477988"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:18
S197	2	"13293245"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:18
S198	1	"13875620"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:19
S199	2	"13993807"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:19
S200	1	"13898465"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:19
S201	1	"13883792"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:19
S202	1	"13996405"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:19
S203	1	"13883002"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:20
S204	0	"14812058"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:20
S205	7	"8915660"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:20
S206	1	"13909538"	US-PGPUB;	OR	ON	2015/10/13

			USPAT; USOCR; DERWENT; IBM_TDB			14:21
S207	1	"13924238"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:22
S208	1	"13898465"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:23
S209	2	"13993807"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:23
S210	58	("20100322173" | "20110081913" | "20130010721" | "8634358" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20110243039" | "8792830" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20020160784" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:25
S211	1	"13906370"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:38
S212	58	("20100322173" | "20110081913" | "20130010721" | "8634358" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20110243039" | "8792830" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20020160784" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:51
S213	0	(H04W88/08, H04W72/044, H04W72/042).cpc. and (H04W52/367, H04W52/12, H04W52/40).cpc. and (H04L29/08657, G01S5/0252, G01S5/02).cpc. and (H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:55

S214	36289	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:56
S215	3	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and single near3 (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:56
S216	553	((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in. and ericsson.as.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 17:05
S217	553	(((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in.) and ericsson.as.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 17:05
S218	131	(((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in.) and ericsson.as. and carrier adj aggregation	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 17:07
S219	48	"455"/$.ccls. and (carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame)) and carrier adj aggregation	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 17:27
S220	48	(H04W88/08, H04W72/044, H04W72/042).cpc. and ((first 1st) adj6 component adj3 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/09 15:13
S221	15	(set group) near6 (radio resource) with (2nd second other another) near6 (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2016/03/09 15:26
S222	35	455/509,522,456.6,137,103,575.ccls. and (downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (carrier adj aggregation)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/09 15:45
S223	0	(H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj4 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/09 15:48
S224	0	(((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in.) and ericsson.as. and single near3 (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/09 16:14
S225	32	(((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2	US-PGPUB; USPAT; USOCR;	OR	ON	2016/03/09 16:14

		parkvall)).in.) and ericsson.as. and (CC (component adj2 carrier)) with (primary adj2 cell)	DERWENT; IBM_TDB			
S226	130	455/$.ccls. and (downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/09 17:02
S227	30	("20120127950" | "20110310819" | "20120275395" | "20120287828" | "20120039291" | "20100271970" | "20120307781" | "20110286436" | "20120224535" | "20120140708" | "20120163288" | "20110299486" | "20100098012" | "20120082125 " | "20120294273").pn.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/09 18:32
S228	10	(carrier adj aggregation) and (schedul$3 near3 (downlink DL) with ((first primary initial) near6 (resource radio frequency frame))) and ((first 1st) adj6 component adj3 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/09 20:46
S229	3	"20070030661"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/09 21:31
S230	76	370/329,252,331.ccls. and (((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj4 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/10 09:26
S231	0	(H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/16 11:49
S233	0	(H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near6 carrier	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/03/16 11:54
S234	18	(H04L5/0053, H04L5/001, H04L5/0094, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/16 11:59
S235	18	(H04L5/0053, H04L5/001, H04L5/0094, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/16 12:04
S236	7	(H04L5/0053, H04L5/001, H04L5/0094, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3	US-PGPUB; USPAT; USOCR; DERWENT;	OR	ON	2016/03/16 12:06

		component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	IBM_TDB			
S237	0	455/509,522,456.6,137,103,575.ccls. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/16 12:31
S238	7	(A01B12/006, H04L5/0053, H04L5/001, H04L5/0094, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/03/16 12:39
S239	4	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/03/16 12:47
S240	0	((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in. and ericsson.as. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/03/16 13:28

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S159	0	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel) same (rererv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin)	US-PGPUB; USPAT	OR	ON	2014/10/31 15:24
S160	5	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (set group) near6 (radio resource) with (2nd second other another) near2 component	US-PGPUB; USPAT	OR	ON	2014/10/31 15:26
S241	0	(H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier	US-PGPUB; USPAT	OR	ON	2016/03/16 11:50
S242	7	(H04L5/0053, H04L5/001, H04L5/0094, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency	US-PGPUB; USPAT	OR	ON	2016/03/16 12:38

		band resources)				
S243	7	(A01B12/006, H04L5/0053, H04L5/001, H04L5/0094, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	US-PGPUB; USPAT	OR	ON	2016/03/16 12:39
S244	1	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	USPAT	OR	ON	2016/03/16 12:47
S245	4	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	US-PGPUB; USPAT	OR	ON	2016/03/16 12:47

3/16/2016 2:33:25 PM
C:\Users\mtalukder\Documents\EAST\Workspaces\12896993.wsp

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of **David Astely *et al.***	
Serial No.: **12/896,993**	Examiner: Md K. Talukder
Filed: **October 4, 2010**	Group Art Unit: 2648
For: **PUCCH Resource Allocation for Carrier Aggregation for LTE-Advanced**	Confirmation No.: 1015
Docket No: **4015-6942 / P30138-US2**	

VIA E-MAIL ONLY

PROPOSED EXAMINER AMENDMENT

In response to a telephone conversation with Examiner Talukder on March 9, 2016, Applicant submits the following proposed examiner amendment. The independent claims are amended to include subject matter from dependent claim 7. In view of this proposal, Applicant believes that all pending claims are in condition for allowance and issuance.

Respectfully submitted,

Dated: March 14, 2016

Edward M. Roney
Registration No. 62,048
Phone: 919.719.4870

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method implemented by a base station of receiving control information from a user terminal, the method comprising:

scheduling downlink transmissions to a first user terminal on a single downlink component carrier associated with a primary cell and a second user terminal on multiple downlink component carriers including the single downlink component carrier associated with the primary cell;

receiving control information associated with the downlink transmissions to the first user terminal on a first set of radio resources on an uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; **[[**and**]]**

receiving control information associated with the downlink transmissions to the second user terminal on a second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources**; and**

transmitting, on the single downlink component carrier, an indication to assign the second set of radio resources when the second user terminal is scheduled to receive the downlink transmissions on the multiple downlink component carriers.

2. (Previously presented) The method of claim 1 further comprising transmitting control information to the first user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink component carrier associated with the primary cell.

3. (Previously presented) The method of claim 1 further comprising transmitting control information to the second user terminal on a downlink component carrier to implicitly or explicitly indicate the second set radio resources on the uplink component carrier associated with the primary cell.

4. (Original) The method of claim 3 wherein at least one of the first and second sets of radio resources are indicated implicitly by at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier.

5. (Original) The method of claim 3 wherein at least one of the first and second sets of radio resources are indicated explicitly by an uplink control channel index.

6. (Original) The method of claim 5 wherein the explicit indication is transmitted as radio resource control signaling.

7. (Previously presented) The method of claim 1 further comprising transmitting an acknowledgement resource indication on the single downlink component carrier associated with the primary cell to dynamically assign said second set of radio resources on the uplink component carrier associated with the primary cell to the second user terminal when the second user terminal is scheduled to receive downlink transmissions on the multiple downlink component carriers.

8. (Original) The method of claim 7 wherein the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources.

9. (Currently amended) A base station comprising:

a transmitter to transmit user data on one or more downlink component carriers to a first user terminal and a second user terminal; and

a controller to schedule downlink transmissions to the first user terminal and the second user terminal, the controller configured to:

schedule downlink transmissions to the first user terminal on a single downlink component carrier associated with a primary cell and the second user terminal on multiple downlink component carriers including the single downlink component carrier associated with the primary cell;

receive control information associated with the downlink transmissions to the first user terminal on a first set of radio resources on an uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; **[[**and**]]**

receive control information associated with the downlink transmissions to the second user terminal on a second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources**; and**

transmit, on the single downlink component carrier, an indication to assign the second set of radio resources when the second user terminal is scheduled to receive the downlink transmissions on the multiple downlink component carriers.

10. (Previously presented) The base station of claim 9 wherein the controller is further configured to transmit control information to the first user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink component carrier associated with the primary cell.

11. (Previously presented) The base station of claim 9 wherein the controller is further configured to transmit control information to the second user terminal on a downlink component carrier to implicitly or explicitly indicate the second set of radio resources on the uplink component carrier associated with the primary cell.

12. (Original) The base station of claim 11 wherein the controller is further configured to indicate at least one of the first and second sets of radio resources implicitly by sending at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier.

13. (Original) The base station of claim 11 wherein the controller is further configured to indicate at least one of the first and second sets of radio resources explicitly by sending an uplink control channel index.

14. (Original) The base station of claim 13 wherein the controller is further configured to send the explicit indication as radio resource control signaling.

15. (Previously presented) The base station of claim 9 wherein the controller is further configured to transmit an acknowledgement resource indication on a downlink component carrier to dynamically assign said second set of radio resources on the uplink component carrier associated with the primary cell to the second user terminal when the second user terminal is scheduled to receive downlink transmissions on the multiple downlink component carriers.

16. (Original) The base station of claim 15 wherein the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources.

17. (Currently amended) A method implemented by a user terminal of transmitting control information in a mobile communication network, the method comprising:

receiving an assignment of radio resources for downlink transmissions from a base station;

transmitting, on a first set of radio resources on an uplink component carrier associated with a primary cell, control information associated with the downlink transmissions responsive to receiving an assignment of a single downlink component carrier associated with the primary cell for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; **[[**and**]]**

transmitting, on a second set of radio resources on the uplink component carrier associated with the primary cell, control information associated with the downlink transmissions responsive to receiving an assignment of multiple downlink component carriers including the single downlink component carrier associated with the primary cell for the downlink transmission, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources**; and**

receiving, on the single downlink component carrier, an indication to assign the second set of radio resources when the user terminal is scheduled to receive the downlink transmissions on the multiple downlink component carriers.

18. (Previously presented) The method of claim 17 further comprising transmitting user data on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

19. (Previously presented) The method of claim 17 further comprising receiving control information from the base station on a downlink component carrier implicitly or explicitly indicating the second set of radio resources on the uplink component carrier associated with the primary cell.

20. (Previously presented) The method of claim 19 wherein receiving control information comprises receiving at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying said second set of resources.

21. (Original) The method of claim 19 wherein receiving control information comprises receiving an uplink control channel index explicitly identifying said second set of resources.

22. (Original) The method of claim 21 wherein the explicit indication is received as radio resource control signaling.

23. (Previously presented) The method of claim 17, further comprising receiving, from a base station, an acknowledgement resource indication on the single downlink component carrier associated with the primary cell to dynamically assign said second set of radio resources on the uplink component carrier associated with the primary cell when the user terminal is scheduled to receive downlink transmissions on the multiple downlink component carriers.

24. (Original) The method of claim 23 further comprising selecting the second set of resources from a semi-static set of uplink resources responsive to the acknowledgement resource indication.

25. (Currently amended) A user terminal for mobile communications, the user terminal comprising:

a receiver to receive downlink transmissions from a base station;

a transmitter to transmit control information associated with the downlink transmission to a base station; and

a controller to select radio resources for transmission of control information associated with the downlink transmissions, the controller configured to:

select a first set of radio resources on an uplink component carrier associated with a primary cell responsive to receiving an assignment of a single downlink component carrier associated with the primary cell for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; **[[**and**]]**

select a second set of radio resources on the uplink component carrier associated with the primary cell responsive to receiving an assignment of multiple downlink component carriers including the single downlink component carrier associated with the primary cell for the downlink transmission, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources**; and**

receive, on the single downlink component carrier, an indication to assign the second set of radio resources when the user terminal is scheduled to receive the downlink transmissions on the multiple downlink component carriers.

26. (Previously presented) The user terminal of claim 25 configured to transmit user data on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

27. (Previously presented) The user terminal of claim 25 wherein the controller is further configured to receive control information from the base station on a downlink component carrier implicitly or explicitly identifying the second set of radio resources on the uplink component carrier associated with the primary cell.

28. (Original) The user terminal of claim 27 wherein the controller is further configured to receive at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying the second set of radio resources.

29. (Previously presented) The user terminal of claim 27 wherein the controller is further configured to receive an uplink control channel index explicitly identifying the second set of radio resources on the uplink component carrier associated with the primary cell.

30. (Original) The user terminal of claim 29 wherein the controller is further configured to receive the explicit indication as radio resource control signaling.

31. (Previously presented) The user terminal of claim 25 wherein the controller is further configured to receive, from a base station, an acknowledgement resource indication on a downlink component carrier dynamically assigning said second set of radio resources on the uplink component carrier associated with the primary cell when the user terminal is scheduled to receive downlink transmissions on the multiple downlink component carriers.

32. (Original) The user terminal of claim 31 wherein the controller is configured to select the second set of resources from a semi-static set of uplink resources responsive to the acknowledgement resource indication.

33. (Currently amended) A method implemented by a user terminal in a mobile communication network, the method comprising:

receiving an assignment of radio resources for a downlink transmissions from a base station;

transmitting control information associated with the downlink transmission on a first set of radio resources on an uplink component carrier associated with a primary cell responsive to receiving an assignment of a first downlink component carrier associated with the primary cell for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier associated with the primary cell; **[[**and**]]**

transmitting control information associated with the downlink transmission on a second set of radio resources on the uplink component carrier associated with the primary cell responsive to receiving an assignment of the first downlink component carrier associated with the primary cell and a second ~~**single**~~ downlink component carrier associated with a non-primary cell for the downlink transmission, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier and the second ~~**single**~~ downlink component carrier and the second set of resources are additional resources as compared to the first set of resources**; and**

receiving, on the first downlink component carrier, an indication to assign the second set of radio resources when the user terminal is scheduled to receive the downlink transmissions on the first and second downlink component carriers.

34. (Currently amended) A user terminal for mobile communications, the user terminal comprising:

a receiver to receive downlink transmissions from a base station;

a transmitter to transmit control information associated with the downlink transmission to a base station; and

a controller to select radio resources for transmission of control information associated with downlink transmissions, the controller configured to:

select a first set of radio resources on an uplink component carrier associated with a primary cell responsive to receiving an assignment of a first downlink component carrier associated with the primary cell for the downlink transmission, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier associated with the primary cell; **[[**and**]]**

select a second set of radio resources on the uplink component carrier associated with the primary cell responsive to receiving an assignment of the first downlink component carrier associated with the primary cell and a second ~~**single**~~ downlink component carrier associated with a non-primary cell for the downlink transmission, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier and the second ~~**single**~~ downlink component carrier and the second set of resources are additional resources as compared to the first set of resources**; and**

receive, on the first downlink component carrier, an indication to assign the second set of radio resources when the user terminal is scheduled to receive the downlink transmissions on the first and second downlink component carriers.

35. (Previously presented) The method of claim 1, further comprising:

receiving user data on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

36. (Previously presented) The method of claim 1, further comprising:
receiving control signaling on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

37. (Previously presented) The base station of claim 9, further configured to:
receive user data on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

38. (Previously presented) The base station of claim 9, further configured to:
receive control signaling on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

39. (Previously presented) The method of claim 17, further comprising:
transmitting control signaling on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

40. (Previously presented) The user terminal of claim 25, further configured to:
transmit control signaling on the second set of radio resources if a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission.

41. (Previously presented) The method of claim 1, further comprising:
if the first user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier associated with a non-primary cell, receiving control information associated with the downlink transmissions to the first user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second single downlink component carrier.

42. (Previously presented) The base station of claim 9, further configured to:

if the first user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier associated with a non-primary cell, receive control information associated with the downlink transmissions to the first user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second single downlink component carrier.

43. (Currently amended) A method implemented by a base station of receiving control information from a first user terminal and a second user terminal, the method comprising:

scheduling downlink transmissions to the first user terminal on a single downlink component carrier associated with a primary cell and the second user terminal on multiple downlink component carriers including the single downlink component carrier associated with the primary cell; and

receiving on a first set or a second set of resources on an uplink component carrier associated with a primary cell, including:

receiving control information associated with the downlink transmissions to the first user terminal on the first set of radio resources on the uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; **[[**and**]]**

receiving control information associated with the downlink transmissions to the second user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources**; and**

transmitting, on the single downlink component carrier, an indication to assign the second set of radio resources when the second user terminal is scheduled to receive the downlink transmissions on the multiple downlink component carriers.

44. (Currently amended) A base station comprising:

a transmitter to transmit user data on one or more downlink component carriers to a first user terminal and a second user terminal; and

a controller to schedule downlink transmissions to the first user terminal and the second user terminal, the controller configured to:

schedule downlink transmissions to the first user terminal on a single downlink component carrier associated with the primary cell and the second user terminal on multiple downlink component carriers including the single downlink component carrier associated with the primary cell; and

receiving on a first set or a second set of resources on an uplink component carrier associated with a primary cell, including:

receive control information associated with the downlink transmissions to the first user terminal on the first set of radio resources on the uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell; **[[**and**]]**

receive control information associated with the downlink transmissions to the second user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources**; and**

transmit, on the single downlink component carrier, an indication to assign the second set of radio resources when the second user terminal is scheduled to receive the downlink transmissions on the multiple downlink component carriers.

45. (Previously presented) The method of claim 1, wherein the first user equipment is the same as the second user equipment.

46. (Previously presented) The method of claim 1, wherein the first user equipment is different from the second user equipment.

47. (Previously presented) The base station of claim 9, wherein the first user equipment is the same as the second user equipment.

48. (Previously presented) The base station of claim 9, wherein the first user equipment is different from the second user equipment.

49. (Previously presented) The method of claim 43, wherein the first user equipment is the same as the second user equipment.

50. (Previously presented) The method of claim 43, wherein the first user equipment is different from the second user equipment.

51. (Previously presented) The base station of claim 44, wherein the first user equipment is the same as the second user equipment.

52. (Previously presented) The base station of claim 44, wherein the first user equipment is different from the second user equipment.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	12896993
Filing Date	2010-10-04
First Named Inventor	David Astely et al.
Art Unit	2648
Examiner Name	Md K. Talukder
Attorney Docket Number	4015-6942 / P30138-US2

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.T./

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	12896993
Filing Date	2010-10-04
First Named Inventor	David Astely et al.
Art Unit	2648
Examiner Name	Md K. Talukder
Attorney Docket Number	4015-6942 / P30138-US2

	1	NTT DOCOMO, Inc., "UL Layered Control Signal Structure in LTE-Advanced", 3GPP DRAFT RAN WG1 Meeting #54bis; RI-083679 UL LAYERED CONTROL SIGNAL, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. Ran WG1, no. Prague, Czech Republic; 20080929-20081003, 29 September 2008 (2008-09-29), XP050597042, [retrieved on 2008-09-24]

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EXAMINER SIGNATURE

Examiner Signature	/Md Talukder/	Date Considered	03/16/2016

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.T./

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	12896993
Filing Date	2010-10-04
First Named Inventor	David Astely et al.
Art Unit	2648
Examiner Name	Md K. Talukder
Attorney Docket Number	4015-6942 / P30138-US2

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the 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 the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Edward M. Roney, Reg. No. 62048/	Date (YYYY-MM-DD)	2016-02-12
Name/Print	Edward M. Roney	Registration Number	62048

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.T./

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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 record s.

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.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.T./

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. 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	12896993	Filing Date	2010-10-04	Docket Number (if applicable)	4015-6942 / p30138-us2	Art Unit	2648
First Named Inventor	David Astely et al.			Examiner Name	Md. K. Talukder		

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, 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 181167

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

Applicant Signature

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
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Signature	/Edward M. Roney/	Date (YYYY-MM-DD)	2016-06-20
Name	Edward M. Roney	Registration Number	62048

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.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of **David Astely *et al.***	
Serial No.: **12/896,993**	Examiner: Md K. Talukder
Filed: **October 4, 2010**	Group Art Unit: 2648
For: **PUCCH Resource Allocation for Carrier Aggregation for LTE-Advanced**	Confirmation No.: 1015
Docket No: **4015-6942 / P30138-US2**	

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Alexandria, VA 22313-1450

AMENDMENTS AND REQUEST FOR CONTINUED EXAMINATION

This paper is being filed prior to the payment of the issue fee to re-open prosecution in this matter based on amendments to the claims described herein and a separately-filed information disclosure statement (IDS). Reconsideration is respectfully requested in light of the amendments and/or remarks below, and with an express Request for Continued Examination (RCE) under 37 C.F.R. § 1.114. The Office is hereby authorized to charge any fees required for entry of this paper to Deposit Account 18-1167.

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method implemented by a base station of receiving control information from a user terminal, the method comprising:

scheduling downlink transmissions to a first user terminal on a single downlink component carrier associated with a primary cell and a second user terminal on multiple downlink component carriers including the single downlink component carrier associated with the primary cell;

receiving control information associated with the downlink transmissions to the first user terminal on a first set of radio resources on an uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell;

receiving control information associated with the downlink transmissions to the second user terminal on a second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources; and

transmitting, on the single downlink component carrier, an indication to assign **radio resources in** the second set of radio resources when the second user terminal is scheduled to receive the downlink transmissions on the multiple downlink component carriers.

2. (Previously presented) The method of claim 1 further comprising transmitting control information to the first user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink component carrier associated with the primary cell.

3. (Previously presented) The method of claim 1 further comprising transmitting control information to the second user terminal on a downlink component carrier to implicitly or explicitly indicate the second set radio resources on the uplink component carrier associated with the primary cell.

4. (Original) The method of claim 3 wherein at least one of the first and second sets of radio resources are indicated implicitly by at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier.

5. (Original) The method of claim 3 wherein at least one of the first and second sets of radio resources are indicated explicitly by an uplink control channel index.

6. (Original) The method of claim 5 wherein the explicit indication is transmitted as radio resource control signaling.

7. (Currently amended) The method of claim 1 further comprising transmitting an acknowledgement resource indication on the single downlink component carrier associated with the primary cell to dynamically assign **radio resources in** said second set of radio resources on the uplink component carrier associated with the primary cell to the second user terminal when the second user terminal is scheduled to receive downlink transmissions on the multiple downlink component carriers.

8. (Original) The method of claim 7 wherein the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources.

9. (Currently amended) A base station comprising:

a transmitter to transmit user data on one or more downlink component carriers to a first user terminal and a second user terminal; and

a controller to schedule downlink transmissions to the first user terminal and the second user terminal, the controller configured to:

schedule downlink transmissions to the first user terminal on a single downlink component carrier associated with a primary cell and the second user terminal on multiple downlink component carriers including the single downlink component carrier associated with the primary cell;

receive control information associated with the downlink transmissions to the first user terminal on a first set of radio resources on an uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell;

receive control information associated with the downlink transmissions to the second user terminal on a second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources; and

transmit, on the single downlink component carrier, an indication to assign **radio resources in** the second set of radio resources when the second user terminal is scheduled to receive the downlink transmissions on the multiple downlink component carriers.

10. (Previously presented) The base station of claim 9 wherein the controller is further configured to transmit control information to the first user terminal on a downlink component carrier to implicitly or explicitly indicate the first set of radio resources on the uplink component carrier associated with the primary cell.

11. (Previously presented) The base station of claim 9 wherein the controller is further configured to transmit control information to the second user terminal on a downlink component carrier to implicitly or explicitly indicate the second set of radio resources on the uplink component carrier associated with the primary cell.

12. (Original) The base station of claim 11 wherein the controller is further configured to indicate at least one of the first and second sets of radio resources implicitly by sending at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier.

13. (Original) The base station of claim 11 wherein the controller is further configured to indicate at least one of the first and second sets of radio resources explicitly by sending an uplink control channel index.

14. (Original) The base station of claim 13 wherein the controller is further configured to send the explicit indication as radio resource control signaling.

15. (Currently amended) The base station of claim 9 wherein the controller is further configured to transmit an acknowledgement resource indication on a downlink component carrier to dynamically assign **radio resources in** said second set of radio resources on the uplink component carrier associated with the primary cell to the second user terminal when the second user terminal is scheduled to receive downlink transmissions on the multiple downlink component carriers.

16. (Original) The base station of claim 15 wherein the acknowledgement resource indication selects the second set of resources from a semi-static set of uplink resources.

17. (Currently amended) A method implemented by a user terminal of transmitting control information in a mobile communication network, the method comprising:

receiving an assignment of radio resources for downlink transmissions from a base station;

transmitting, on a first set of radio resources on an uplink component carrier associated with a primary cell, control information associated with the downlink transmissions responsive to receiving an assignment of **radio resources on** a single downlink component carrier associated with the primary cell for the downlink transmission**s**, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell;

transmitting, on a second set of radio resources on the uplink component carrier associated with the primary cell, control information associated with the downlink transmissions responsive to receiving an assignment of **radio resource on** multiple downlink component carriers including the single downlink component carrier associated with the primary cell for the downlink transmission**s**, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources; and

receiving, on the single downlink component carrier, an indication to assign **radio resources in** the second set of radio resources when the user terminal is scheduled to receive the downlink transmissions on the multiple downlink component carriers.

18. (Cancelled)

19. (Previously presented) The method of claim 17 further comprising receiving control information from the base station on a downlink component carrier implicitly or explicitly indicating the second set of radio resources on the uplink component carrier associated with the primary cell.

20. (Previously presented) The method of claim 19 wherein receiving control information comprises receiving at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying said second set of resources.

21. (Original) The method of claim 19 wherein receiving control information comprises receiving an uplink control channel index explicitly identifying said second set of resources.

22. (Original) The method of claim 21 wherein the explicit indication is received as radio resource control signaling.

23. (Currently amended) The method of claim 17, further comprising receiving, from a base station, an acknowledgement resource indication on the single downlink component carrier associated with the primary cell to dynamically assign **radio resources in** said second set of radio resources on the uplink component carrier associated with the primary cell when the user terminal is scheduled to receive downlink transmissions on the multiple downlink component carriers.

24. (Original) The method of claim 23 further comprising selecting the second set of resources from a semi-static set of uplink resources responsive to the acknowledgement resource indication.

25. (Currently amended) A user terminal for mobile communications, the user terminal comprising:

a receiver to receive downlink transmissions from a base station;

a transmitter to transmit control information associated with the downlink transmission**s** to a base station; and

a controller to select radio resources for transmission of control information associated with the downlink transmissions, the controller configured to:

select a first set of radio resources on an uplink component carrier associated with a primary cell responsive to receiving an assignment of **radio resources on** a single downlink component carrier associated with the primary cell for the downlink transmission**s**, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell;

select a second set of radio resources on the uplink component carrier associated with the primary cell responsive to receiving an assignment of **radio resources on** multiple downlink component carriers including the single downlink component carrier associated with the primary cell for the downlink transmission**s**, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources; and

receive, on the single downlink component carrier, an indication to assign **radio resources in** the second set of radio resources when the user terminal is scheduled to receive the downlink transmissions on the multiple downlink component carriers.

26. (Cancelled)

27. (Previously presented) The user terminal of claim 25 wherein the controller is further configured to receive control information from the base station on a downlink component carrier implicitly or explicitly identifying the second set of radio resources on the uplink component carrier associated with the primary cell.

28. (Original) The user terminal of claim 27 wherein the controller is further configured to receive at least one of a downlink control channel index, number of downlink component carriers, and user terminal identifier implicitly identifying the second set of radio resources.

29. (Previously presented) The user terminal of claim 27 wherein the controller is further configured to receive an uplink control channel index explicitly identifying the second set of radio resources on the uplink component carrier associated with the primary cell.

30. (Original) The user terminal of claim 29 wherein the controller is further configured to receive the explicit indication as radio resource control signaling.

31. (Currently amended) The user terminal of claim 25 wherein the controller is further configured to receive, from a base station, an acknowledgement resource indication on a downlink component carrier dynamically assigning **radio resources in** said second set of radio resources on the uplink component carrier associated with the primary cell when the user terminal is scheduled to receive downlink transmissions on the multiple downlink component carriers.

32. (Original) The user terminal of claim 31 wherein the controller is configured to select the second set of resources from a semi-static set of uplink resources responsive to the acknowledgement resource indication.

33. (Currently amended) A method implemented by a user terminal in a mobile communication network, the method comprising:

receiving an assignment of radio resources for **[[a]]** downlink transmissions from a base station;

transmitting control information associated with the downlink transmission**s** on a first set of radio resources on an uplink component carrier associated with a primary cell responsive to receiving an assignment of **radio resources on** a first downlink component carrier associated with the primary cell for the downlink transmission**s**, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier associated with the primary cell;

transmitting control information associated with the downlink transmission**s** on a second set of radio resources on the uplink component carrier associated with the primary cell responsive to receiving an assignment of **radio resources on** the first downlink component carrier associated with the primary cell and a second downlink component carrier associated with a non-primary cell for the downlink transmission**s**, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier and the second downlink component carrier and the second set of resources are additional resources as compared to the first set of resources; and

receiving, on the first downlink component carrier, an indication to assign **radio resources in** the second set of radio resources when the user terminal is scheduled to receive the downlink transmissions on the first and second downlink component carriers.

34. (Currently amended) A user terminal for mobile communications, the user terminal comprising:

a receiver to receive downlink transmissions from a base station;

a transmitter to transmit control information associated with the downlink transmission**s** to a base station; and

a controller to select radio resources for transmission of control information associated with downlink transmissions, the controller configured to:

select a first set of radio resources on an uplink component carrier associated with a primary cell responsive to receiving an assignment of **radio resources on** a first downlink component carrier associated with the primary cell for the downlink transmission**s**, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier associated with the primary cell;

select a second set of radio resources on the uplink component carrier associated with the primary cell responsive to receiving an assignment of **radio resources on** the first downlink component carrier associated with the primary cell and a second downlink component carrier associated with a non-primary cell for the downlink transmission**s**, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the first downlink component carrier and the second downlink component carrier and the second set of resources are additional resources as compared to the first set of resources; and

receive, on the first downlink component carrier, an indication to assign **radio resources in** the second set of radio resources when the user terminal is scheduled to receive the downlink transmissions on the first and second downlink component carriers.

35. (Cancelled)

36. (Currently amended) The method of claim 1, further comprising:

receiving control signaling on the second set of radio resources if **radio resources on** a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission**s**.

37. (Cancelled)

38. (Currently amended) The base station of claim 9, further configured to:

receive control signaling on the second set of radio resources if **radio resources on** a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission**s**.

39. (Currently amended) The method of claim 17, further comprising:

transmitting control signaling on the second set of radio resources if **radio resources on** a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission**s**.

40. (Currently amended) The user terminal of claim 25, further configured to:

transmit control signaling on the second set of radio resources if **radio resources on** a single downlink component carrier associated with a non-primary cell is assigned for the downlink transmission**s**.

41. (Previously presented) The method of claim 1, further comprising:

if the first user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier associated with a non-primary cell, receiving control information associated with the downlink transmissions to the first user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second single downlink component carrier.

42. (Previously presented) The base station of claim 9, further configured to:

if the first user terminal is scheduled to receive downlink transmissions on a second single downlink component carrier associated with a non-primary cell, receive control information associated with the downlink transmissions to the first user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the second single downlink component carrier.

43. (Currently amended) A method implemented by a base station of receiving control information from a first user terminal and a second user terminal, the method comprising:

scheduling downlink transmissions to the first user terminal on a single downlink component carrier associated with a primary cell and the second user terminal on multiple downlink component carriers including the single downlink component carrier associated with the primary cell; and

receiving on a first set or a second set of resources on an uplink component carrier associated with a primary cell, including:

receiving control information associated with the downlink transmissions to the first user terminal on the first set of radio resources on the uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell;

receiving control information associated with the downlink transmissions to the second user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources; and

transmitting, on the single downlink component carrier, an indication to assign **radio resources in** the second set of radio resources when the second user terminal is scheduled to receive the downlink transmissions on the multiple downlink component carriers.

44. (Currently amended) A base station comprising:

a transmitter to transmit user data on one or more downlink component carriers to a first user terminal and a second user terminal; and

a controller to schedule downlink transmissions to the first user terminal and the second user terminal, the controller configured to:

schedule downlink transmissions to the first user terminal on a single downlink component carrier associated with the primary cell and the second user terminal on multiple downlink component carriers including the single downlink component carrier associated with the primary cell; and

receiving on a first set or a second set of resources on an uplink component carrier associated with a primary cell, including:

receive control information associated with the downlink transmissions to the first user terminal on the first set of radio resources on the uplink component carrier associated with the primary cell, wherein the first set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the single downlink component carrier associated with the primary cell;

receive control information associated with the downlink transmissions to the second user terminal on the second set of radio resources on the uplink component carrier associated with the primary cell, wherein the second set of radio resources is reserved for user terminals scheduled to receive downlink transmissions on the multiple downlink component carriers and the second set of resources are additional resources as compared to the first set of resources; and

transmit, on the single downlink component carrier, an indication to assign **radio resources in** the second set of radio resources when the second user terminal is scheduled to receive the downlink transmissions on the multiple downlink component carriers.

45. (Previously presented) The method of claim 1, wherein the first user equipment is the same as the second user equipment.

46. (Previously presented) The method of claim 1, wherein the first user equipment is different from the second user equipment.

47. (Previously presented) The base station of claim 9, wherein the first user equipment is the same as the second user equipment.

48. (Previously presented) The base station of claim 9, wherein the first user equipment is different from the second user equipment.

49. (Previously presented) The method of claim 43, wherein the first user equipment is the same as the second user equipment.

50. (Previously presented) The method of claim 43, wherein the first user equipment is different from the second user equipment.

51. (Previously presented) The base station of claim 44, wherein the first user equipment is the same as the second user equipment.

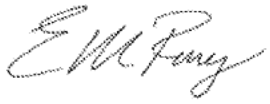
52. (Previously presented) The base station of claim 44, wherein the first user equipment is different from the second user equipment.

REMARKS

After entry of this Amendment, claims 1-17, 19-25, 27-34, 36 and 38-52 are pending. Claims 1, 7, 9, 15, 17, 23, 25, 31, 33-34, 36, 38-40 and 43-44 are amended. Support is described by Applicant's disclosure such as at paragraphs [0009], [0010], [0011] and [0012]. Claims 18, 26, 35 and 37 are cancelled. No new matter is introduced by the present Response.

Favorable consideration is respectfully and earnestly solicited.

Respectfully submitted,



Dated: June 20, 2016

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PTO/SB/08a (03-15)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	12896993
Filing Date	2010-10-04
First Named Inventor	David Astely et al.
Art Unit	2648
Examiner Name	Md K. Talukder
Attorney Docket Number	4015-6942 / P30138-US2

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	1	101765208	CN	A	2010-06-30	Huawei Technologies Co., Ltd	Machine Translation Included	
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	ZTE (source), "ACK/NACK Design for LTE-Advanced,"TSG-RAN WG1 #58bis, R1-093821, Miyazaki, Japan, October 12-16, 2009.	
	2	Infineon Technologies (source), "Clarification of UL DPCCH slot format information usage in IE 'DTX-DRX Information'","3GPP TSG-RAN WG2 Meeting #65, Tdoc R2-091165, Athens, Greece February 9-13, 2009.	
	3	NTT DocCoMo, Inc. (source), "UL ACK/NACK resource allocation for DL semi-persisent scheduling," 3GPP TSG RAN WG2 #62, R2-082485 (resubmission of R2-081857), Kansas City, Missouri, USA, May 5-9, 2008.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Filing Date	2010-10-04
	First Named Inventor	David Astely et al.
	Art Unit	2648
	Examiner Name	Md K. Talukder
	Attorney Docket Number	4015-6942 / P30138-US2

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the 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 the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

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A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Edward M. Roney/	Date (YYYY-MM-DD)	2016-06-20
Name/Print	Edward M. Roney	Registration Number	62048

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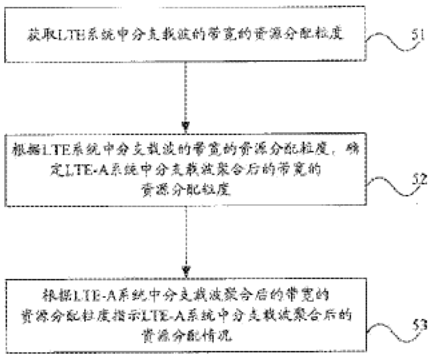
(54)发明名称

资源分配的方法、网络设备和无线系统

(57)摘要

本发明公开了一种资源分配的方法、网络设备和无线系统。该方法包括根据获取到的后向兼容系统中的资源分配粒度，确定演进系统中的资源分配粒度；根据演进系统中的资源分配粒度，指示演进系统中的资源分配情况。可以根据后向兼容系统中分支载波的带宽的资源分配粒度，确定演进系统中分支载波聚合后的带宽的资源分配粒度，进而指示演进系统中分支载波聚合后的资源分配情况。或者，还可以根据后向兼容系统中各分支载波的带宽的资源分配粒度，确定演进系统中各分支载波的带宽的资源分配粒度，进而指示演进系统中各分支载波的资源分配情况。通过本发明实施例可以保持LTE-A终端和LTE终端资源分配的兼容性，并且节省资源分配信令的开销。



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1. 一种资源分配的方法，其特征在于，包括：

根据获取到的后向兼容系统中的资源分配粒度，确定演进系统中的资源分配粒度；

根据演进系统中的资源分配粒度，指示演进系统中的资源分配情况。

2. 根据权利要求 1 所述的方法，其特征在于，

所述根据获取到的后向兼容系统中的资源分配粒度，确定演进系统中的资源分配粒度，包括：

获取后向兼容系统中，分支载波的带宽的资源分配粒度；

根据后向兼容系统中分支载波的带宽的资源分配粒度，确定演进系统中，分支载波聚合后的带宽的资源分配粒度；

所述根据演进系统中的资源分配粒度，指示演进系统中的资源分配情况，包括：根据演进系统中分支载波聚合后的带宽的资源分配粒度，指示演进系统中，分支载波聚合后的资源分配情况。

3. 根据权利要求 2 所述的方法，其特征在于，所述根据后向兼容系统中分支载波的带宽的资源分配粒度，确定演进系统中，分支载波聚合后的带宽的资源分配粒度包括：

根据后向兼容系统中所有分支载波的带宽的资源分配粒度，确定演进系统中，分支载波聚合后的带宽的资源分配粒度；或者，

在所有分支载波中确定配置给终端的分支载波，根据配置给终端的分支载波的带宽的资源分配粒度，确定演进系统中，分支载波聚合后的带宽的资源分配粒度。

4. 根据权利要求 3 所述的方法，其特征在于，所述根据后向兼容系统中分支载波的带宽的资源分配粒度，确定演进系统中，分支载波聚合后的带宽的资源分配粒度的计算公式为：

$P = LCM(P1, \ldots, Pn)$，或者，$P = 0.5 \times LCM(P1, \ldots, Pn)$；其中，P1、...、Pn 分别为后向兼容系统中所有分支载波或配置给终端的分支载波的带宽的资源分配粒度，P 为演进系统中分支载波聚合后的带宽的资源分配粒度，$LCM(P1, \ldots, Pn)$ 为 P1、...、Pn 的最小公倍数，对于 $P = 0.5 \times LCM(P1, \ldots, Pn)$ 需要满足 $LCM(P1, \ldots, Pn) \bmod 2 = 0$。

5. 根据权利要求 2 所述的方法，其特征在于，所述根据演进系统中分支载波聚合后的带宽的资源分配粒度，指示演进系统中，分支载波聚合后的资源分配情况包括：

根据演进系统中分支载波聚合后的带宽的资源分配粒度，将分支载波的带宽包括的资源块分为一个或多个资源块组；

每个资源块组用一个比特指示；或者，每个足额的资源块组用一个比特指示，所有分支载波内不足额的资源块组联合用一个比特指示。

6. 根据权利要求 2 所述的方法，其特征在于，所述根据演进系统中分支载波聚合后的带宽的资源分配粒度，指示演进系统中，分支载波聚合后的资源分配情况包括：

根据演进系统中分支载波聚合后的带宽的资源分配粒度，将各分支载波的带宽包括的资源块分为一个或多个资源块组；

将所有分支载波的带宽包括的资源块组分为 N 个资源块组子集，且 $N=\frac{P}{2^k}$；其中，N 为资源块组子集的个数，P 为演进系统中分支载波聚合后的带宽的资源分配粒度，k 为大于等于 0 的整数；

采用比特映射的方式指示各资源块组子集中资源块的分配情况。

7. 根据权利要求 1 所述的方法，其特征在于，所述根据获取到的后向兼容系统中的资源分配粒度，确定演进系统中的资源分配粒度，包括：

获取后向兼容系统中，各分支载波的带宽的资源分配粒度；

根据后向兼容系统中各分支载波的带宽的资源分配粒度，确定演进系统中，各分支载波的带宽的资源分配粒度；

所述根据演进系统中的资源分配粒度，指示演进系统中的资源分配情况，包括：根据演进系统中各分支载波的带宽的资源分配粒度，指示演进系统中，各分支载波的资源分配情况。

8. 根据权利要求 7 所述的方法，其特征在于，所述根据后向兼容系统中各分支载波的带宽的资源分配粒度，确定演进系统中，各分支载波的带宽的资源分配粒度的计算公式为：

$P = k \times P1$，或者，$P = 0.5 \times k \times P1$；其中，P1 为后向兼容系统中一个分支载波的带宽的资源分配粒度，P 为演进系统中该分支载波的带宽的资源分配粒度，k 为大于等于 2 的整数，对于 $P = 0.5 \times k \times P1$ 需要满足 $(k \times P1) \bmod 2 = 0$。

9. 根据权利要求 7 所述的方法，其特征在于，所述根据演进系统中各分支载波的带宽的资源分配粒度，指示演进系统中，各分支载波的资源分配情况包括：

根据演进系统中一个分支载波的带宽的资源分配粒度，将演进系统中该分支载波的带宽包括的资源块分为一个或多个资源块组；

将所述资源块组分为 N 个资源块组子集，且 $N=\frac{P}{2^k}$；其中，N 为资源块组子集的个数，P 为演进系统中该分支载波的带宽的分配粒度，k 为大于等于 0 的整数；

采用比特映射的方式指示各资源块组子集中资源块的分配情况。

10. 根据权利要求 6 或 9 所述的方法，其特征在于，所述采用比特映射的方式指示各资源块组子集中资源块的分配情况包括：在一资源块组子集中，用一个比特指示该资源块组子集中多个资源块的分配情况。

11. 根据权利要求 1 所述的方法，其特征在于，还包括：

通过协议中静态配置的方式使终端确定演进系统中的资源分配粒度；

或者，通过单播的方式将演进系统中各分支载波的带宽的资源分配粒度发送给终端；

或者，通过广播的方式将演进系统中各分支载波的带宽的资源分配粒度发送给终端。

12. 一种网络设备，其特征在于，包括：

资源确定单元，用于根据获取到的后向兼容系统中的资源分配粒度，确定演进系统中的资源分配粒度；

资源分配单元，用于根据所述资源确定单元所确定的演进系统中的资源分配粒度，指示演进系统中的资源分配情况。

13. 根据权利要求 12 所述的网络设备，其特征在于，

所述资源确定单元包括：

获取模块，用于获取后向兼容系统中，分支载波的带宽的资源分配粒度；

确定模块，用于根据获取模块得到的后向兼容系统中分支载波的带宽的资源分配粒

度，确定演进系统中，分支载波聚合后的带宽的资源分配粒度；

所述资源分配单元包括：指示模块，用于根据确定模块得到的演进系统中分支载波聚合后的带宽的资源分配粒度，指示演进系统中，分支载波聚合后的资源分配情况。

14. 根据权利要求 13 所述的设备，其特征在于：所述确定模块具体用于根据后向兼容系统中所有分支载波的带宽的资源分配粒度，确定演进系统中，分支载波聚合后的带宽的资源分配粒度；或者，在所有分支载波中确定配置给终端的分支载波，根据配置给终端的分支载波的带宽的资源分配粒度，确定演进系统中，分支载波聚合后的带宽的资源分配粒度。

15. 根据权利要求 13 所述的设备，其特征在于：

所述指示模块具体用于根据演进系统中分支载波聚合后的带宽的资源分配粒度，将分支载波的带宽包括的资源块分为一个或多个资源块组；每个资源块组用一个比特指示；或者，每个足额的资源块组用一个比特指示，所有分支载波内不足额的资源块组联合用一个比特指示；或者，

所述指示模块具体用于根据演进系统中分支载波聚合后的带宽的资源分配粒度，将各分支载波的带宽包括的资源块分为一个或多个资源块组；将所有分支载波的带宽包括的资源块组分为 N 个资源块组子集，且 $N=\frac{P}{2^k}$；其中，N 为资源块组子集的个数，P 为演进系统中分支载波聚合后的带宽的资源分配粒度，k 为大于等于 0 的整数；采用比特映射的方式指示各资源块组子集中资源块的分配情况。

16. 根据权利要求 12 所述的网络设备，其特征在于，

所述资源确定单元包括：

获取模块，用于获取后向兼容系统中，各分支载波的带宽的资源分配粒度；

确定模块，用于根据获取模块得到的后向兼容系统中各分支载波的带宽的资源分配粒度，确定演进系统中，各分支载波的带宽的资源分配粒度；

所述资源分配单元包括：指示模块，用于根据确定模块得到的演进系统中各分支载波的带宽的资源分配粒度，指示演进系统中，各分支载波的资源分配情况。

17. 根据权利要求 16 所述的设备，其特征在于：所述指示模块具体用于根据演进系统中一个分支载波的带宽的资源分配粒度，将演进系统中该分支载波的带宽包括的资源块分为一个或多个资源块组；将所述资源块组分为 N 个资源块组子集，且 $N=\frac{P}{2^k}$；其中，N 为资源块组子集的个数，P 为演进系统中该分支载波的带宽的分配粒度，k 为大于等于 0 的整数；采用比特映射的方式指示各资源块组子集中资源块的分配情况。

18. 根据权利要求 12 所述的设备，其特征在于，还包括：

通知模块，用于通过协议中静态配置的方式，或者单播的方式，或者广播的方式，将资源确定模块得到的演进系统中的资源分配粒度通知给终端。

19. 一种无线系统，其特征在于，包括：

网络设备，用于根据后向兼容系统中分支载波的带宽的资源分配粒度，确定演进系统中，分支载波聚合后的带宽的资源分配粒度，指示演进系统中，分支载波聚合后的资源分配情况；或者，用于根据后向兼容系统中各分支载波的带宽的资源分配粒度，确定演进系统中，各分支载波的带宽的资源分配粒度，指示演进系统中，各分支载波的资源分配情况。

资源分配的方法、网络设备和无线系统

技术领域

[0001] 本发明涉及无线通信技术，特别涉及一种资源分配的方法、网络设备和无线系统。

背景技术

[0002] 在长期演进 (Long Term Evolved，LTE) 系统中，网络将上下行采用的确切的系统带宽大小通过广播信令通知给网络内的每一个终端，进而终端再根据系统带宽所包括的资源块 (Resource block，RB) 数目确定某些资源分配方法的资源分配粒度，例如下行的资源分配方法 0 和 1(Resource allocation type0/1，RA type 0/1) 的粒度。之后，网络还会通过资源分配信令将具体资源分配的信息发送给需要传输数据的终端，终端根据接收的资源分配信令信息确定网络具体分配的时频资源位置，并在相应的时频资源位置上发送或是接收数据，实现网络和终端的数据传输和通信。

[0003] 在演进的 LTE 系统 (LTE-A) 中，为了支持更大的带宽，一种可能的方式是将多个分支载波进行聚合，即将多个分支载波的资源同时调度给一个终端使用。多个分支载波占用的频谱可以是连续的，也可以是非连续的，每个分支载波的带宽可以相同，也可以不同，每个分支载波可以是兼容 LTE 终端的载波，也可以仅仅是支持 LTE-A 终端的载波，那么 LTE 终端在该 LTE-A 载波上不能进行数据传输和通信。现有 LTE-A 资源分配技术中是根据所有分支载波聚合后的整个系统带宽确定的资源分配粒度。

[0004] 发明人在实现本发明的过程中发现现有技术至少存在如下问题：现有 LTE-A 资源分配技术是根据所有分支载波聚合后的整个系统带宽确定的资源分配粒度，这种分配技术会造成 LTE-A 系统的后向不兼容，资源漏洞和浪费。

发明内容

[0005] 本发明是提供一种资源分配的方法、网络设备和无线系统，以使 LTE-A 资源分配技术能够后向兼容。

[0006] 本发明实施例提供了一种资源分配的方法，包括：

[0007] 根据获取到的后向兼容系统中的资源分配粒度，确定演进系统中的资源分配粒度；

[0008] 根据演进系统中的资源分配粒度，指示演进系统中的资源分配情况。

[0009] 本发明实施例提供了一种网络设备，包括：

[0010] 资源确定单元，用于根据获取到的后向兼容系统中的资源分配粒度，确定演进系统中的资源分配粒度；

[0011] 资源分配单元，用于根据所述资源确定单元所确定的演进系统中的资源分配粒度，指示演进系统中的资源分配情况。

[0012] 本发明实施例提供了一种无线系统，其特征在于，包括：

[0013] 网络设备，用于根据后向兼容系统中分支载波的带宽的资源分配粒度，确定演进系统中，分支载波聚合后的带宽的资源分配粒度，指示演进系统中，分支载波聚合后的资源

分配情况；或者，用于根据后向兼容系统中各分支载波的带宽的资源分配粒度，确定演进系统中，各分支载波的带宽的资源分配粒度，指示演进系统中，各分支载波的资源分配情况。

[0014] 由上述技术方案可知，本发明实施例根据分支载波在后向兼容系统中的分配粒度得到在演进系统中的分配粒度，由于演进系统中的分配粒度是考虑了后向兼容系统中的分配粒度，而非现有技术只根据演进系统中的带宽，可以避免现有技术由于没有考虑后向兼容系统中的分配粒度造成的资源冲突问题，可以保证对 LTE-A 终端和 LTE 终端的兼容。

附图说明

[0015] 图 1 为现有资源分配方法示意图；

[0016] 图 2 为本发明第一实施例的方法流程示意图；

[0017] 图 3 为本发明第二实施例的资源分配方法示意图；

[0018] 图 4 为本发明第四实施例的资源分配方法示意图；

[0019] 图 5 为本发明第五实施例的方法流程示意图；

[0020] 图 6 为本发明第六实施例的资源分配方法示意图；

[0021] 图 7 为本发明第七实施例的资源分配方法示意图；

[0022] 图 8 为本发明第八实施例的资源分配方法示意图；

[0023] 图 9 为本发明第九实施例的资源分配方法示意图；

[0024] 图 10 为本发明第十实施例的网络设备的结构示意图；

[0025] 图 11 为本发明第十一实施例的网络设备的结构示意图。

具体实施方式

[0026] 下面通过附图和实施例，对本发明的技术方案做进一步的详细描述。

[0027] 在 LTE 系统的下行资源分配中，每个时间传输单元对应的资源分配信令中承载终端用户资源分配的类型和对应的资源分配信息，分为 RA type0、RAtype1、RA type2。RA type0 是用比特映射 (Bitmap) 的方式指示资源块组 (RBG) 的分配情况，其中每个比特指示对应的 RBG 分配与否，一个 RBG 也就是资源分配的最小粒度，每个资源块组 (RBG) 包括若干个资源块 (Resource Block，RB)。每个资源块组包括的资源块的个数是由系统带宽包括的所有 RB 总数目决定的，即 RBG 的大小是系统带宽包含 RB 个数的一个函数。不同的系统带宽对应的资源块组的大小不同，即资源分配的最小粒度不同。参见表 1 为系统带宽包含的资源块的个数 NRBDL 与粒度 P 的关系。

[0028] 表 1

[0029]

N_{RB}^{DL}	P
≤ 10	1
11 ～ 26	2

N_{RB}^{DL}	P
27 ～ 63	3
64 ～ 110	4

[0030]

[0031] 如果系统带宽包含的资源块的个数为 NRBDL，每个资源块组的大小（即粒度）为 P，对于 RA type0 的分配方式，在资源分配信令中需要 $N_{RBG}=\left\lceil \frac{N_{RB}^{DL}}{P} \right\rceil$ 个比特来表示具体的资源分配情况。其中，$\lceil * \rceil$ 表示向上取整。

[0032] 在同一系统带宽情况下，RA type1 和 RA type0 占用资源分配信令的比特数是相同的，也是采用比特映射（bitmap）方式指示的。为了区分具体的资源分配类型是 RA type 0 还是 RA type 1，在资源分配的信令中有 1 个比特的信息进行区分。RA type1 根据系统带宽将资源块组分为 P 个资源块组子集，例如，RA type0 中每个资源块组包括的资源块的个数为 P。因此需要 $\lceil \log_2(P) \rceil$ 个比特表示被调度终端用户的资源是哪个资源块组子集的。为了能够指示尽量多的资源，还需要 1 个比特用于指示资源分配的起始方向，即是从左还是从右指示资源分配。因此用于指示被调度的资源块的比特数目为 $N_{RB}^{TYPE1}=\left\lceil \frac{N_{RB}^{DL}}{P} \right\rceil-\lceil \log_2(P) \rceil-1$，每个比特可以指示对应的资源块组子集中的 RB 是否被调用，而且对被调度终端用户的资源分配也仅限制在一个子集中进行。

[0033] 当从 LTE 系统扩展到下一代的 LTE-A 系统时，现有资源分配的方法是直接根据载波聚合后的带宽确定资源分配粒度，而不考虑具体的每个分支载波针对 LTE 用户的资源分配粒度情况。参见表 2 为载波聚合后的带宽包含的 RB 个数、载波聚合后的资源分配粒度及资源分配所需要的比特数目之间的关系。

[0034] 表 2

[0035]

N_{RB}^{DL}	64 ～ 110	111 ～ 220	221 ～ 330	331 ～ 440	441 ～ 550
P	4	6	8	10	12
资源分配比特数	28	37	42	44	46

[0036]

[0037] 图 1 为现有资源分配方法示意图，载波聚合前的两个分支载波均为 10M（根据现有技术得到此时包括的资源块的个数为 50），通过表 1 可以得知每个分支载波的资源分配粒度均为 3，即每个分支载波的每个资源块组由 3 个资源块组成，这样，对于这两个分支载波中 LTE 用户进行资源分配（RA type0）的粒度为 3；载波聚合后的带宽为 20M（包括的资源块的个数为 100），通过表 2 得知载波聚合后的资源分配的粒度为 4，即聚合后的带宽内的每个 RBG 由 4 个 RB 组成。从图 1 可以看出，当载波聚合后的 RBG1（对应 RB4 ～ RB7）分配给

LTE-A 终端时，与之对应的分支载波中的 RBG1 和 RBG2 不能再以 RBG 为单位分配给 LTE 终端，即在与之对应的分支载波中不能采用 RAtype 0 方法将 RBG1 和 RBG2 分配给 LTE 终端，这样对应的没有被分配出去的 RB3 和 RB8 不能以此方式分配给 LTE 终端，这样造成了分支载波 RGB1、RGB2 中两端 RB 的资源浪费，或者调度器协调除 RA type 0 资源分配方法将 RB3 和 RB8 分配给终端，这样可以将 RB3 和 RB8 资源利用起来，但将增加调度器的复杂度。

[0038] 为此，不能仅仅以载波聚合后的带宽确定资源分配粒度，需要结合具体的每个分支载波针对 LTE 终端的分配粒度再确定载波聚合后 LTE-A 系统的资源分配粒度，以确保 LTE 和 LTE-A 系统的资源分配方法兼容，避免资源的浪费。因此，本发明实施例提供了一种资源分配方法，包括：根据获取到的后向兼容系统中的资源分配粒度，确定演进系统中的资源分配粒度；根据演进系统中的资源分配粒度，指示演进系统中的资源分配情况。本实施例根据分支载波在后向兼容系统中的分配粒度得到在演进系统中的分配粒度，由于演进系统中的分配粒度是考虑了后向兼容系统中的分配粒度，而非现有技术只根据演进系统中的带宽，可以避免现有技术由于没有考虑后向兼容系统中的分配粒度造成的资源冲突问题，可以保证对 LTE-A 终端和 LTE 终端的兼容。下面具体描述上述的方法：

[0039] 图 2 为本发明第一实施例的方法流程示意图，包括：

[0040] 步骤 21：网络设备（例如基站）获取后向兼容系统中，各分支载波的带宽的资源分配粒度。

[0041] 下面以后向兼容系统为 LTE 系统、演进系统为 LTE-A 系统为例。

[0042] 步骤 22：网络设备根据 LTE 系统中各分支载波的带宽的资源分配粒度，确定 LTE-A 系统中各分支载波的带宽的资源分配粒度。

[0043] 具体的计算公式为：$P = k \times P1$，或者，$P = 0.5 \times k \times P1$（此时需要 $(k \times P1) \bmod 2 = 0$）；其中，P1 为 LTE 系统中一个分支载波的带宽的资源分配粒度，P 为 LTE-A 系统中该分支载波的带宽的资源分配粒度，k 为大于等于 2 的整数。例如，两个分支载波分别为 10M（LTE 系统中对应的资源分配粒度为 3）和 20M（LTE 系统中对应的资源分配粒度为 4），在 LTE-A 系统中，可以将 10M 的分支载波的资源分配粒度选为 3、6、9 等，可以将 20M 的分支载波的资源分配粒度选为 4、6、8 等。

[0044] 步骤 23：网络设备根据 LTE-A 系统中各分支载波的带宽的资源分配粒度，指示 LTE-A 系统中各分支载波的资源分配情况。

[0045] 具体的，在资源分配时，可以采用 RA type0 方式，也可以采用 RA type1 方式。对于 RA type0 方式，在每个分支载波内，按照 LTE-A 系统中该分支载波的粒度，将若干个 RB 组成一个 RBG，用每个比特指示相应的 RBG 是否分配。

[0046] 但是，对于 RA type1 方式，由于采用上述倍数的粒度选择方法后，LTE-A 系统中的资源分配粒度较 LTE 系统中的资源分配粒度大（通常是倍数的关系）。例如，图 3 为本发明第二实施例的资源分配方法示意图。参见图 3，以一个 20M 的分支载波为例，该带宽包括 100 个资源块。对于 LTE 终端，分配粒度为 4，资源分配占用的比特数目为 25，对于 LTE-A 终端，分配粒度为 8，资源分配占用的比特数目为 13。从图 3 可以看出，当针对 LTE-A 终端的 RBG0 分配给某一 LTE-A 终端时，与之对应的针对 LTE 终端的 RBG0、RBG1 不能再分配给 LTE 终端；当针对 LTE 终端的 RBG5 分配给某一 LTE 终端时，与之对应的针对 LTE-A 终端的 RBG2 不能再采用 RA type0 的方式分配给 LTE-A 终端。但是可以采用其他的方式，例如 RA type1 的

方式分配给 LTE-A 终端或者以同样的方式分配给其他的 LTE 终端，采用不同的分配方式进行资源分配，可以使资源分配的方法更灵活，更好地保持 LTE 终端和 LTE-A 终端的兼容性。

[0047] 对于 RA type1 方式，若仍旧将 RBG 分为与资源分配粒度同样多的 RBG 子集，很可能出现指示比特位数不够及不能很好获得频率分集增益的问题。因为 RA type1 和 RA type0 占用同样的比特数，对于 LTE-A 终端，由于其分配粒度为 8，那么相应的资源块组子集的个数也为 8，另外需要一个比特指示方向（从左还是从后指示资源块），由于此时的资源比特数目为 13，则只有 9 个比特用于指示子集中资源块分配与否，从图 3 可以看出，9 个比特只能指示一个资源块组中的 8 个资源块即另一个资源块组中的 1 个资源块。这样并不能使子集中全部的资源块均被覆盖到，还使得指示的资源块是集中的，不能很好地获得数据传输的频率分集增益。

[0048] 为此，对于 RA type1：将该分支载波中的资源块组分为 N 个资源块组子集，且 $N=\frac{P}{2^k}$；其中，N 为资源块组子集的个数，P 为 LTE-A 系统中该分支载波的带宽的分配粒度，k 为大于等于 0 的整数；用比特指示各资源块组子集中资源块的分配情况。具体地，图 4 为本发明第四实施例的资源分配方法示意图。参见图 4，以 LTE-A 的 P = 8 为例，将资源块组分为 4 个资源块组子集（k = 1）。第一个子集中包括 LTE-A 的 RBG0、RBG4、RBG8、RBG12，第二个子集包括 LTE-A 的 RBG1、RBG5、RBG9，第三个子集包括 LTE-A 的 RBG2、RBG6、RBG10，第四个子集包括 LTE-A 的 RBG3、RBG7、RBG11。对于 LTE 终端，仍可以采用现有技术分为 4 个子集。

[0049] 对于 LTE-A 终端，在 RA type1 方式下分为 4 个子集，这样需要 2 个比特指示 RB 在哪个子集中，用一个比特指示方向（从左还是右指示），这时还剩余 10 个比特，每个比特指示子集中的一个 RB 分配与否。若认为此时指示的资源仍旧不够分散，可以用一个比特指示两个资源块是否分配，此时可以覆盖每个子集中至少 3 个资源块组的分配情况，实现指示的资源较为分散，提高频率分集增益。当然，每个比特还可以指示更多的资源块，当每个比特指示较多的资源块时，用于资源分配的比特数目足以指示每个子集中所有资源块的分配情况时，可以将用于指示方向的比特节省下来用于其他用途，例如，用于校验。

[0050] 上述以其中的一个分支载波为例，另一个分支载波的处理流程如上所述，不再赘述。

[0051] 上述采用 RA type1 方式时，通过将资源块组划分为小于分配粒度的资源块组子集，可以增加用于指示资源块比特数目，使指示的资源块更多更分散，当用一个比特指示多个资源块时可以进一步指示更多和更分散的资源块，提高频率分集增益。

[0052] 上述实现了网络侧对终端的资源分配，为了使终端准确地调度资源，需要将资源分配粒度发送给终端，资源分配粒度是采用上述根据各分支载波的情况获得的各分支载波的带宽的资源分配粒度。可以采用如下方式下发资源分配粒度：

[0053] 方式一：采用静态的方式。例如，网络侧通过协议以固定表格的方式静态配置终端的资源分配粒度。

[0054] 方式二：采用半静态的方式。例如，网络侧通过高层信令根据终端的业务情况半静态地改变资源分配粒度，并将改变后的资源分配粒度通过单播或广播的方式发送给终端。

[0055] 本实施例根据 LTE 系统中各分支载波的资源分配粒度，独立地确定各分支载波在

LTE-A 系统中的资源分配粒度。可以保证 LTE-A 和 LTE 终端的兼容，节省资源。通过将资源块组分为小于分配粒度的资源块组子集可以提高频率分集增益。通过一个比特指示更多的资源块，可以进一步地提高频率分集增益。

[0056] 图 5 为本发明第五实施例的方法流程示意图，包括：

[0057] 步骤 51：网络设备获取 LTE 系统中，分支载波的带宽的资源分配粒度。

[0058] 步骤 52：网络设备根据 LTE 系统中分支载波的带宽的资源分配粒度，确定 LTE-A 系统中分支载波聚合后的带宽的资源分配粒度。

[0059] 其中，网络设备可以根据后向兼容系统中所有分支载波的带宽的资源分配粒度，确定演进系统中，分支载波聚合后的带宽的资源分配粒度；或者，网络设备在所有分支载波中确定配置给终端的分支载波，根据配置给终端的分支载波的带宽的资源分配粒度，确定演进系统中，分支载波聚合后的带宽的资源分配粒度。例如，分支载波为第一载波、第二载波、第三载波，网络设备可以根据第一载波、第二载波和第三载波在 LTE 系统中的资源分配粒度确定 LTE-A 系统中载波聚合后的资源分配粒度；也可以首先确定配置给 UE 的载波，（例如适合 UE 的为第一载波和第二载波），则根据第一载波和第二载波在 LTE 系统中的资源分配粒度确定这个 LTE-A UE 载波聚合后的资源分配粒度。

[0060] 具体的计算公式为：$P = LCM(P1, \ldots, Pn)$，或者，$P = 0.5 \times LCM(P1, \ldots, Pn)$（此时需要 $LCM(P1, \ldots, Pn) \bmod 2 = 0$）；其中，P1、...、Pn 分别为需要进行聚合后资源分配粒度计算的分支载波（所有的分支载波或配置给终端的分支载波）在 LTE 系统中的资源分配粒度，P 为 LTE-A 系统中各分支载波聚合后的带宽的资源分配粒度，LCM(P1, ..., Pn) 为 P1、...、Pn 的最小公倍数。例如，图 6 为本发明第六实施例的资源分配方法示意图，参见图 6，聚合前的分支载波的带宽均为 10M，$P = 3$，分支载波聚合后的带宽为 20M，将 P 选为 6（分支载波分配粒度的最小公倍数）。由于分支载波聚合后的粒度正好是分支载波的粒度的倍数，不会出现如图 1 那种 LTE-A 系统的一个资源块组涉及了 LTE 系统中的两个资源块组且并没有与两个资源块组完全对齐，造成的资源浪费及不兼容问题。或者，再例如，当分载波的分配粒度分别为 3 和 4 时，可以将聚合载波的分配粒度选择为 12。同时，如果觉得以某一倍数的关系调用的资源块数较大，可以选择倍数的一半，若觉得 12 较大，可以选为 6。这样同时调度两个 LTE-A 的终端可以与 LTE 系统的终端的资源对齐，实现一定程度的兼容。图 7 为本发明第七实施例的资源分配方法示意图，参见图 7，分支载波的带宽分别为 15M 及 5M，聚合后的带宽为 20M。在 LTE 系统中，相应的粒度分别为 $P = 4$ 及 $P = 2$。在 LTE-A 系统中将 P 选为 4。

[0061] 上述选择 LTE-A 系统的资源分配粒度只是示例，不限于上述选择方案，只要考虑各分支载波在 LTE 系统中的资源分配粒度，根据各分支载波在 LTE 系统中的资源分配粒度得到 LTE-A 系统中聚合后的带宽的资源分配粒度均在本实施例的覆盖范围内。

[0062] 上述根据各分支载波的资源分配粒度，而不是如现有技术那样只根据聚合后的带宽确定载波聚合后的带宽的分配粒度，可以实现 LTE 终端与 LTE-A 终端的兼容，避免资源浪费。

[0063] 步骤 53：网络设备根据 LTE-A 系统中各分支载波聚合后的带宽的资源分配粒度，指示 LTE-A 系统中各分支载波聚合后的资源分配情况。

[0064] 在指示资源分配情况时，可以采用 RA type0 方式，也可以采用 RA type1 方式。

[0065] 对于 RA type0 方式：图 8 为本发明第八实施例的资源分配方法示意图。参见图 8，当将整个载波聚合后的带宽内所有 RB 进行顺序编号并依次按照资源分配粒度划分资源块组 (RBG) 时，很可能出现前一个分支载波中的剩余资源块与后一个分支载波中前面几个资源块组成一个资源块组。使本该 LTE 终端的 2 个资源块组对应 LTE-A 终端 1 个资源块组，对应了 LTE-A 终端的 2 个资源块，出现资源冲突，破坏了兼容性。为此，当分支载波包含的资源块的个数不为载波聚合后的带宽的资源分配粒度的整数倍时，将分支载波中按照聚合后的资源分配粒度分配后剩余的资源块另组成一个资源块组（参见图 8 的填充的资源块）。其中，当一 RBG 中的 RB 的个数为聚合后的资源分配粒度时，该 RBG 为足额 RBG，上述剩余的 RB 组成的 RBG 为不足额 RBG。在资源指配信令中，每个资源块组用一个比特指示，此时，由于分支载波剩余的资源块单独组成一个资源块组，比以聚合后的带宽为整体分配资源时增加一个比特（从图 8 可以看出，第二个中的资源块组的个数比第二个中的资源组的个数多一个）。或者，为了保证资源分配占用相同的比特数，将按照聚合后的资源分配粒度得到的资源块组（足额 RBG）分别用一个比特指示，将各分载波中剩余的资源块组成的资源块组（不足额 RBG）用一个比特联合指示，即第三个中未填充的资源块组分别用一个比特指示，将两个填充的资源块组联合用一个比特指示。图 9 为本发明第九实施例的资源分配方法示意图，本实施例与图 8 所示的实施例不同的是本实施例以分载波分别为 15M 和 5M 为例。其余原理与图 8 相同，不再赘述。

[0066] 上述采用 RA type0 方式进行调度，可以以资源块组大小为单位进行集中调度。为了提高频率分集增益，可以采用 RA type1 方式。

[0067] 对于 RA type1 方式：由于采用上述公倍数的粒度选择方法后，LTE-A 系统中的资源分配粒度较 LTE 系统中的资源分配粒度大，也可能出现第一实施例中的问题。因此，对于 RA type1 方式，也可以如第一实施例中的，将 RBG 分为个数小于 LTE-A 系统中的分配粒度的 RBG 子集，还可以用一个比特指示每个子集中的多个 RB。具体实现方式可以参见第一实施例，在此不再赘述。

[0068] 上述实现了网络侧对终端的资源分配，为了使终端准确地调度资源，需要将资源分配粒度发送给终端，资源分配粒度是采用上述根据各分支载波的情况获得的各分支载波聚合后的带宽的资源分配粒度。可以采用如下方式下发资源分配粒度。

[0069] 方式一：采用静态的方式。例如，网络侧通过协议以固定表格的方式静态配置终端的资源分配粒度。

[0070] 方式二：采用半静态的方式。例如，网络侧通过高层信令根据终端的业务情况半静态地改变资源分配粒度，并将改变后的资源分配粒度通过单播或广播的方式发送给终端。

[0071] 第一实施例是根据各分支载波在 LTE 系统中的资源分配粒度，独立地分别获得各分支载波在 LTE-A 系统中的资源分配粒度。本实施例是根据各分支载波在 LTE 系统中的资源分配粒度，统一确定在 LTE-A 系统中的载波聚合后的带宽的资源分配粒度。对于第一实施例，由于各分支载波是分别独立处理的，因此，对于 RA type0 方式，可以采用现有技术实现；但是，由于第一实施例中 LTE-A 系统相比于 LTE 系统增大了资源分配粒度，为了保证频率分集增益，对于 RA type1 方式，在 LTE-A 系统中，将 RBG 子集的个数选为小于资源分配粒度，进一步地，还可以用一个比特联合指示一个 RBG 子集中的多个 RB。

[0072] 本实施例根据 LTE 系统中各分支载波的资源分配粒度，统一确定在 LTE-A 系统中

的载波聚合后的带宽的资源分配粒度。可以保证 LTE-A 和 LTE 终端的兼容，节省资源。通过考虑分支载波的边界可以避免资源冲突。通过将资源块组分为小于分配粒度的资源块组子集可以提高频率分集增益。通过一个比特指示更多的资源块，可以进一步地提高频率分集增益。

[0073] 本领域普通技术人员可以理解：实现上述方法实施例的全部或部分步骤可以通过程序指令相关的硬件来完成，前述的程序可以存储于一计算机可读取存储介质中，该程序在执行时，执行包括上述方法实施例的步骤；而前述的存储介质包括：ROM、RAM、磁碟或者光盘等各种可以存储程序代码的介质。

[0074] 对应上述方法，本发明实施例提供了一种网络设备，包括：资源确定单元，用于根据获取到的后向兼容系统中的资源分配粒度，确定演进系统中的资源分配粒度；资源分配单元，用于根据所述资源确定单元所确定的演进系统中的资源分配粒度，指示演进系统中的资源分配情况。本实施例根据分支载波在后向兼容系统中的分配粒度得到在演进系统中的分配粒度，由于演进系统中的分配粒度是考虑了后向兼容系统中的分配粒度，而非现有技术只根据演进系统中的带宽，可以避免现有技术由于没有考虑后向兼容系统中的分配粒度造成的资源冲突问题，可以保证对 LTE-A 终端和 LTE 终端的兼容。下面对上述设备进行详细描述，具体地，上述的资源确定单元包括下述的获取模块和确定模块，上述的资源分配单元包括下述的指示模块：

[0075] 图 10 为本发明第十实施例的网络设备的结构示意图，包括获取模块 101、确定模块 102 和指示模块 103。获取模块 101 用于获取后向兼容系统中，各分支载波的带宽的资源分配粒度；确定模块 102 用于根据获取模块 101 得到的后向兼容系统中各分支载波的带宽的资源分配粒度，确定演进系统中，各分支载波的带宽的资源分配粒度；指示模块 103 用于根据确定模块 102 得到的演进系统中各分支载波的带宽的资源分配粒度，指示演进系统中，各分支载波的资源分配情况。或者，获取模块 101 用于获取后向兼容系统中，分支载波的带宽的资源分配粒度；确定模块 102 用于根据获取模块 101 得到的后向兼容系统中分支载波的带宽的资源分配粒度，确定演进系统中，分支载波聚合后的带宽的资源分配粒度；指示模块 103 用于根据确定模块 102 得到的演进系统中分支载波聚合后的带宽的资源分配粒度，指示演进系统中，分支载波聚合后的资源分配情况。

[0076] 具体地，确定模块 102 具体用于根据后向兼容系统中所有分支载波的带宽的资源分配粒度，确定演进系统中，分支载波聚合后的带宽的资源分配粒度；或者，在所有分支载波中确定配置给终端的分支载波，根据配置给终端的分支载波的带宽的资源分配粒度，确定演进系统中，分支载波聚合后的带宽的资源分配粒度。此时，指示模块 103 具体用于根据演进系统中分支载波聚合后的带宽的资源分配粒度，将分支载波的带宽包括的资源块分为一个或多个资源块组；每个资源块组用一个比特指示；或者，每个足额的资源块组用一个比特指示，所有分支载波内不足额的资源块组联合用一个比特指示；或者，指示模块 103 具体用于根据演进系统中分支载波聚合后的带宽的资源分配粒度，将各分支载波的带宽包括的资源块分为一个或多个资源块组；将所有分支载波的带宽包括的资源块组分为 N 个资源块组子集，且 $N=\frac{P}{2^k}$；其中，N 为资源块组子集的个数，P 为演进系统中分支载波聚合后的带宽的资源分配粒度，k 为大于等于 0 的整数；采用比特映射的方式指示各资源块组子集中资

源块的分配情况。

[0077] 或者，确定模块 102 具体用于通过公式 P = k×P1，或者，P = 0.5×k×P1，根据后向兼容系统中各分支载波的带宽的资源分配粒度，确定演进系统中，各分支载波的带宽的资源分配粒度；其中，P1 为后向兼容系统中一个分支载波的带宽的资源分配粒度，P 为演进系统中该分支载波的带宽的资源分配粒度，k 为大于等于 2 的整数，对于 P = 0.5×k×P1 需要满足 (k×P1)mod2 = 0。此时，指示模块 103 具体用于根据演进系统中一个分支载波的带宽的资源分配粒度，将演进系统中该分支载波的带宽包括的资源块分为一个或多个资源块组；将所述资源块组分为 N 个资源块组子集，且 $N=\frac{P}{2^k}$；其中，N 为资源块组子集的个数，P 为演进系统中该分支载波的带宽的分配粒度，k 为大于等于 0 的整数；采用比特映射的方式指示各资源块组子集中资源块的分配情况。

[0078] 本实施例根据分支载波的在 LTE 系统中的资源分配粒度独立或统一得到 LTE-A 系统中的聚合后的资源分配粒度，可以很好地考虑分支载波的情况，实现 LTE-A 终端与 LTE 终端的兼容，避免资源浪费。

[0079] 图 11 为本发明第十一实施例的网络设备的结构示意图，包括获取模块 111、确定模块 112 和指示模块 113，还包括通知模块 114。获取模块 111 用于获取后向兼容系统中，各分支载波的带宽的资源分配粒度；确定模块 112 用于根据获取模块 111 得到的后向兼容系统中各分支载波的带宽的资源分配粒度，确定演进系统中，各分支载波的带宽的资源分配粒度；指示模块 113 用于根据确定模块 112 得到的演进系统中各分支载波的带宽的资源分配粒度，指示演进系统中，各分支载波的资源分配情况；通知模块 114 用于通过静态配置的方式，或者单播的方式，或者组播的方式，将确定模块得到的演进系统中各分支载波的带宽的资源分配粒度发送给终端。

[0080] 或者，获取模块 111 用于获取后向兼容系统中，各分支载波的带宽的资源分配粒度；确定模块 112 用于根据获取模块 111 得到的后向兼容系统中各分支载波的带宽的资源分配粒度，确定演进系统中，各分支载波聚合后的带宽的资源分配粒度；指示模块 113 用于根据确定模块 112 得到的演进系统中各分支载波聚合后的带宽的资源分配粒度，指示演进系统中，各分支载波聚合后的资源分配情况；通知模块 114 用于通过静态配置的方式，或者单播的方式，或者组播的方式，将确定模块得到的演进系统中各分支载波聚合后的带宽的资源分配粒度发送给终端。本实施例不仅可以实现第九实施例的技术效果，还可以针对终端静态设置分配粒度，或者，通过单播发送针对某一终端的分配粒度，或者，通过组播发送针对所有终端的分配粒度。

[0081] 进一步地，本发明实施例还提供了一种无线系统，包括网络设备，用于根据后向兼容系统中分支载波的带宽的资源分配粒度，确定演进系统中，分支载波聚合后的带宽的资源分配粒度，指示演进系统中，分支载波聚合后的资源分配情况；或者，用于根据后向兼容系统中各分支载波的带宽的资源分配粒度，确定演进系统中，各分支载波的带宽的资源分配粒度，指示演进系统中，各分支载波的资源分配情况。具体的网络设备可参见图 10、图 11 所示的网络设备。

[0082] 本实施例根据分支载波的在 LTE 系统中的资源分配粒度独立或统一得到 LTE-A 系统中的聚合后的资源分配粒度，可以很好地考虑分支载波的情况，实现 LTE-A 终端与 LTE 终

端的兼容，避免资源浪费。

[0083] 最后应说明的是：以上实施例仅用以说明本发明的技术方案而非对其进行限制，尽管参照较佳实施例对本发明进行了详细的说明，本领域的普通技术人员应当理解：其依然可以对本发明的技术方案进行修改或者等同替换，而这些修改或者等同替换亦不能使修改后的技术方案脱离本发明技术方案的精神和范围。

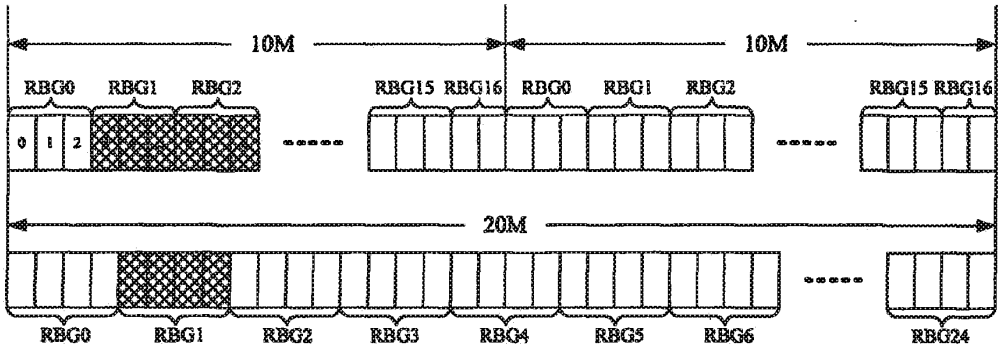

图 1

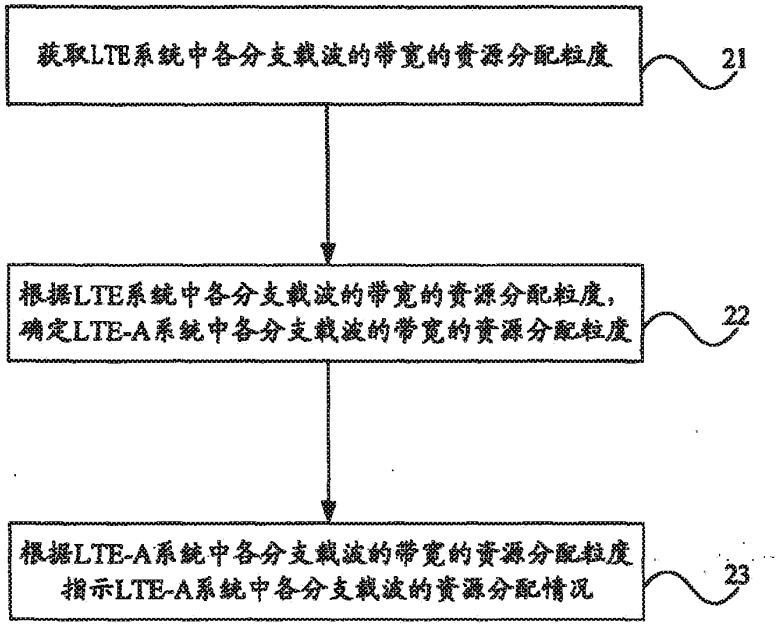

图 2

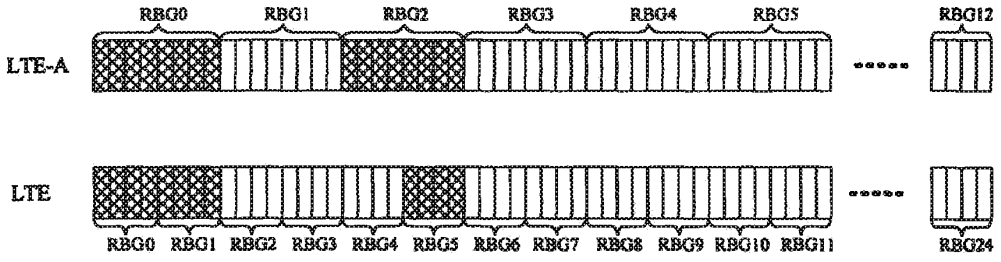

图 3

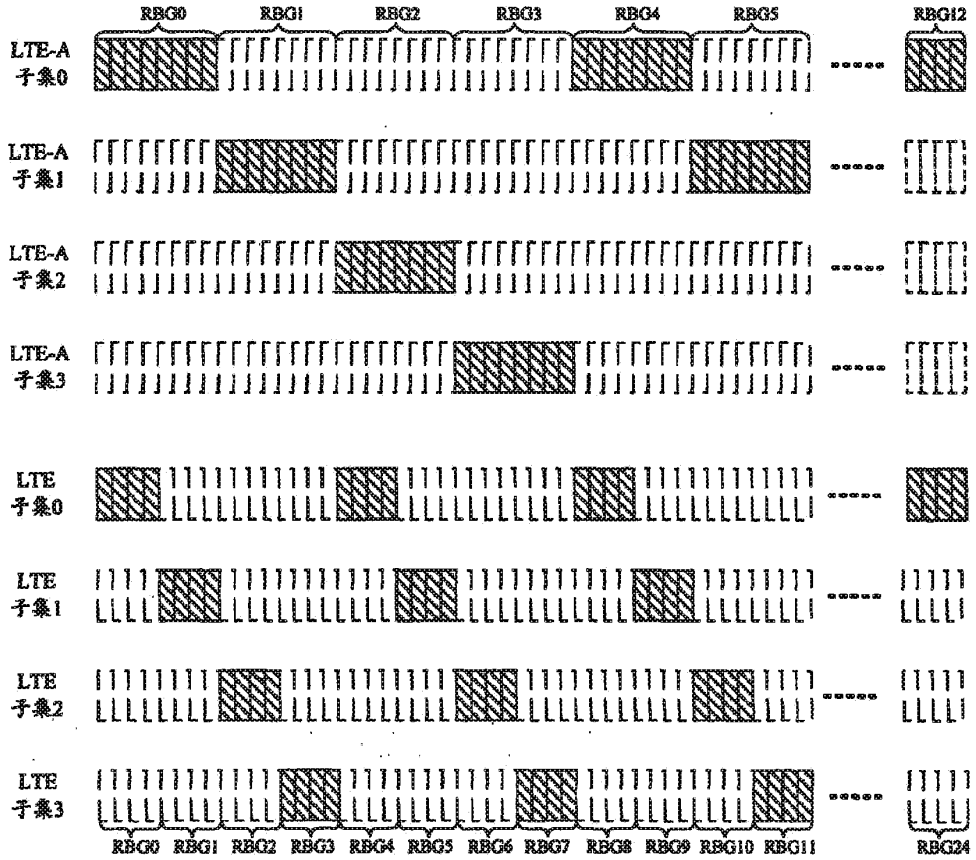

图 4

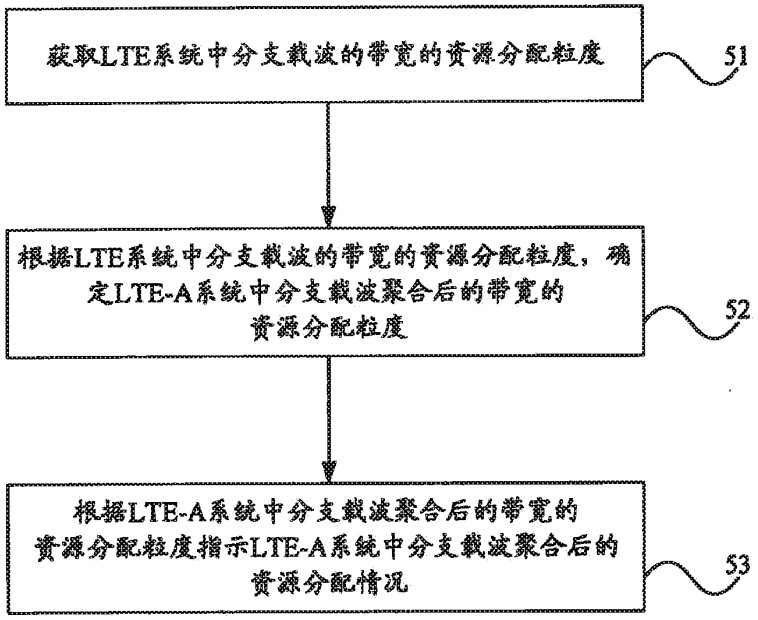

图 5

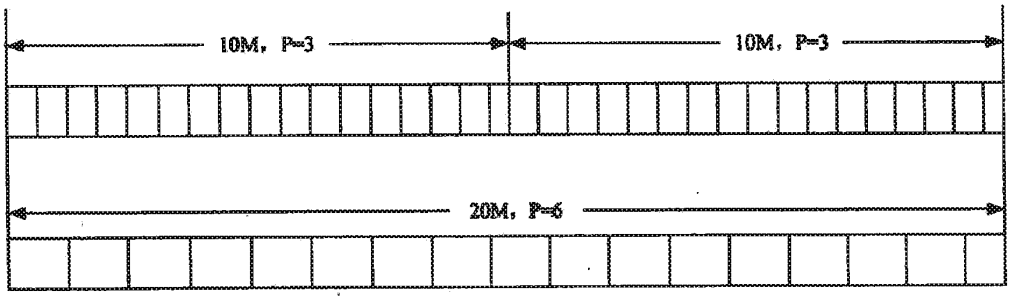

图 6

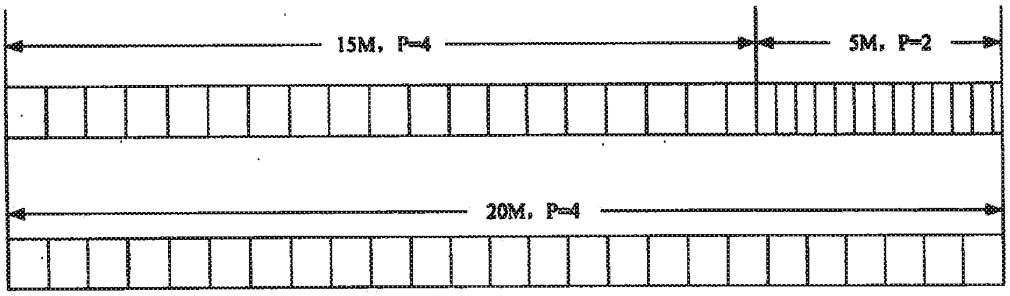

图 7

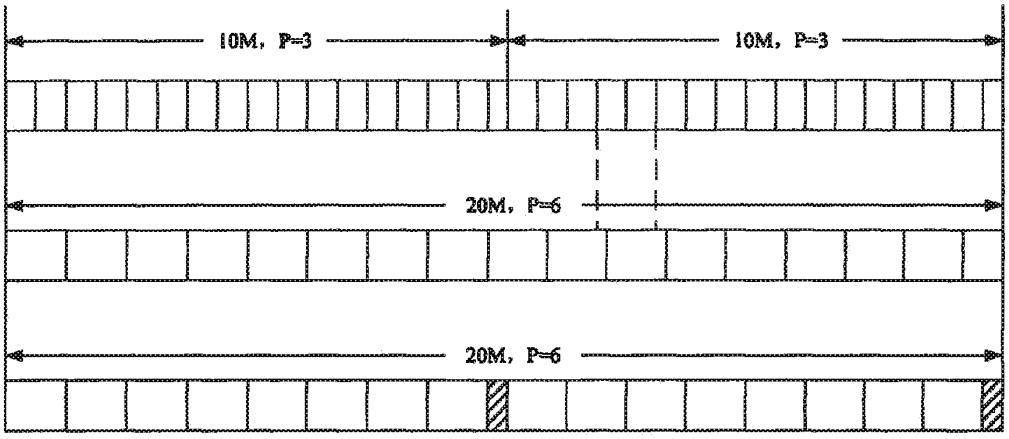

图 8

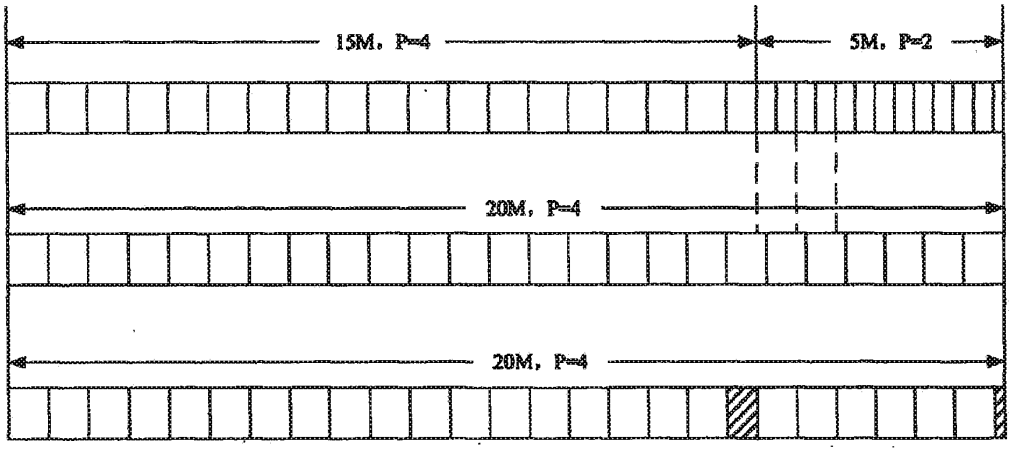

图 9

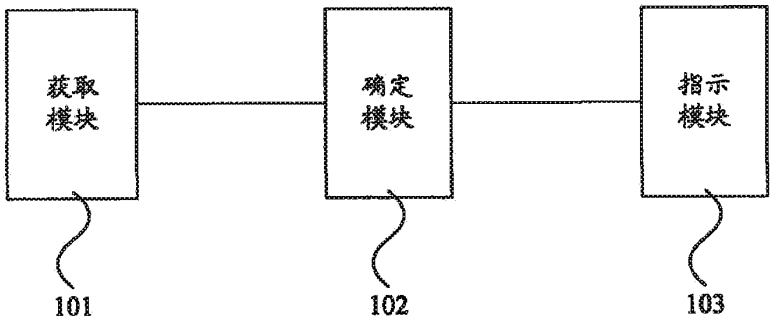

图 10

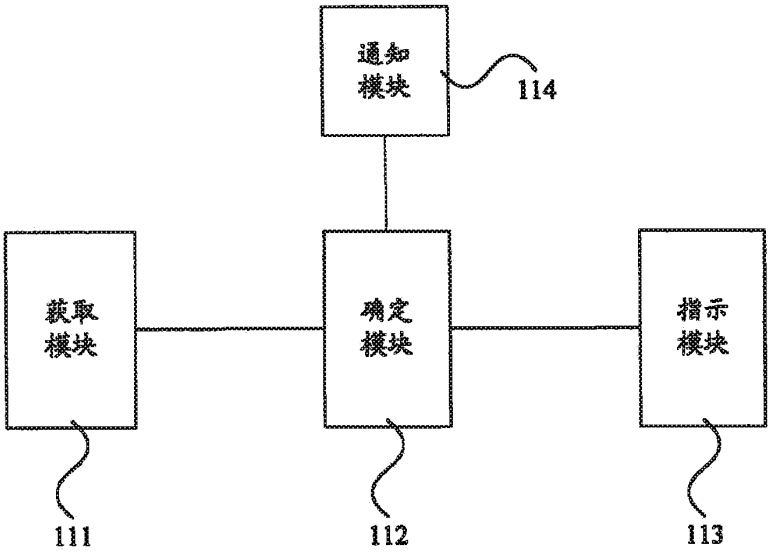

图 11

Espacenet

Bibliographic data: CN101765208 (A) — 2010-06-30

Method for distributing resources, network equipment and wireless system

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Classification: **- international:** ***H04W28/12; H04W72/04***
- cooperative:

Application number: CN20081188931 20081226

Priority number(s): CN20081188931 20081226

Also published as: CN101765208 (B)

Abstract of CN101765208 (A)

The invention discloses a method for distributing resources, network equipment and a wireless system. The method comprises the following steps of: confirming resource distributing granularity in an evolution system according to the resource distributing granularity of an obtained backward compatible system; and indicating the resource distributing condition in the evolution system according to the resource distributing granularity in the evolution system.; The resource distributing granularity of bandwidth after branch carriers are polymerized in the evolution system can be confirmed according to the resource distributing granularity of the bandwidth of the branch carriers in the backward compatible system so as to indicate the resource distributing condition after the branch carriers are polymerized in the evolution system or the resource distributing granularity of bandwidth of all branch carriers in the evolution system can be confirmed according to the resource distributing granularity of the bandwidth of all branch carriers in the backward compatible system so as to indicate the resource distributing condition of all branch carriers in the evolution system.; By the embodiment of the invention, the compatibility of the resource distribution of an LTE-A terminal and an LTE terminal can be maintained, and the cost of a resource distributing signaling is saved.

Notice

DESCRIPTION CN101765208

The present invention discloses a method of resource allocation, network equipment and wireless systems. The method comprising administering to a compatible system resource allocation size to determine the evolution of resources in the system according to the particle size distribution after acquired; according to the evolution of the particle size distribution of resources in the system, indicating the evolution of the system of allocation of resources. After the allocation of resources according to the size of the branch system compatible carrier bandwidth, determine resource allocation granularity bandwidth evolution system branch carrier after polymerization, thereby indicating the allocation of resources in the branch evolution system carrier after polymerization. After Alternatively, you can also according to the resource allocation granularity compatible system each branch carrier bandwidth, determine resource allocation granularity evolution system each branch carrier bandwidth, thus indicating a resource allocation system in the evolution of the respective branch carriers. Example maintain compatibility with LTE terminals and LTE-A terminal resource allocation, resource allocation and saving the overhead of signaling by the present invention.

The method of resource allocation, network equipment and wireless systems

TECHNICAL FIELD

The present invention relates to wireless communication technologies, particularly to a method of resource allocation, network equipment and wireless systems.

Background technique

The exact size of the system bandwidth in the LTE (Long Term Evolved, LTE) system, the network will be notified through the downlink broadcast signaling used within the network to each terminal, then the terminal further based on the resource block included in a system bandwidth (Resource block, RB) determining the number of resource allocation granularity some resource allocation method, for example, downlink resource allocation method of 0 and 1 (resource allocation type0 / 1, RA type 0/1) particle size. Thereafter, the network will be transmitted through a specific resource allocation signaling resource allocation information to the terminal needs to transmit data, the terminal position according to the time-frequency resources the resource allocation signaling information received to determine the specific distribution network, and in the corresponding time-frequency resources send or receive data location, data transmission and communication networks and terminals.

In the evolution of the LTE system (LTE-A), in order to support greater bandwidth, one possible way is to multiple branches carrier aggregation, resource upcoming multiple branches carriers simultaneously dispatched to a terminal use. A plurality of spectrum occupied by the branch carriers may be continuous or non-continuous, the bandwidth of each branch carrier may be the same or different, each branch carrier may be a carrier compatible with LTE terminals, it may simply be a support LTE- a carrier terminal, the LTE terminal in the LTE-a carrier for data transmission and can not communicate. Existing LTE-A technology resource allocation is based on the particle size distribution of the entire system bandwidth of all branches of carrier aggregation are determined by resources.

The inventors found that the prior art at least the following problems in the process of carrying out the invention: the existing LTE-A technology resource allocation resource allocation granularity is determined based on the entire system bandwidth of all branches of the carrier after polymerization, this allocation will result in LTE technology not backward compatible -A system vulnerabilities and waste of resources.

SUMMARY

The present invention is to provide a resource allocation method, network equipment and wireless systems, so that LTE-A resource allocation techniques to be able to post compatible.

Embodiment of the invention provides a method for resource allocation, comprising:

Particle size distribution of resources in the system to be compatible in accordance with acquired after determining the evolution of the system of resource allocation granularity;

According to the evolution of the system of resource allocation size, indicating the evolution of the system of allocation of resources.

Embodiment of the invention there is provided a network device, comprising:

Resource determination unit for the particle size distribution of resources in the system to be compatible in accordance with acquired after determining the evolution of the system of resource allocation granularity;

Resource allocation means for determining resource allocation based on the unit size determined by the evolution of resources in the system, indicating the evolution of the system of allocation of resources.

The embodiment provides a wireless system of the present invention is characterized in that it comprises:

Network equipment for after-compatible system according to the branch of the carrier bandwidth granularity of resource allocation, to determine the evolution of the system, bandwidth resources branch carrier particle size distribution after polymerization, indicating the LTE system, resource allocation branch carrier after polymerization; or, according to the resource allocation size after the system is compatible with the bandwidth of each branch of the carrier to determine the evolution of the system, each branch carrier resource allocation granularity bandwidth indicates the evolution of the system, the distribution of resources each branch carrier.

By the technical solutions found, embodiments of the present invention obtained in the evolution of the system allocation granularity according to the branch carrier in a backward-compatible system allocation granularity cases, after due to the evolution of the system allocation granularity is considered the size to a compatible system distribution, according to the prior art, not only the evolution of the system bandwidth, resource conflicts can be avoided in the prior art not considered due to the after-compatible system allocation granularity caused can ensure LTE-a terminal and LTE compatible terminals.

BRIEF DESCRIPTION

Figure 1 is a schematic view of conventional resource allocation method;

Figure 2 is a schematic process flow schematic diagram of a first embodiment;

Figure 3 of the present invention the resource allocation method of the second embodiment of the schematic;

Figure 4 of the present invention the resource allocation method of the fourth embodiment is a schematic;

Figure 5 is a process flow according to the fifth embodiment of the schematic;

Figure 6 of the present invention the sixth embodiment of the resource allocation method schematic;

Figure 7 is a resource allocation method according to the seventh embodiment is a schematic;

Figure 8 of the present invention the resource allocation method of the eighth embodiment schematic view;

Figure 9 is a resource allocation method according to the ninth embodiment schematic view;

Figure 10 a schematic view of a tenth embodiment of the present invention, the structure of an example of a network device;

11 a schematic diagram of the structure of the present invention, a network device in the eleventh embodiment.

detailed description

By the following figures and examples of technical solutions of the present invention is described in further detail do.

In the LTE downlink resource allocation system, each time a transmission unit corresponding to the end-user resource allocation signaling bearer resource allocation type and corresponding resource allocation information, divided into RA type0, RAtype1, RA type2. RA type0 with bit map (a Bitmap) indication of the resource block group (RBG) allocation case where each bit indicates whether or not a corresponding RBG is assigned, that is, a minimum size of RBG resource allocation, each resource block group (RBCs) includes a plurality of resource blocks (resource block, RB). The number of resource blocks included in each resource block group by the total number of system bandwidth RB includes all decisions that RBG size is a function of system bandwidth contains the number of RB's. Different sizes of resource block groups corresponding to a different system bandwidth, i.e., the minimum granularity of the resource allocation is different. See Table 1 for the relationship between the system bandwidth includes a resource block number and the size of P NRBDL.

Table 1

If the number of resource blocks included in the system bandwidth NRBDL, the size (i.e., size) of each resource block group is P, the RA type0 for distribution, in the resource allocation signaling requires <Img class = "EMIRef" id = "102441405-ifd0001" /> Bits to indicate a specific allocation of resources. Where, Expressed rounded up.

In the same case the system bandwidth, RA type1 and RA type0 resource-allocation signaling bits is the same, but also the use of bitmap (bitmap) mode indication. In order to distinguish the specific type of resource allocation is RA type 0 or RA type 1, in the resource allocation signaling in a bit of information to distinguish. RA type1 according to the system bandwidth of the resource block is divided into groups of P resource block group subsets, for example, the number of resource blocks RA type0 each resource block group comprising of P. Therefore need <Img class = "EMIRef" id = "102441405-ifd0003" /> Bit indicates the end user is scheduled resources which resource block group subset. To be able to instruct as many resources, but also need a bit used to indicate the direction of the initial resource allocation, that is, from the left or right directions resource allocation. Therefore, the number of bits used to indicate the resource blocks scheduled to Corresponding to each bit may indicate whether the sub-groups of resource blocks RB set is called, and scheduling of resource allocation is limited to only the end user can be a subset.

When extending from the LTE system to the next generation of the LTE-A system, the existing resource allocation method is the direct determination of resource allocation based on the bandwidth granularity carrier after polymerization, regardless of the specific size of each branch carrier resource allocation for LTE users Happening. See Table 2 for the number of RB included in the bandwidth of the carrier after polymerization, the relationship between the number of bits of resource allocation and resource allocation granularity carriers needed after polymerization of.

Table 2

Figure 1 is a schematic view of conventional resource allocation method, the two branches of the carrier before the carrier aggregation are 10M (according to the prior art to obtain the resource block at this time include the number is 50), Table 1 can be learned by each branch carrier the resource allocation granularity are 3, i.e., each resource block groups each branch carrier from three resource blocks, so that, for both branches carriers LTE user resource assignment (RA type0) particle size of 3; carrier the bandwidth is 20M after the polymerization (the number of resource blocks included in 100), the resource allocation by table 2 that after the carrier aggregation size is 4, i.e., within the bandwidth of each RBG after polymerization by the 4 RB composition. As can be seen from Figure 1, when the carrier RBG1 after polymerization (corresponding to RB4 ~ RB7) allocated to LTE-A terminal, the corresponding branch carriers RBG1 RBG2 and can no longer be assigned to units of RBG LTE terminals, namely in the corresponding branch carriers can not be used RAtype 0 method RB3 will RBG1 and RBG2 allocated to LTE terminals, such correspondence has not been assigned to go out and RB8 not allocated in this way to LTE terminals, which caused the branch carrier RGB1, RGB2 waste of resources in both ends of the RB, or the scheduler to coordinate inter RA type 0 resource allocation method will RB3 and RB8 are assigned to the terminal, which can be RB3 and RB8 resources utilized, but will increase the complexity of the scheduler.

For this reason, not only to determine the bandwidth of aggregated carriers resource allocation granularity, combined with the specific needs of each branch carrier Allotments granularity after the carrier aggregation LTE-A system for allocation granularity LTE terminals, to ensure that the LTE and LTE- a resource allocation method is compatible with the system, to avoid waste of resources. Accordingly, embodiments of the present invention provides a resource allocation method, comprising: a backwards compatible system resource allocation size, determined according to the evolution of the system after obtaining a resource allocation size; particle size distribution according to the evolution of resources in the system, indicating that evolution system resource allocation. In this embodiment, the branch carrier obtained after the evolution of the system in the particle size distribution to the particle size distribution of a compatible system, since the evolution of the system is the particle size distribution of the particle size distribution after consideration of the compatibility of the system, rather than according to the prior art only in accordance with Evolution of the system bandwidth, the prior art can be avoided due to resource issues in post-conflict does not consider to be compatible system allocation granularity caused can ensure LTE-a terminal and LTE compatible terminals. The following detailed description of the method described above:

The method of the present invention, a flow chart 2 a schematic view of a first embodiment, comprising:

Backward compatible with the system, each branch carrier bandwidth resource allocation size after the network

equipment (such as a base station) get: Step 21.

The following after-compatible system to the LTE system, an evolved system for the LTE-A system, for example.

Step 22: The network equipment according to the resource allocation granularity LTE system bandwidth of each branch carrier, determine a resource allocation granularity LTE-A system, each branch carrier bandwidth.

The specific calculation formula: $P = k \times P1$, or, $P = 0.5 \times k \times P1$ (case requires $(k \times P1) \bmod 2 = 0$); wherein, P1 is the resource allocation in a LTE system bandwidth branch carrier particle size, P is the LTE-a system resource allocation granularity of the branch carrier bandwidth, k is an integer of 2. For example, two carriers are branches 10M (the LTE system, resource allocation granularity corresponding to 3) and 20M (LTE system, resource allocation granularity corresponding to 4), in the LTE-A system, from the branch of the carrier 10M resource allocation granularity preferably 3,6,9, etc., can be a resource allocation granularity 20M preferably 4,6,8 branch carriers and the like.

Step 23: The network equipment according to the particle size distribution of LTE-A system, each branch carrier bandwidth resources, indicating LTE-A system, the distribution of resources each branch carrier.

Specifically, when the resource allocation, RA type0 mode can also be used RA type1 mode. For RA type0 manner, in each branch carrier, in the LTE-A system in accordance with the particle size of the branch carrier, will be composed of a plurality of RBG RB, with each bit indicating whether a corresponding RBG is allocated.

However, the RA type1 way, since the above-described particle size selection method after multiple, LTE-A system is a resource allocation granularity than the resource allocation in the LTE system a large grain size (usually a multiple of the relationship). For example, Figure 3 of the present invention the resource allocation method of the second embodiment of FIG. Referring to Figure 3, with a branch carrier 20M for example, the bandwidth includes 100 resource blocks. For LTE terminals, the particle size distribution of 4, the number of bits occupied by the resource allocation 25 for LTE-A terminals, the particle size distribution is 8, the number of bits occupied by the resource allocation 13. As can be seen from Figure 3, when given a LTE-A terminal RBG0 allocation for LTE-A terminal, with corresponding RBG0 for LTE terminals, RBG1 can not be allocated to LTE terminal; when RBG5 allocation for LTE terminals to a LTE terminal, corresponding RBG2 for LTE-a terminal can no longer use the RA type0 allocated to LTE-a terminal. But you can use other means, such as RA type1 manner allocated to LTE-A terminal in the same way or assigned to other LTE terminals, using different allocation resource allocation, resource allocation method can be more flexible and better to maintain compatibility with LTE terminals and LTE-a terminals.

For RA type1 way, if still will RBG resource allocation granularity into the same number of RBG subset, it may indicate that the number of bits and not well enough to obtain a frequency diversity gain problems. Because RA type1 and RA type0 occupy the same number of bits, the LTE-A terminals, due to its particle size distribution is 8, then the number of resource block groups corresponding subset for 8, additional bits indicating the need for a direction (left or indication from the resource block), since the number of resources in this case is 13 bits, only the 9 bits is used to indicate whether or not the subset of the resource block allocation can be seen from Figure 3, only nine bits indicating a resource block group the eight resource blocks that is another resource block groups in a resource block. This does not make the frequency subset of all resource blocks are covered, but also makes the indicated resource blocks are concentrated, can not get good data transmission diversity gain.

To this end, the RA type1: the branch carrier groups of resource blocks are divided into N resource block group subset, and <Img class = "EMIRef" id = "102441405-ifd0005" /> Where N is the number of resource block group subset, P is the LTE-A system, the particle size distribution of the branch carrier bandwidth, k is an integer of 0; with each bit indicating resource block group subset allocation of resource blocks Happening. In particular, FIG. 4 of the present invention the resource allocation method of the fourth embodiment of FIG. Referring to Figure 4, the LTE-A P = 8 as an example, the resource block is divided into four groups subset of resource block groups (k = 1). The first sub-set includes RBG0 LTE-A's, RBG4, RBG8, RBG12, the second subset comprising RBG1 LTE-A's, RBG5, RBG9, third subset including the LTE-A RBG2, RBG6, RBG10, fourth including LTE-a subset of RBG3, RBG7, RBG11. For LTE terminals, the prior art can still be divided into four subsets.

For LTE-A terminal at RA type1 divided into four subsets, this requires two bits indicating which subset in RB, with a bit indicates the direction (left or right directions), then also the remaining 10 bits, each bit indicates a subset of RB assignment or not. If at this time indicates that the resource is still insufficient dispersion, can be a bit indicating whether to allocate two resource blocks, this time can be covered in each subset allocation of resource blocks of at least three groups, more resources to achieve the indicated dispersion, increase frequency diversity gain. Of course, each bit may also indicate more resource blocks, each bit indicating when more resource blocks, the number of bits used for resource allocation in each subset is sufficient to indicate the allocation of resource blocks of all, it can be used for bits indicate the direction of savings for other purposes, e.g., for verification purposes.

In the above example in which a branch carrier, another branch of the processing flow of the carrier as described above, will not repeat them.

When using the above-described RA type1 manner, by dividing the resource block group size is smaller than the allocated resource block group subsets, increase the number of bits for indicating a resource block, so that more

and more of the resource blocks indicates the dispersion, when using a multi-bit indication when resource blocks may further indicate more and more distributed resource blocks, increase frequency diversity gain.

Allocation of resources described above to achieve a network-side resources allocated to the terminal, in order to enable the terminal to accurately schedule resources, resources need to be allocated granularity sent to the terminal, the resource allocation size is the use of the bandwidth of each branch carrier above depending on the circumstances of each branch carrier obtained granularity. Hair resource allocation granularity can use the following mode:

One way: static manner. For example, a fixed network side protocol table configured or resource allocation granularity terminal.

Option 2: semi-static way. For example, by changing the network side layer signaling terminal according to the service conditions of semi-statically allocated resource size and resource allocation size after the change to the terminal via unicast or broadcast.

This embodiment of the resource allocation granularity LTE system carrier each branch, each branch independently determined carriers in LTE-A system resource allocation granularity. Guaranteed compatible LTE-A and LTE terminals, saving resources. Divided by the resource block group size is smaller than the allocated resource block group subset may improve the frequency diversity gain. Indicating by a bit more resource blocks can be further improved frequency diversity gain.

5 is a flowchart of a method according to the fifth embodiment of a schematic diagram, comprising:

Step 51: The network device acquires the LTE system, the branch carrier bandwidth resource allocation granularity.

Step 52: The network equipment according to the resource allocation granularity branch carrier LTE system bandwidth, resource allocation granularity is determined bandwidth LTE-A carrier aggregation system after the branch.

Wherein, the network device according to the compatible systems to all branches of the carrier bandwidth resource allocation granularity, determining the LTE system, resource allocation granularity bandwidth branch

carrier after polymerization; or two network devices configured to the terminal in all branches carriers branch carrier, according to the resource allocation granularity configuration to the terminal branch of the bandwidth of the carrier, to determine the LTE system, resource allocation granularity bandwidth branch carrier after polymerization. For example, the carrier is a branched first carrier, the second carrier, a third carrier, the network device according to a first carrier, the second carrier and the third carrier in the LTE system determines the granularity of the resource allocation in the LTE-A system, after the carrier aggregation particle size distribution of resources; and to be the first carrier to determine the configuration of the UE, (for example, for UE for the first and second carriers), it is determined that the LTE- according to the first and second carriers in the LTE system resource allocation granularity resource allocation granularity a UE carrier after polymerization.

The specific calculation formula: P = LCM (P1, ..., Pn), or, P = 0.5 × LCM (P1, ..., Pn) (case requires LCM (P1, ..., Pn) mod2 = 0); wherein, P1, ..., Pn are the need for post-polymerization resource allocation granularity computing branch carrier (or carriers of all branches of the configuration to the terminal branch carrier) particle size distribution of resources in the LTE system, P is LTE-a system, each branch carrier resource allocation granularity bandwidth after polymerization, lCM (P1, ..., Pn) as P1, ..., Pn is the least common multiple. For example, FIG. 6 of the present invention the resource allocation method of the sixth embodiment is a schematic view, see Figure 6, the bandwidth of the carrier before the polymerization of the branches are 10M, P = 3, the bandwidth of the carrier after the polymerization of the branch 20M, preferably 6 to P (branch carrier particle size distribution of the least common multiple). Since the particle size of the carrier after the polymerization branched exact multiples of the granularity of a branch carrier, does not appear as shown in Figure 1 that a resource block group in the LTE-A system and LTE system involves two groups of resource blocks and not with the two resource block group perfectly aligned, resulting in a waste of resources and incompatibility issues. Alternatively, another example, when the sub-carrier allocation granularity 3 and 4, respectively, the polymerization can be selected for allocation granularity carrier 12. At the same time, if you think the relationship between the number of resource blocks to a large multiple of the call, you can select multiple half, if that 12 is large, can be selected as 6. Thus two scheduled simultaneously LTE-A terminal can be aligned with the LTE system resources for a terminal, a certain degree of compatibility. Figure 7 is a resource allocation method according to the seventh embodiment schematic view, see Fig. 7, the bandwidth of the carrier are branched and 15M 5M, after the polymerization of the bandwidth 20M. In the LTE system, the corresponding particle sizes of P = 4 and P = 2. LTE-A system will be elected in P 4.

The selection LTE-A system resource allocation granularity is merely exemplary, not limited to the above options, as far as the respective branch carriers in the LTE system resource allocation granularity, in accordance with each branch carrier in the LTE system resource allocation granularity obtained LTE-A system resource allocation granularity bandwidths after polymerization are within the coverage area of the present embodiment.

According to the above-described resource allocation granularity of each branch carrier, not only to determine that the bandwidth allocation granularity of the bandwidth of the carrier after polymerization after

polymerization according to the prior art, e.g., an LTE terminal can achieve compatibility with LTE-A terminals, and to avoid waste of resources.

Step 53: The network equipment according to the particle size distribution of LTE-A system in each branch after the carrier aggregation bandwidth resources, indicating the allocation of resources LTE-A system, each branch carrier after polymerization.

When indicating the allocation of resources, you can use RA type0 way, can also be used RA type1 way.

For RA type0 manner: 8 of the present invention the resource allocation method eighth embodiment of FIG. Referring to Figure 8, when within the bandwidth of the entire carrier aggregation after all RB carried out after a branch of the carrier before the sequence number and sequence of resource allocation granularity divided resource block group (RBG) by time, the likely emergence of a branch carrier remaining resource blocks resource blocks in the first few blocks of a resource group. So that the terminal 2 of the LTE resource block groups corresponding to an LTE-A terminal groups of resource blocks, resource blocks corresponding to the two terminals of LTE-A, a resource conflict, the destruction of compatibility. For this reason, when the number of resource blocks is not a branch of the bandwidth of the carrier containing the carrier after polymerization of an integral multiple of a resource allocation granularity, the branch carrier according to allocate the remaining resources after the allocation granularity of resource blocks after polymerization a composition of another resource block groups (see Figure 8 filled resource blocks). Wherein, when the number of RB's in a RBG resource allocation granularity after polymerization, this is full RBG RBG, RBG of RB said remaining composition is not full RBG. In the resource assignment signaling, each resource block group with a bit indication, this time, since the branch carrier remaining resource blocks form a separate resource block group, after an increase in bandwidth aggregation for the overall resource allocation when a bit (from FIG. 8 it can be seen, the number of resource blocks in the third group one more) than the number of the second resource group. Alternatively, resource block groups (RBGs full) in order to ensure the number of bits occupied by the same resource allocation, resource allocation according to the particle size obtained after polymerization are represented by a bit indicating the remaining sub-carriers of resource blocks of resource block group (not full RBG) with a joint bit indicates that a third of the unfilled resource block groups were treated with a bit indicating the two resource blocks filled with a set of conjoined bit instructions. Example 9 of the present invention the resource allocation method of the ninth embodiment schematic view, the embodiment shown in FIG. 8 embodiment is different from the present embodiment in divided carrier, respectively 15M and 5M example. Principle and the remaining 8 the same, not repeat them.

The above-described manner using RA type0 scheduling, resource block group size can be as a unit for centralized scheduling. In order to improve the frequency diversity gain can RA type1 mode.

For RA type1 way: As a result of the aforementioned common multiple size selection method after, LTE-A system of resource allocation granularity than the LTE system resource allocation large size, may also occur in patients with the problem of the first embodiment. Therefore, RA type1 way to be as in the first embodiment, the RBG is divided into less than the number of LTE-A system allocation granularity RBG subset, you can also use a bit indicating a plurality of RB in each subset . Specific implementation can be found in the first embodiment, it is not described here.

Above to achieve a network-side resources allocated to the terminal, in order to enable the terminal to accurately schedule resources need to be allocated size sent to the terminal resources, resource allocation granularity is the use of the bandwidth of each branch carrier aggregation according to the situation of each branch carrier obtained after the above resource allocation granularity. Hair resource allocation granularity can use the following mode.

One way: static manner. For example, a fixed network side protocol table configured or resource allocation granularity terminal.

Option 2: semi-static way. For example, by changing the network side layer signaling terminal according to the service conditions of semi-statically allocated resource size and resource allocation size after the change to the terminal via unicast or broadcast.

The first embodiment is based on the resource allocation size each branch carrier in the LTE system, the carriers obtained independently in each branch of the LTE-A system resource allocation granularity, respectively. The present embodiment is based on each branch carrier in the LTE system resource allocation granularity, Uniform Resource allocation granularity is determined carrier aggregation in LTE-A system, after the bandwidth. For the first embodiment, since the respective carriers are independent of each branch processing, therefore, the RA type0 way, the prior art may be employed to achieve; however, since the first embodiment, LTE-A system is increased as compared to the LTE system resource allocation granularity, in order to ensure an RBG subset frequency diversity gain, the RA type1 way, the LTE-a system, the number of RBG subset is preferably less than the particle size distribution of resources, and further, can also be combined with a bit indicating a plurality of RB.

This embodiment of the resource allocation granularity LTE system each branch carrier, determine a resource allocation granularity unified carrier aggregation in LTE-A system, after the bandwidth. Guaranteed compatible LTE-A and LTE terminals, saving resources. Border resource conflicts can be avoided by considering the branch carriers. Divided by the resource block group size is smaller than the allocated resource block group subset may

improve the frequency diversity gain. Indicating by a bit more resource blocks can be further improved frequency diversity gain.

Those of ordinary skill will be appreciated: all or part of the above method may be prepared by the procedure of Example program instructing relevant hardware to complete the implementation, the aforementioned program may be stored in a computer readable storage medium, the program is executed, executed the method comprising the steps of the above-described embodiments; and the aforementioned storage medium include: ROM, RAM, disk, or an optical medium can store program codes.

Corresponding to the above-described method, the present embodiment of the invention there is provided a network device, comprising: a resource determining means for allocating to a particle size compatible with the system according to the resource acquired after determining the evolution of the system resource allocation granularity; resource allocation unit, for particle size distribution according to the resource determination unit determines the evolution of resources in the system, indicating the evolution of the system of allocation of resources. In this embodiment, the branch carrier obtained after the evolution of the system in the particle size distribution to the particle size distribution of a compatible system, since the evolution of the system is the particle size distribution of the particle size distribution after consideration of the compatibility of the system, rather than according to the prior art only in accordance with Evolution of the system bandwidth, the prior art can be avoided due to resource issues in post-conflict does not consider to be compatible system allocation granularity caused can ensure LTE-a terminal and LTE compatible terminals. The following detailed description of the apparatus described above, particularly, the aforementioned determining unit comprises resource acquisition module and a determining module, said unit comprising a resource allocation indicating the module:

Figure 10 a schematic view of a tenth embodiment of the present invention, the structure of an example of a network device, comprising an acquisition module 101, a determination module 102 and the indication module 103. 101 acquisition module for acquiring backwards compatible system, each branch carrier bandwidth resource allocation granularity; determining module 102 for post-acquisition module 101 according to the resources available to the bandwidth allocation granularity compatible systems in each branch of the carrier to determine the evolution systems, resource allocation size of each branch carrier bandwidth; module 103 for indicating the resource allocation size determination module 102 to obtain the evolution of the system each branch carrier bandwidth, indicating the evolution of the system, the distribution of resources each branch carrier. Alternatively, the acquisition module 101 for acquiring backwards compatible system, the branch carrier bandwidth resource allocation granularity; module 102 is used to determine the particle size distribution of resources in the branch system compatible carrier bandwidth is determined based on the module 101 to obtain the resulting evolution systems, resource allocation granularity bandwidth branch carrier after polymerization; indication module 103 for resource allocation size determination module 102 to obtain the evolution of the system after the branch carrier aggregation bandwidth, indicating the evolution of the system, according to the

branch after the carrier aggregation assignments.

Specifically, after determining module 102 is specifically configured according to the resource allocation size is compatible with all branches of the system bandwidth carriers, determining the LTE system, resource allocation granularity bandwidth branch carrier after polymerization; or, in all branches to determine the configuration of the carrier to branch carrier terminal, according to the particle size distribution of resources allocated to the terminal branches of the bandwidth of the carrier to determine the evolution of the system, resource allocation granularity bandwidth branch carrier after polymerization. In this case, the specific indication module 103 for the resource allocation granularity bandwidth LTE system carrier aggregation branch after branch resource blocks of bandwidth carriers include one or more resource blocks are divided into groups; each resource block group with a bit instructions; or, the full amount of each resource block groups with a bit indicating the resource block groups in all branches of the carrier is not in full union with a bit indication; or indication module 103 is specifically configured according to the evolution of the system after the branch carrier aggregation resource allocation granularity of bandwidth, the bandwidth of resource blocks included in each branch carrier into one or more resource block groups; the bandwidth of the resource block groups including all branches carriers are divided into N resource block group subset, and <Img class = "EMIRef" id = "102441405-ifd0006" /> Where N is the number of resource blocks subset group, P is the resource allocation granularity bandwidth evolution system branch carrier after polymerization, k is an integer of 0; using a bit map indicating the way each resource block group subsets resources distribution block.

Alternatively, the determination module 102 is used by a specific formula $P = k \times P1$, or, $P = 0.5 \times k \times P1$, based on the resource allocation size backward compatible with each branch carrier system bandwidth, determining the evolution of the system, each branch carrier bandwidth resource allocation granularity; after which, P1 is the compatible system a branch carrier bandwidth resource allocation granularity, P is the bandwidth of the LTE system in the branch carriers resource allocation granularity, k is an integer of 2, for $P = 0.5 \times k \times P1$ need to satisfy $(k \times P1) \bmod 2 = 0$. At this time, the module 103 is specifically configured to instruct the resource allocation granularity of a branch carrier in the LTE system bandwidth, the bandwidth of the LTE system resource block of the branch carrier comprises one or more of the resource blocks into groups; the resource block group into N resource block group subsets, and <Img class = "EMIRef" id = "102441405-ifd0007" /> Where N is the number of resource blocks subset group, P is the evolution of the system allocation granularity of the branch carrier bandwidth, k is an integer of 0; using a bit map indicating the way each resource block group subset of resource blocks assignments.

In the present embodiment of the branch system LTE carrier resource allocation granularity obtained independence or unification resource allocation granularity LTE-A system after polymerization, can well be considered a branch of the carrier, the realization of LTE-A terminal and LTE terminal compatible, to avoid waste of resources.

11 eleventh embodiment of the present invention a schematic structural view of a network device, comprising an acquisition module 111, a determination module 112 and the indication module 113, further comprising a notification module 114. 111 acquisition module for acquiring backwards compatible system, each branch carrier bandwidth resource allocation granularity; module 112 is used to determine resource allocation granularity compatible system each branch carrier bandwidth is determined based on the module 111 to obtain the resulting evolution system, each branch carrier bandwidth resource allocation granularity; indication module 113 for particle size distribution determination module 112 obtained according to the evolution of the system each branch carrier bandwidth resources, indicating the evolution of the system, the distribution of resources each branch carrier; notification module 114 is used by way of static configuration, or unicast mode or multicast mode, the module will determine the resulting evolution of the system resource allocation size of each branch carrier bandwidth to the terminal.

Alternatively, the acquiring module 111 for backward compatibility system, each branch carrier bandwidth granularity resource allocation after obtaining; determining module 112 is used to obtain the bandwidth according to each branch system compatible carrier resource allocation module 111 obtained after particle size, determine the evolution of the system, each branch carrier resource allocation granularity aggregated bandwidth; module 113 for indicating the resource allocation size determination module 112 to obtain the evolution of the system after each branch carrier aggregation bandwidth, indicating the evolution of the system, each branch the distribution of resources carrier after polymerization; notification module 114 is used by way of static configuration, or unicast mode or multicast mode, the module size will determine the allocation of resources resulting evolution of the system after each branch carrier aggregation bandwidth sent to the terminal. This embodiment not only can achieve the technical effects of the ninth embodiment, the particle size distribution can also be set up for a static terminal, or by sending unicast particle size distribution for a particular terminal, or sent via multicast for particle size distribution of all terminals.

Further, embodiments of the present invention further provides a radio system comprising a network device, according to the resources after the allocation granularity compatible with the system bandwidth in the branch carriers, determining the LTE system, resource allocation bandwidth branch carrier after polymerization particle size, indicating the LTE system, resource allocation branch carrier after polymerization; or, after the resource allocation according to the size of each branch of the system is compatible with the bandwidth of the carriers, determining the evolution of the system, each branch carrier bandwidth resource allocation granularity indicating that the evolution of the system, the distribution of resources each branch carrier. Specific network devices can be found in FIG. 10, the network device 11 shown in FIG.

In the present embodiment of the branch system LTE carrier resource allocation granularity obtained independence or unification resource allocation granularity LTE-A system after polymerization, can well be considered a branch of the carrier, the realization of LTE-A terminal and LTE terminal compatible, to avoid

waste of resources.

Finally, it should be noted that: The above embodiments are merely provided for describing the technical solutions of the present invention, not to limit it, although with reference to the preferred embodiment of the present invention has been described in detail, those skilled in the art will appreciate: it is still technical solutions of the present invention can be modified or replaced by equivalents, and such modifications or equivalent replacements nor make technical solutions revised departing from the spirit and scope of the present invention, technical solutions.

Notice

CLAIMS CN101765208

[1]

1. A method of resource allocation, characterized in that, comprising: Particle size distribution of resources in the system to be compatible in accordance with acquired after determining the evolution of the system of resource allocation granularity; According to the evolution of the system of resource allocation size, indicating the evolution of the system of allocation of resources.

[2]

2. The method according to claim 1, characterized in that, The particle size distribution of resources in the system to be compatible in accordance with acquired after determining the evolution of the system of resource allocation size, comprising: Backward compatible system, the branch carrier bandwidth granularity resource allocation after obtaining; The particle size distribution compatible carrier system branch according to the bandwidth resources after determining the evolution of the system, bandwidth resources branch carrier particle size distribution after polymerization; According to the evolution of the system resource allocation size, indicating the evolution of the system of allocation of resources, including: the resource allocation size evolution system after the branch carrier aggregation bandwidth, indicating the evolution of the system, the distribution of resources after the branch carrier aggregation .

[3]

3. The method according to claim 2, characterized in that, after the system according to the branch of a compatible carrier bandwidth granularity resource allocation, determining the LTE system, resource allocation granularity bandwidth branch carrier after polymerization include: Distribution system according backwards compatible carriers all branches granularity of bandwidth resources, determining the LTE system, resource allocation granularity bandwidth branch carrier after polymerization; or Determining the carrier allocated to the terminal branches in all branches of carriers, the resource allocation size allocated to the terminal branch of the bandwidth of the carrier to determine the LTE system, resource allocation granularity bandwidth branch carrier after polymerization.

[4]

4. The method according to claim 3, characterized in that, after the system according to the branch of a compatible carrier bandwidth granularity resource allocation, determining the evolution of the system, after the carrier aggregation is calculated branch bandwidth granularity of resource allocation: P = LCM (P1, ..., Pn), or, P = 0.5 × LCM (P1, ..., Pn); wherein, P1, ..., Pn are backwards compatible to all branches of the system, or carriers allocated to the terminal a resource allocation bandwidth granularity of the branch carriers, P is the bandwidth of the LTE system branch carrier after polymerization resource allocation granularity, lCM (P1, ..., Pn) as P1, ..., Pn is the least common multiple for P = 0.5 × LCM (P1, ..., Pn) required to meet LCM (P1, ..., Pn) mod2 = 0.

[5]

5. The method according to claim 2, characterized in that, according to the granularity of the resource allocation in the LTE system of bandwidth branch carrier after polymerization, indicating the LTE system, resource allocation branch carrier after polymerization include: Based on the resource allocation granularity bandwidth LTE system carrier aggregation branch after branch resource blocks of bandwidth carriers include one or more resource blocks are divided into groups; Each resource block group with a bit indication; or each resource block group with the full bit indicating a resource block group in all the branches of the carrier is not combined with a bit full instructions.

[6]

6. The method according to claim 2, characterized in that, according to the granularity of the resource allocation

in the LTE system of bandwidth branch carrier after polymerization, indicating the LTE system, resource allocation branch carrier after polymerization include: According to resource allocation granularity bandwidth LTE system branch carrier after polymerization, the bandwidth of the resource block of each branch carrier comprises one or more resource blocks into groups; The bandwidth of the resource block groups including all branches carriers into N resource block group subsets, and <Img class = "EMIRef" id = "102441406-ifm0001" /> Where N is the number of resource block group subset, P is assigned the branch carrier aggregation LTE system after a bandwidth resource granularity, k is an integer of 0; Use bitmap indication of the resource block groups each subset allocation of resource blocks.

[7]

7. The method according to claim 1, characterized in that the system is compatible with the granularity of the resource allocation, to determine the evolution of the system in accordance with a resource allocation granularity after acquired, comprising: Backward compatible with the system, each branch carrier bandwidth granularity resource allocation after obtaining; The particle size distribution of each branch of the system is compatible with the bandwidth resources based carrier after determining the evolution of the system, each branch carrier bandwidth granularity of resource allocation; According to the evolution of the system resource allocation size, indicating the evolution of the system of allocation of resources, including: the resource allocation size evolution system each branch carrier bandwidth, indicating the evolution of the system, the distribution of resources each branch carrier.

[8]

8. The method according to claim 7, characterized in that, after the resource allocation according to the particle size of the carrier is compatible with the system bandwidth of each branch, determining the evolution of the system, each branch carrier is calculated bandwidth granularity of resource allocation: $P = k \times P1$, or, $P = 0.5 \times k \times P1$; wherein the compatible system a branch carrier bandwidth resource allocation granularity, P is the resource allocation granularity LTE system the branch carrier bandwidth P1 after, k is an integer of 2, for $P = 0.5 \times k \times P1$ need to satisfy $(k \times P1) \bmod 2 = 0$.

[9]

9. The method according to claim 7, characterized in that, according to the granularity of the resource allocation in the LTE system of bandwidth each branch carrier, indicating the LTE system, resource allocation of each branch carrier comprising: Evolution of particle size distribution in accordance with a system branch carrier

bandwidth resources, resource blocks of the bandwidth of the LTE system is divided into a branch carrier comprises one or more resource block groups; The set of the resource block into N resource block group subset, and <Img class = "EMIRef" id = "102441406-ifm0002" /> Where N is the number of resource block group subset, P is the evolution of the system allocation granularity of the branch carrier bandwidth, k is an integer of 0; Use bitmap indication of the resource block groups each subset allocation of resource blocks.

[10]

10. The method according to claim 6 or claim 9, characterized in that the indication of the use of a bit map for each resource block group subset allocation of resource blocks comprising: a resource block group subset, with a bit indicating that the resource block group subset allocation of a plurality of resource blocks.

[11]

11. The method according to claim 1, characterized by further comprising: By agreement in a way that static configuration terminal determines the evolution of system resource allocation granularity; Alternatively, by way of unicast allocation granularity transmitted to the terminal evolution system each branch carrier bandwidth resources; Alternatively, by way of radio resource allocation granularity evolution system each branch carrier bandwidth to the terminal.

[12]

12. A network device, characterized by comprising: Resource determination unit for the particle size distribution of resources in the system to be compatible in accordance with acquired after determining the evolution of the system of resource allocation granularity; Resource allocation means for determining resource allocation based on the unit size determined by the evolution of resources in the system, indicating the evolution of the system of allocation of resources.

[13]

13. The network apparatus according to claim 12, characterized in that, The resource determination unit comprises: Get module for a compatible system, the branch carrier bandwidth granularity resource allocation after obtaining; Determining module, according to the particle size distribution for a compatible system to obtain

branch of the module carrier obtained bandwidth resources, determine the evolution of the system, bandwidth resources branch carrier aggregation after allocation granularity; The resource allocation unit comprises: indicating module for resource allocation granularity bandwidth determination module obtained evolution system branch carrier after polymerization, indicating the evolution of the system, the distribution of resources branch carrier after polymerization.

[14]

14. The apparatus of claim 13, wherein: said determining module according to the specific system backwards compatible carriers in all branches of the bandwidth allocation granularity of the resource, determining the evolution of the system, the bandwidth allocation of resources after a branch carrier aggregation particle size; or to determine the configuration of the terminal branches of the carrier in all branches of carriers, the resource allocation size allocated to the terminal branch of the bandwidth of the carrier to determine the LTE system, resource allocation granularity bandwidth branch carrier after polymerization.

[15]

15. The apparatus of claim 13, wherein: The indication module is specifically configured according to the resource allocation granularity bandwidth LTE system carrier aggregation branch after branch resource blocks of bandwidth carriers include one or more resource blocks are divided into groups; each resource block group with a bit indicates ; or the full amount of each resource block groups with a bit indicating the resource block groups in all branches of the carrier is not in full union with a bit indication; or The specific indication module for allocating resources according to bandwidth granularity evolution system after the branch carrier aggregation, resource blocks of bandwidth each branch carrier included into one or more resource block groups; bandwidth carriers include all branches of resource block into N resource block group subset of groups, and <Img class = "EMIRef" id = "102441406-ifm0003" /> Where N is the number of resource blocks subset group, P is the resource allocation granularity bandwidth evolution system branch carrier after polymerization, k is an integer of 0; using a bit map indicating the way each resource block group subsets resources distribution block.

[16]

16. The network apparatus according to claim 12, characterized in that, The resource determination unit comprises: Obtaining module, configured to be compatible system, each branch carrier bandwidth granularity After obtaining the resource allocation; Determining module, the module for obtaining distribution obtained according to the compatibility of the carrier system, each branch of the bandwidth resource granularity,

determining the evolution of the system, each branch carrier bandwidth granularity of resource allocation; The resource allocation unit comprises: indicating module for particle size distribution determination module obtained according to the evolution of the system in each branch carrier bandwidth resources, indicating the evolution of the system, the distribution of resources each branch carrier.

[17]

17. The apparatus of claim 16, wherein: said indication module for resource allocation according to the specific size of a branch carrier LTE system bandwidth, the bandwidth of the LTE system resource block that branch into a carrier comprising or more resource block groups; the group resource block into N resource block group subset, and <Img class = "EMIRef" id = "102441406-ifm0004" /> Where N is the number of resource blocks subset group, P is the evolution of the system allocation granularity of the branch carrier bandwidth, k is an integer of 0; using a bit map indicating the way each resource block group subset of resource blocks assignments.

[18]

18. The apparatus according to claim 12, characterized by further comprising: Notification module, the way for agreement by static configuration or unicast mode, or broadcast, the resource determination module obtained evolution system of resource allocation granularity notification to the terminal.

[19]

19. A radio system comprising: Network equipment for after-compatible system according to the branch of the carrier bandwidth granularity of resource allocation, to determine the evolution of the system, bandwidth resources branch carrier particle size distribution after polymerization, indicating the LTE system, resource allocation branch carrier after polymerization; or, according to the resource allocation size after the system is compatible with the bandwidth of each branch of the carrier to determine the evolution of the system, each branch carrier resource allocation granularity bandwidth indicates the evolution of the system, the distribution of resources each branch carrier.

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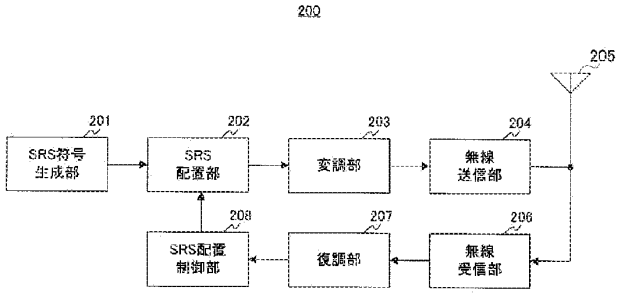
(54) Title: RADIO COMMUNICATION DEVICE AND RADIO COMMUNICATION METHOD

(54) 発明の名称: 無線通信装置及び無線通信方法

[図6]



201 SRS CODE GENERATION UNIT
202 SRS ARRANGEMENT UNIT
203 MODULATION UNIT
204 RADIO TRANSMISSION UNIT
208 SRS ARRANGEMENT CONTROL UNIT
207 DEMODULATION UNIT
206 RADIO RECEPTION UNIT

(57) Abstract: Provided is a radio communication device which can prevent interference between SRS and PUCCH when the PUCCH transmission bandwidth fluctuates and suppress degradation of CQI estimation accuracy by the band where no SRS is transmitted. The device includes: an SRS code generation unit (201) which generates an SRS (Sounding Reference Signal) for measuring uplink line data channel quality; an SRS arrangement unit (202) which frequency-multiplexes the SRS on the SR transmission band and arranges it; and an SRS arrangement control unit (208) which controls SRS frequency multiplex so as to be uniform in frequency without modifying the bandwidth of one SRS multiplex unit in accordance with the fluctuation of the reference signal transmission bandwidth according to the SRS arrangement information transmitted from the base station and furthermore controls the transmission interval of the frequency-multiplexed SRS.

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添付公開書類:
— 国際調査報告書

(57) 要約: ＰＵＣＣＨ送信帯域幅が変動する場合に、ＳＲＳとＰＵＣＣＨとの干渉を防止しつつ、ＳＲＳが送信されない帯域によるＣＱＩ推定精度の劣化を抑えることができる無線通信装置。この装置において、ＳＲＳ符号生成部（２０１）は、上り回線データチャネルの品質を測定するためのＳＲＳ(Sounding Reference Signal)を生成し、ＳＲＳ配置部（２０２）は、ＳＲＳをＳＲ送信帯域に周波数多重して配置し、ＳＲＳ配置制御部（２０８）は、基地局から送信されるＳＲＳ配置情報に基づき、参照信号送信帯域幅の変動に応じて、ＳＲＳの１多重単位の帯域幅を変更せずに、周波数的に均等となるようにＳＲＳの周波数多重を制御し、さらに周波数多重されたＳＲＳの送信間隔を制御する。

明 細 書

無線通信装置及び無線通信方法

技術分野

[0001] 本発明は、無線通信装置及び無線通信方法に関する。

背景技術

[0002] 現在、３ＧＰＰ ＲＡＮ ＬＴＥ(Third Generation Partnership Project Radio Access Network Long Term Evolution)では、上り回線のSounding Reference Signal(ＳＲＳ)が検討されている。ここで、Soundingとは回線品質を推定することを称し、ＳＲＳは主に、上り回線データチャネルのＣＱＩ(Channel Quality Indicator)推定、および基地局と移動局との間のタイミングオフセット推定を行うために、特定のタイムスロットにおいて時間多重されて送信される。

[0003] また、ＳＲＳの送信方法として、特定のタイムスロットで広帯域で送信し、一度に広帯域にわたるＣＱＩを推定する方法と、周波数帯をずらしながら（周波数ホッピング）狭帯域のＳＲＳを複数のタイムスロットで送信し、数回に分けて広帯域のＣＱＩを推定する方法とが提案されている。

[0004] 一般的に、セル境界付近に存在するＵＥ(User Equipment)は、パスロスが大きく、また最大送信電力が限られている。そのため、広帯域にＳＲＳ送信すると、単位周波数あたりの基地局受信電力が低くなり、受信ＳＮＲ(Signal to Noise Ratio)が低くなるため、その結果、ＣＱＩ推定精度が劣化する。従って、セル境界付近のＵＥは、限られた電力を所定の周波数帯域に絞って送信する狭帯域ＳＲＳ送信方法をとる。逆に、セル中央付近のＵＥは、パスロスが小さくて、広帯域にＳＲＳを送信しても、単位周波数あたりの基地局受信電力は十分確保可能であるため、広帯域ＳＲＳ送信方法をとる。

[0005] 一方、ＳＲＳを送信するもう１つの目的は、基地局と移動局との間のタイミングオフセット推定のためである。従って、定められたタイミング推定精度Δｔを確保するためには、１送信単位（１周波数多重単位）のＳＲＳの帯

域幅は、１／Δｔ以上とする必要がある。すなわち、１送信単位のＳＲＳの帯域幅は、ＣＱＩ推定精度とタイミング推定精度との両方を満足させる必要がある。

[0006] また、ＬＴＥにおいて、上り回線制御チャネルであるＰＵＣＣＨ(Physical Uplink Control Channel)は、システム帯域の両端に周波数多重される。従って、ＳＲＳはシステム帯域から上記ＰＵＣＣＨを除いた帯域で送信される。

[0007] さらに、ＰＵＣＣＨの送信帯域幅(１チャネルのＰＵＣＣＨの帯域幅のチャネル数倍)は、制御データの収容数に応じて変動する。つまり、制御データの収容数が少ない場合は、ＰＵＣＣＨ送信帯域幅が狭く（チャネル数が少なく）なり、逆に制御データの収容数が多い場合は、ＰＵＣＣＨ送信帯域幅が広く（チャネル数が多く）なる。従って、図１に示すように、ＰＵＣＣＨ送信帯域幅が変動するとＳＲＳ送信帯域幅も変動する。図１において、横軸は周波数軸を示し、縦軸は時間軸を示す（以下同様）。なお、以下では、１チャネルのＰＵＣＣＨの帯域幅を単にＰＵＣＣＨ帯域幅と省略し、ＰＵＣＣＨ帯域幅にチャネル数を乗じた帯域幅をＰＵＣＣＨ送信帯域幅と称す。同様に、１送信単位のＳＲＳの帯域幅を単にＳＲＳ帯域幅と省略し、複数送信単位のＳＲＳの帯域幅をＳＲＳ送信帯域幅と称す。

非特許文献1：3GPP R1-072229, Samsung, “Uplink channel sounding RS structure”, 7th-11th May 2007

発明の開示

発明が解決しようとする課題

[0008] ＰＵＣＣＨ送信帯域幅が変動する場合の狭帯域ＳＲＳ送信方法として、非特許文献１には、図２に示すような方法が開示されている。非特許文献１記載のＳＲＳ送信方法においては、図２に示すようにＳＲＳ送信帯域幅を、ＰＵＣＣＨ送信帯域幅が最大となるときのＳＲＳ送信帯域幅に固定し、ＰＵＣＣＨ送信帯域幅が変動してもＳＲＳ送信帯域幅を変更しない。また、図２に示すように、ＳＲＳを狭帯域で送信する際には、ＳＲＳを周波数ホッピング

して送信する。非特許文献１記載の方法によれば、図２下段に示すようにＰＵＣＣＨ送信帯域幅が最大値未満である場合には、ＳＲＳが送信されない帯域が生じ、周波数領域におけるＣＱＩ推定精度が著しく劣化する。

[0009] また、図３Ａに示すように、ＳＲＳ送信帯域幅を、ＰＵＣＣＨ送信帯域幅が最小の時のＳＲＳ送信帯域幅に固定すると、図３Ｂに示すようにＰＵＣＣＨ送信帯域幅が増加した場合には、ＳＲＳとＰＵＣＣＨとの間で干渉が生じ、ＰＵＣＣＨの受信性能が劣化する。

[0010] ＰＵＣＣＨ送信帯域幅が増加した場合に、図３Ｂに示したようなＳＲＳとＰＵＣＣＨとの干渉を防止するためには、図４Ｂに示すように、ＰＵＣＣＨと干渉が生じるＳＲＳの送信を停止する方法が考えられる。ここで、図４Ａは図３Ａと同様であり、説明を明確にするために重複して示した図である。ただし、この方法によれば、ＳＲＳが送信されない帯域が生じてしまい、周波数領域におけるＣＱＩ推定精度が劣化する。

[0011] 本発明の目的は、狭帯域ＳＲＳの送信において、ＰＵＣＣＨ送信帯域幅が変動する場合に、ＳＲＳとＰＵＣＣＨとの干渉を防止しつつ、ＳＲＳが送信されない帯域によるＣＱＩ推定精度の劣化を抑えることができる無線通信装置および無線通信方法を提供することである。

課題を解決するための手段

[0012] 本発明の無線通信装置は、上り回線データチャネルの品質を測定するための参照信号を生成する生成手段と、前記参照信号を送信する参照信号送信帯域に、前記参照信号を周波数多重して配置する配置手段と、前記参照信号送信帯域幅の変動に応じて、前記参照信号の１多重単位の帯域幅を変更せずに、周波数的に均等となるように前記周波数多重の多重位置を制御する制御手段と、を具備する構成を採る。

[0013] 本発明の無線通信方法は、上り回線データチャネルの品質を推定するための参照信号を生成するステップと、前記参照信号を送信する参照信号送信帯域に、前記参照信号を周波数多重して配置するステップと、前記参照信号送信帯域幅の変動に応じて、前記参照信号の１多重単位の帯域幅を変更せずに

、周波数的に均等となるように前記周波数多重の多重位置を制御するステップと、を有するようにした。

発明の効果

[0014] 本発明によれば、狭帯域ＳＲＳの送信において、ＰＵＣＣＨ送信帯域幅が変動する場合に、ＳＲＳとＰＵＣＣＨとの干渉を防止しつつ、ＳＲＳが送信されない帯域によるＣＱＩ推定精度の劣化を抑えることができる。

図面の簡単な説明

[0015] [図1]ＰＵＣＣＨ送信帯域幅が変動に応じてＳＲＳ送信帯域幅が変動する様子を示す図（従来）

[図2]ＰＵＣＣＨ送信帯域幅が変動する場合の狭帯域ＳＲＳ送信方法を示す図（従来）

[図3A]ＰＵＣＣＨ送信帯域幅が変動する場合の狭帯域ＳＲＳ送信方法のバリエーションを示す図（従来）

[図3B]ＰＵＣＣＨ送信帯域幅が変動する場合の狭帯域ＳＲＳ送信方法のバリエーションを示す図（従来）

[図4A]ＰＵＣＣＨ送信帯域幅が変動する場合の狭帯域ＳＲＳ送信方法のバリエーションを示す図（従来）

[図4B]ＰＵＣＣＨ送信帯域幅が変動する場合の狭帯域ＳＲＳ送信方法のバリエーションを示す図（従来）

[図5]本発明の実施の形態１に係る基地局の構成を示す図

[図6]本発明の実施の形態１に係る移動局の構成を示す図

[図7]本発明の実施の形態１に係るＳＲＳ配置決定部における処理手順を示すフロー図

[図8A]本発明の実施の形態１に係るＳＲＳ配置決定部において決定されたＳＲＳの配置を例示する図

[図8B]本発明の実施の形態１に係るＳＲＳ配置決定部において決定されたＳＲＳの配置を例示する図

[図9]本発明の実施の形態２に係るＳＲＳ配置決定部における処理手順を示す

フロー図

[図10A]本発明の実施の形態２に係るＳＲＳ配置決定部において決定されたＳＲＳの配置を例示する図

[図10B]本発明の実施の形態２に係るＳＲＳ配置決定部において決定されたＳＲＳの配置を例示する図

[図11A]本発明の実施の形態３に係るＳＲＳ配置決定部において決定されたＳＲＳの配置を例示する図

[図11B]本発明の実施の形態３に係るＳＲＳ配置決定部において決定されたＳＲＳの配置を例示する図

[図12A]本発明の実施の形態４に係るＳＲＳ配置決定部において決定されたＳＲＳの配置を例示する図

[図12B]本発明の実施の形態４に係るＳＲＳ配置決定部において決定されたＳＲＳの配置を例示する図

[図13A]本発明の実施の形態５に係るＳＲＳ配置決定部において決定されたＳＲＳの配置を例示する図

[図13B]本発明の実施の形態５に係るＳＲＳ配置決定部において決定されたＳＲＳの配置を例示する図

[図14A]本発明に係るＲＳ配置決定部のバリエーションにおいて決定されたＳＲＳの配置を例示する図（その一）

[図14B]本発明に係るＲＳ配置決定部のバリエーションにおいて決定されたＳＲＳの配置を例示する図（その一）

[図15A]本発明に係るＲＳ配置決定部のバリエーションにおいて決定されたＳＲＳの配置を例示する図（その二）

[図15B]本発明に係るＲＳ配置決定部のバリエーションにおいて決定されたＳＲＳの配置を例示する図（その二）

[図16]本発明に係るＳＲＳ配置定義テーブルの一例を示す図

[図17A]本発明に係るＲＳ配置決定部のバリエーションにおいて決定されたＳＲＳの配置を例示する図（その三）

[図17B]本発明に係るＲＳ配置決定部のバリエーションにおいて決定されたＳＲＳの配置を例示する図（その三）

[図18A]本発明に係るＲＳ配置決定部のバリエーションにおいて決定されたＳＲＳの配置を例示する図（その四）

[図18B]本発明に係るＲＳ配置決定部のバリエーションにおいて決定されたＳＲＳの配置を例示する図（その四）

発明を実施するための最良の形態

[0016] 以下、本発明の実施の形態について、添付図面を参照して詳細に説明する。

[0017] （実施の形態１）

本発明の実施の形態１に係る基地局１００の構成を図５に示し、本発明の実施の形態１に係る移動局２００の構成を図６に示す。

[0018] なお、説明が煩雑になることを避けるために、図５では、本発明と密接に関連するＳＲＳの受信に係わる構成部を示し、上り回線データおよび下り回線データの送受信等に係わる構成部の図示及び説明を省略する。同様に、図６では、本発明と密接に関連するＳＲＳの送信に係わる構成部を示し、上り回線データおよび下り回線データの送受信等に係わる構成部の図示及び説明を省略する。

[0019] 図５に示す基地局１００において、ＳＲＳ配置決定部１０１は、ＰＵＣＣＨチャネル数に基づき周波数／時間領域においてＳＲＳの配置を決定し、決定したＳＲＳ配置に関する情報（以下、ＳＲＳ配置情報と称す）を制御信号生成部１０２およびＳＲＳ抽出部１０８に出力する。なお、ＳＲＳ配置決定部１０１における処理の詳細については後述する。制御信号生成部１０２は、ＳＲＳ配置情報を含む制御信号を生成し、変調部１０３に出力する。変調部１０３は、制御信号を変調し無線送信部１０４に出力する。無線送信部１０４は、変調信号に対しＤ／Ａ変換、アップコンバート、増幅等の送信処理を施し、アンテナ１０５から無線送信する。

[0020] 無線受信部１０６は、アンテナ１０５を介して無線受信した移動局２００

からのＳＲＳに対しダウンコンバート、Ａ／Ｄ変換等の受信処理を施し、復調部１０７に出力する。復調部１０７は、受信したＳＲＳを復調しＳＲＳ抽出部１０８に出力する。ＳＲＳ抽出部１０８は、ＳＲＳ配置決定部１０１からのＳＲＳ配置情報に基づき、周波数／時間領域に配置されたＳＲＳを抽出し、ＣＱＩ/タイミングオフセット推定部１０９に出力する。ＣＱＩ/タイミングオフセット推定部１０９は、ＳＲＳからＣＱＩおよびタイミングオフセットを推定する。

[0021] 図６に示す移動局２００において、ＳＲＳ符号生成部２０１は、上り回線データチャネルの品質を測定するためのＳＲＳとして用いられる符号系列、すなわちＳＲＳ符号を生成しＳＲＳ配置部２０２に出力する。ＳＲＳ配置部２０２は、ＳＲＳ配置制御部２０８の指示に従って、ＳＲＳ符号を周波数／時間領域のリソース上に配置し変調部２０３に出力する。変調部２０３は、ＳＲＳ符号を変調し無線送信部２０４に出力する。無線送信部２０４は、変調信号に対しＤ／Ａ変換、アップコンバート、増幅等の送信処理を施し、アンテナ２０５から無線送信する。

[0022] 無線受信部２０６は、アンテナ２０５を介して無線受信した基地局１００からの制御信号に対しダウンコンバート、Ａ／Ｄ変換等の受信処理を施し、復調部２０７に出力する。復調部２０７は、受信した制御信号を復調しＳＲＳ配置制御部２０８に出力する。ＳＲＳ配置制御部２０８は、復調された制御信号に含まれるＳＲＳ配置情報に従って、ＳＲＳ配置部２０２を制御する。

[0023] 次に、基地局１００のＳＲＳ配置決定部１０１における処理について詳述する。

[0024] 図７は、ＳＲＳ配置決定部１０１における処理手順を示すフロー図である。

[0025] まず、ステップ（以下、「ＳＴ」と記す）１０１０において、ＳＲＳ配置決定部１０１は、所要ＣＱＩ推定精度および所要タイミングオフセット推定精度に基づきＳＲＳ帯域幅を決定する。

[0026] 次いで、ＳＴ１０２０において、ＳＲＳ配置決定部１０１は、システム帯域幅、ＰＵＣＣＨチャネル数、およびＳＲＳ帯域幅に基づき、ＳＲＳの周波数領域での多重数を算出する。具体的に、ＳＲＳの周波数領域での多重数は、システム帯域幅からＰＵＣＣＨ送信帯域幅を除いたＳＲＳ送信帯域幅に、ＳＴ１０１０で１送信単位の帯域幅が決定されたＳＲＳが多重可能な最大数である。すなわち、ＳＲＳの周波数領域での多重数は、ＳＲＳ送信帯域幅を、ＳＴ１０１０で決定されたＳＲＳ帯域幅で除算して得られる商の整数部分となる。ここで、ＰＵＣＣＨ送信帯域幅は、ＰＵＣＣＨチャネル数により決まり、制御データの収容数に応じて変動するものである。

[0027] 次いで、ＳＴ１０３０において、ＳＲＳ配置決定部１０１は、ＳＲＳがＳＲＳ送信帯域幅において所定の時間間隔で周波数ホッピング（周波数多重）するように、ＳＲＳ配置を決定する。具体的には、ＳＲＳ配置決定部１０１は、周波数領域では、ＣＱＩ推定対象となる周波数帯域を均等にカバーするように、時間領域では所定の時間間隔となるように、ＳＲＳを周波数／時間領域に配置すると決定する。

[0028] 図８Ａおよび図８Ｂは、ＳＲＳ配置決定部１０１において決定されたＳＲＳの配置を例示する図である。なお、図８Ａは、ＰＵＣＣＨチャネル数が２である場合を示し、図８Ｂは、ＰＵＣＣＨチャネル数が４である場合を示す。

[0029] 図８Ａおよび図８Ｂにおいて、ＳＲＳ帯域幅は、所要ＣＱＩ推定精度および所要タイミングオフセット推定精度を満たすように決定されたものであり、ＰＵＣＣＨチャネル数、ＳＲＳ送信帯域幅が変動してもＳＲＳ帯域幅を変更しない。

[0030] また、図８Ａおよび図８ＢそれぞれにおけるＰＵＣＣＨチャネル数が異なるため、ＳＲＳ送信帯域幅がそれぞれ異なり、ＳＲＳ送信帯域幅をＳＲＳ帯域幅で除算して得られるＳＲＳ周波数多重数、すなわちＳＲＳホッピング数もそれぞれ異なる。図８AにおいてＰＵＣＣＨチャネル数が２である場合には、ＳＲＳ周波数多重数が４となり、図８ＢにおいてＰＵＣＣＨチャネル数

が４である場合には、ＳＲＳ周波数多重数が３となる。

[0031] そして図８に示すように、ＳＲＳ送信帯域においてＳＲＳが周波数多重される位置は、ＳＲＳがＳＲＳ送信帯域、すなわちＣＱＩ推定対象となる周波数帯域を均等にカバーするような位置となる。これにより、ＳＲＳが送信されない帯域は、帯域幅がより小さく数がより多くの帯域に分割されるため、つまり、特定の広い範囲の帯域にわたってＳＲＳが送信されない状況が回避されるため、ＳＲＳが送信されない帯域によるＣＱＩ推定精度の劣化を抑えることができる。

[0032] このように、本実施の形態によれば、ＰＵＣＣＨチャネル数の増減に伴い、ＳＲＳ帯域幅を固定としたまま、ＣＱＩ推定帯域幅を均等にカバーするようにＳＲＳの配置を変更するため、ＰＵＣＣＨ送信帯域幅が変動する場合に、ＣＱＩ推定精度およびタイミングオフセット推定精度を維持しつつ、ＳＲＳとＰＵＣＣＨとの間の干渉を防止することができ、さらにＳＲＳが送信されない帯域によるＣＱＩ推定精度の劣化を抑えることができる。

[0033] （実施の形態２）

本発明の実施の形態２に係る基地局および移動局は、実施の形態１に係る基地局および移動局と基本的に同様な構成をとり、基本的に同様な動作を行う。従って、ここではブロック図を図示せず、詳細な説明を省略する。本実施の形態に係る基地局、移動局と、実施の形態１に係る基地局、移動局との相違点は基地局のＳＲＳ配置決定部のみにある。なお、本実施の形態に係る基地局が備えるＳＲＳ配置決定部は、実施の形態１に係る基地局が備えるＳＲＳ配置決定部１０１と一部の処理のみにおいて相違する。

[0034] 以下、本実施の形態に係るＳＲＳ配置決定部の処理について説明する。

[0035] 図９は、本実施の形態に係るＳＲＳ配置決定部における処理手順を示すフロー図である。なお、図９に示す手順は、図７に示した手順と基本的に同様なステップを有しており、同一のステップには同一の符号を付し、その説明を省略する。図９に示す手順は、ＳＴ１０３０の代わりにＳＴ２０３０を有する点のみにおいて、図７に示した手順と相違する。

[0036] ＳＴ２０３０において、ＳＲＳ配置決定部は、まず、下記の式（１）に従ってＳＲＳを周波数／時間領域に配置する時間間隔を算出する。式（１）に従って算出される時間間隔τ（c_{PUCCH}）を用いてＳＲＳが送信されると、ＰＵＣＣＨチャネル数が変動した場合でも、ＣＱＩ推定対象帯域に対するＣＱＩ推定期間が一定となる。

$$\tau(c_{PUCCH}) \fallingdotseq T / n(c_{PUCCH}) \quad \cdots (1)$$

[0037] 式（１）において、Ｔは、ＣＱＩ推定対象帯域に対するＣＱＩ推定期間を示し、c_{PUCCH}はＰＵＣＣＨチャネル数を示す。ｎ（c_{PUCCH}）は、ＰＵＣＣＨチャネル数がc_{PUCCH}である場合のＳＲＳ周波数多重数、すなわち周波数ホッピング数を示す。なお、送信間隔タイムスロットを単位とするため、τ（c_{PUCCH}）は式（１）の右辺の値をタイムスロットに合わせた結果となる。

[0038] また、ＳＴ２０３０において、ＳＲＳ配置決定部は、ＳＲＳがＳＲＳ送信帯域幅において、算出した時間間隔τで周波数多重するように、ＳＲＳ配置を決定する。すなわち、ＳＲＳ配置決定部は、周波数領域ではＣＱＩ推定対象となる周波数帯域を、時間領域ではＣＱＩ推定期間Ｔを均等にカバーするようにＳＲＳを配置すると決定する。

[0039] 図１０Ａおよび図１０Ｂは、本実施の形態に係るＳＲＳ配置決定部において決定されたＳＲＳの配置を例示する図である。なお、図１０は図８と基本的に同様であり、重複な説明は省略する。

[0040] 図１０Ａおよび図１０Ｂにおいて、ＳＲＳ送信帯域幅の変動に伴い、ＳＲＳ帯域幅は変更せず、ＳＲＳはＳＲＳ送信帯域を均等にカバーするように周波数多重される。

[0041] また、図１０Ａにおいては、時間間隔τ（２）を用いてＳＲＳを配置し、図１０Ｂにおいては、時間間隔τ（４）を用いてＳＲＳを配置する。すなわち、本実施の形態においては、ＰＵＣＣＨチャネル数が小さくなる場合には、ＳＲＳ送信間隔を短くし、ＰＵＣＣＨチャネル数が大きくなる場合には、ＳＲＳ送信間隔を長くする。これにより、ＰＵＣＣＨチャネル数が変動しても、ＣＱＩ推定期間Ｔは変動しない。

[0042] このように、本実施の形態によれば、ＰＵＣＣＨチャネル数の増減に伴い、ＳＲＳ帯域幅を固定としたまま、ＣＱＩ推定帯域幅を均等にカバーするようにＳＲＳの配置を変更する。このため、ＰＵＣＣＨ送信帯域幅が変動する場合に、ＣＱＩ推定精度およびタイミングオフセット推定精度を維持しつつ、ＳＲＳとＰＵＣＣＨとの間の干渉を防止することができ、さらにＳＲＳが送信されない帯域によるＣＱＩ推定精度の劣化を抑えることができる。

[0043] さらに、本実施の形態によれば、ＰＵＣＣＨチャネル数が小さくなる場合には、ＳＲＳ送信間隔を短くし、ＰＵＣＣＨチャネル数が大きくなる場合には、ＳＲＳ送信間隔を長くする。このため、ＰＵＣＣＨ送信帯域幅が変動する場合に、ＣＱＩ推定期間を一定に維持することができ、ＣＱＩ推定精度の劣化を防止することができる。

[0044] （実施の形態３）

本発明の実施の形態３に係る基地局および移動局は、実施の形態１に係る基地局および移動局と基本的に同様な構成をとり、基本的に同様な動作を行う。従って、ここではブロック図を図示せず、詳細な説明を省略する。本実施の形態に係る基地局、移動局と、実施の形態１に係る基地局、移動局との相違点は基地局のＳＲＳ配置決定部のみにある。なお、本実施の形態に係る基地局が備えるＳＲＳ配置決定部は、実施の形態１に係る基地局が備えるＳＲＳ配置決定部１０１と一部の処理のみにおいて相違する。

[0045] 以下、本実施の形態に係るＳＲＳ配置決定部において決定されたＳＲＳの配置について説明する。

[0046] 図１１Ａおよび図１１Ｂは、本実施の形態に係るＳＲＳ配置決定部において決定されたＳＲＳの配置を例示する図である。なお、図１１は図１０と基本的に同様であり、重複な説明を省略する。

[0047] 図１１Ａおよび図１１Ｂにおいて、ＳＲＳ送信帯域幅の変動に伴い、ＳＲＳ帯域幅は変更せず、ＳＲＳはＳＲＳ送信帯域を均等にカバーするように周波数多重される。

[0048] また、図１１Ａおよび図１１Ｂに示すように、ＳＲＳ周波数多重数は、Ｐ

ＵＣＣＨチャネル数の増減にかかわらず、ＰＵＣＣＨチャネル数が最大の時のＳＲＳ周波数多重数である。ここでは、ＰＵＣＣＨチャネル数の最大値を４とし、ＳＲＳ周波数多重数は３となる。

[0049] また、図１１Ａおよび図１１Ｂに示すように、ＳＲＳの送信間隔は、ＰＵＣＣＨチャネル数の増減にかかわらず、ＰＵＣＣＨチャネル数が最大の時の送信間隔である。ここでは、ＰＵＣＣＨチャネル数の最大値を４とし、送信間隔はτ（４）で表される。図１１に示すような方法によれば、ＰＵＣＣＨチャネル数が変動する度に送信間隔を算出する必要がなく、ＳＲＳ配置の決定処理を簡略化できる。

[0050] このように、本実施の形態によれば、ＰＵＣＣＨチャネル数の増減に伴い、ＳＲＳ帯域幅を固定としたまま、ＣＱＩ推定帯域幅を均等にカバーするようにＳＲＳの配置を変更する。このため、ＰＵＣＣＨ送信帯域幅が変動する場合に、ＣＱＩ推定精度およびタイミングオフセット推定精度を維持しつつ、ＳＲＳとＰＵＣＣＨとの間の干渉を防止することができ、さらにＳＲＳが送信されない帯域によるＣＱＩ推定精度の劣化を抑えることができる。

[0051] さらに、本実施の形態によれば、ＰＵＣＣＨチャネル数の増減に伴い、ＳＲＳ周波数多重数およびＳＲＳ送信間隔を変化せずＳＲＳを配置するため、ＳＲＳ配置処理を簡略化することができる。

[0052] （実施の形態４）

本発明の実施の形態４においては、ＰＵＣＣＨ送信帯域の変動に伴い、複数の移動局からのＳＲＳの配置方法について説明する。

[0053] 本発明の実施の形態４に係る基地局および移動局は、実施の形態１に係る基地局および移動局と基本的に同様な構成をとり、基本的に同様な動作を行う。従って、ここではブロック図を図示せず、詳細な説明を省略する。本実施の形態に係る基地局、移動局と、実施の形態１に係る基地局、移動局との相違点は基地局のＳＲＳ配置決定部のみにある。なお、本実施の形態に係る基地局が備えるＳＲＳ配置決定部は、実施の形態１に係る基地局が備えるＳＲＳ配置決定部１０１と一部の処理のみにおいて相違する。

[0054] 以下、本実施の形態に係るＳＲＳ配置決定部において決定されたＳＲＳの配置について説明する。

[0055] 図１２Ａおよび図１２Ｂは、本実施の形態に係るＳＲＳ配置決定部において決定されたＳＲＳの配置を例示する図である。なお、図１２は図８と基本的に同様であり、重複な説明を省略する。

[0056] 図１２Ａおよび図１２Ｂにおいて、ＳＲＳ送信帯域幅の変動に伴い、ＳＲＳ帯域幅は変更せず、ＳＲＳはＳＲＳ送信帯域を均等にカバーするように周波数多重される。

[0057] また、図１２Ａおよび図１２Ｂに示すように、本実施の形態に係るＳＲＳ配置決定部は、ＰＵＣＣＨ送信帯域の変動に伴い、所定の周波数帯域におけるＳＲＳのホッピングパターンを変更せず、ＳＲＳを配置する。逆に、変更となるＳＲＳ配置は、異なるホッピングパターン間で同じ帯域となるように制御する。具体的には、ＰＵＣＣＨ送信帯域幅の増減に応じて、特定の帯域に配置したＳＲＳの送信をＯＮ／ＯＦＦすることによって、その他の帯域のホッピングパターンを変更しなくてもすむ。

[0058] このように、本実施の形態によれば、ＰＵＣＣＨチャネル数の増減に伴い、ＳＲＳ帯域幅を固定としたまま、ＣＱＩ推定帯域幅を均等にカバーするようにＳＲＳの配置を変更する。このため、ＰＵＣＣＨ送信帯域幅が変動する場合に、ＣＱＩ推定精度およびタイミングオフセット推定精度を維持しつつ、ＳＲＳとＰＵＣＣＨとの間の干渉を防止することができ、さらにＳＲＳが送信されない帯域によるＣＱＩ推定精度の劣化を抑えることができる。

[0059] さらに、本実施の形態によれば、ＰＵＣＣＨチャネル数の増減に伴い、ＳＲＳのホッピングパターンを変更せず、ＳＲＳを周波数／時間領域に配置するため、ＰＵＣＣＨ送信帯域幅が変動する場合に、移動局多重数、および各移動局のＣＱＩ推定対象帯域に対するＣＱＩ推定期間を維持することができる。

[0060] （実施の形態５）

本発明の実施の形態５に係る基地局および移動局は、実施の形態１に係る

基地局および移動局と基本的に同様な構成をとり、基本的に同様な動作を行う。従って、ここではブロック図を図示せず、詳細な説明を省略する。本実施の形態に係る基地局、移動局と、実施の形態１に係る基地局、移動局との相違点は基地局のＳＲＳ配置決定部のみにある。なお、本実施の形態に係る基地局が備えるＳＲＳ配置決定部は、実施の形態１に係る基地局が備えるＳＲＳ配置決定部１０１と一部の処理のみにおいて相違する。

[0061] 以下、本実施の形態に係るＳＲＳ配置決定部において決定されたＳＲＳの配置について説明する。

[0062] 図１３Ａおよび図１３Ｂは、本実施の形態に係るＳＲＳ配置決定部において決定されたＳＲＳの配置を例示する図である。

[0063] 図１３Ａおよび図１３Ｂにおいて、ＳＲＳ送信帯域幅の変動に伴い、ＳＲＳ帯域幅は変更せず、ＳＲＳはＳＲＳ送信帯域を均等にカバーするように周波数多重される。

[0064] また、図１３Ａおよび図１３Ｂにおいて、ＳＲＳ周波数多重数は、ＰＵＣＣＨチャネル数が最小の時のＳＲＳ周波数多重数であり、ＰＵＣＣＨチャネル数の増減にかかわらず固定となる。図１３Ａおよび図１３Ｂにおいて、ＰＵＣＣＨチャネル数の最小値は２であり、ＳＲＳ周波数多重数は４である。

[0065] また、図１３Ａおよび図１３Ｂにおいて、ＰＵＣＣＨチャネル数の増減に伴い、ＳＲＳ送信帯域が変動するものの、ＳＲＳ周波数多重数が固定となるため、複数のＳＲＳの一部が重なるようにＳＲＳを周波数領域に配置する。

[0066] また、図１３Ａおよび図１３Ｂにおいて、ＰＵＣＣＨチャネル数の増減に伴い、ＳＲＳ周波数多重数が変動しないため、ＳＲＳ送信間隔も変動しない。

[0067] このように、本実施の形態によれば、ＰＵＣＣＨチャネル数の増減に伴い、ＳＲＳ帯域幅を固定としたまま、ＣＱＩ推定帯域幅を均等にカバーするようにＳＲＳの配置を変更する。このため、ＰＵＣＣＨ送信帯域幅が変動する場合に、ＣＱＩ推定精度およびタイミングオフセット推定精度を維持しつつ、ＳＲＳとＰＵＣＣＨとの間の干渉を防止することができ、さらにＳＲＳが

送信されない帯域によるＣＱＩ推定精度の劣化を抑えることができる。

[0068] さらに、本実施の形態によれば、ＰＵＣＣＨチャネル数の増減に伴い、ＳＲＳ周波数多重数を変更せず、周波数多重されるＳＲＳの一部の帯域が重なるようにＳＲＳを配置するため、ＣＱＩ推定精度をさらに向上し、ＳＲＳが送信されない帯域によるＣＱＩ推定精度の劣化を防止することができる。

[0069] 以上、本発明の実施の形態について説明した。

[0070] なお、上記各実施の形態においてあげられたＰＵＣＣＨチャネル数、例えば２、または４は、例としてあげられたものであり、これに限定するものではない。

[0071] また、上記各実施の形態では、ＳＲＳ送信帯域はシステム帯域からＰＵＣＣＨ送信帯域を除いた帯域である場合を例にとって説明したが、本発明はこれに限定されず、ＳＲＳ送信帯域はＰＵＣＣＨチャネル数の増減に応じて変動する特定の帯域でも良い。

[0072] また、上記各実施の形態では、ＰＵＣＣＨチャネル数の増減に伴いＳＲＳ帯域幅を変更せず、ＳＲＳがＳＲＳ送信帯域に周波数多重される位置を変更する場合を例にとって説明したが、本発明はこれに限定されず、ＰＵＣＣＨチャネル数の増減に伴い、ＳＲＳがＳＲＳ送信帯域に多重される位置を変更し、さらにＳＲＳ帯域幅を変更しても良い。ただし、ＳＲＳ帯域幅の変動は、ＣＱＩ推定精度、タイミングオフセット推定精度の劣化が無視できる範囲内において、例えば±１～２ＲＢ以内において限定される必要があり、この限定によってＣＱＩ推定精度の劣化を抑えることができる。ここで、ＲＢ(Resource Block)とは、無線リソース上の特定の範囲を表す単位である。図１４Ａは、所定範囲内においてＳＲＳ帯域を拡張する場合を例示する図であり、図１４Ａにおいて拡張される帯域の範囲は１ＲＢ以下である。また、ここでＳＲＳ帯域幅の拡張、および短縮は、ＣＡＺＡＣ(Constant Amplitude Zero Auto-Correlation)系列、またはＣＡＺＡＣと同様な性質を有する系列のcyclic extension、およびtruncationにしても良い。

[0073] また、上記各実施の形態で、狭帯域ＳＲＳでＣＱＩ推定できなかった上り

回線データチャネルを、広帯域ＳＲＳを送信している移動局に優先的に割り当てることが考えられる。図１４Ｂは、狭帯域ＳＲＳでＣＱＩ推定できなかった上り回線データチャネルを、広帯域ＳＲＳを送信している移動局に優先的に割り当てる場合を説明するための図である。上記、パケット割当方法により、周波数スケジューリング効果の低下を防止することが可能となる。

[0074] また、図１５Ａに示す通り、ＳＲＳの配置は、ＰＵＣＣＨと隣接させても良い。さらに、図１５Ｂに示す通り、ホッピング周期毎に異なるＳＲＳ配置としても良い。

[0075] また、ＳＲＳは、単にパイロット信号、参照信号、リファレンス信号などと呼ばれる場合がある。

[0076] また、ＳＲＳに使用する既知信号としては、ＣＡＺＡＣ系列、またはＣＡＺＡＣと同様な性質を有する系列を用いて良い。

[0077] また、上記各実施の形態に係る基地局において得られたＳＲＳ配置情報は、Ｌ１／Ｌ２control channelであるＰＤＣＣＨ(Physical Downlink Control Channel)を用いて移動局に通知されても良く、またはＬ３ messageとしてＰＤＳＣＨ(Physical Downlink Shared Channel)を用いて移動局に通知されても良い。

[0078] また、上記各実施の形態において、上り回線は、ＬＴＥで用いられているＤＦＴ－ｓ－ＯＦＤＭ (Discrete Fourier Transform-s-Orthogonal Frequency Division Multiplexing) 構成をとっても良い。

[0079] また、上記各実施の形態において、下り回線は、ＬＴＥで用いられているＯＦＤＭ構成をとっても良い。

[0080] また、上記各実施の形態に係るＳＲＳ配置情報は、報知チャネル、例えば、ＢＣＨ(Broadcast Channel)で通知されるＰＵＣＣＨ構成情報と一意的に予め関連付けられても良い。これにより、ＵＥ毎にＳＲＳ配置情報を送信する必要がなくなるため、シグナリングオーバヘッド(Signaling Overhead)が低減される。例えば、以下のように、ＰＵＣＣＨチャネル数から各ＵＥがＳＲＳ配置を算出しても良い。

[0081] 以下、ＰＵＣＣＨチャネル数からＳＲＳ配置を算出する算出式の一例を示す。

[0082] ＳＲＳの周波数領域の配置開始サブキャリアをk_0とすると、k_0は下記の式（２）のように表される。

[数1]

$$k_0 = k_{RB}(n) \cdot N_{SC}^{RB} \quad \cdots (2)$$

[0083] 式（２）において、ｎは周波数領域でのＳＲＳ多重番号を示し、N_{sc}^{RB}は、１ＲＢあたりのサブキャリア(sub-carrier)数を示す。また、k_{RB}（ｎ）は、周波数多重番号ｎのＳＲＳが配置されるＲＢの番号を示し、下記の式（３）または（４）で表される。

[数2]

$$k_{RB}(n) = n \cdot N_{SRS}^{BASE} + \left\lfloor (n+1) \cdot \frac{N_{RB}^{UL} - N_{RB}^{PUCCH} - N_{SRS}^{BASE} \cdot N_{SRS}}{N_{SRS}+1} \right\rfloor + \left\lfloor \frac{N_{RB}^{PUCCH}}{2} \right\rfloor \quad n = 0,1,\ldots,N_{SRS}-1 \quad \cdots (3)$$

[数3]

$$k_{RB}(n) = n \cdot N_{SRS}^{BASE} + \left\lfloor (2n+1) \cdot \frac{N_{RB}^{UL} - N_{RB}^{PUCCH} - N_{SRS}^{BASE} \cdot N_{SRS}}{2N_{SRS}} \right\rfloor + \left\lfloor \frac{N_{RB}^{PUCCH}}{2} \right\rfloor \quad n = 0,1,\ldots,N_{SRS}-1 \quad \cdots (4)$$

[0084] 式（３）および式（４）において、N_{SRS}はＳＲＳ周波数多重数を示し、下記の式（５）で表される。

[数4]

$$N_{SRS} = \left\lfloor \frac{N_{RB}^{UL} - N_{RB}^{PUCCH}}{N_{SRS}^{BASE}} \right\rfloor \quad \cdots (5)$$

[0085] 式（３）、（４）、および（５）において、N_{RB}^{PUCCH}は、ＰＵＣＣＨ送信帯域に含まれるＲＢ数を示し、N_{RB}^{UL}は、システム帯域に含まれるＲＢ数を示す。N_{SRS}^{BASE}は、ＳＲＳ帯域幅に含まれるＲＢ数を示す。

[0086] 上記パラメータのうち、N_{RB}^{PUCCH}以外はシステムパラメータであるため、一度シグナリング、あるいは報知されれば、固定的に用いることができる。従って、移動局はN_{RB}^{PUCCH}が与えられれば、上記の式（２）～式（５）

に従ってＳＲＳ配置を導出することができる。ここで、N_{RB}^{PUCCH}はＰＵＣＣＨチャネル数により決まるパラメータであるため、移動局は、基地局からＰＵＣＣＨチャネル数が与えられればＳＲＳ配置を導出し、ＳＲＳを送信することができる。

[0087] また、移動局は、上記の式（２）～式（５）の代わりに、ＳＲＳ配置定義テーブルを参照して、ＰＵＣＣＨチャネル数からＳＲＳ配置を得て、ＳＲＳを送信しても良い。図１６は、ＳＲＳ配置定義テーブルの一例を示す図である。図１６に示すＳＲＳ配置定義テーブルは、ＰＵＣＣＨチャネル数が１、および４の場合のＳＲＳ配置ＲＢ番号を定義したテーブルである。また、ｔはホッピング周期における送信タイミングを示す。また、図１６に示すように、異なるＳＲＳ多重番号ｎに応じて、ホッピングパターンも異なる。また、テーブル中の「－」はＳＲＳを割り当てないことを示す。移動局は、ＳＲＳ配置定義テーブルを保持することにより、基地局からＰＵＣＣＨチャネル数が与えられればＳＲＳ配置を得て、ＳＲＳを送信することができる。

[0088] また、ＰＵＣＣＨ構成情報と一意的に予め関連付けられる情報として、ＳＲＳ配置情報の他に、上記ＳＲＳ帯域幅の可変情報や、ＳＲＳ系列情報といった他のＳＲＳ構成情報でも良い。

[0089] また、上記各実施の形態では、１つのＳＲＳ送信帯域幅に対して、狭帯域のＳＲＳ帯域幅を周波数領域において均等にカバーする例を挙げて説明した。しかし本発明はこれに限定されない。本発明では、１つのＳＲＳ送信帯域幅を複数のより帯域幅の小さなＳＲＳ送信帯域幅（以下、ＳＲＳサブバンドと称す）に分割し、それぞれのＳＲＳサブバンドの帯域幅に対して、狭帯域のＳＲＳ帯域幅を周波数領域において均等にカバーするように配置しても良い。

[0090] １つのＳＲＳ送信帯域幅に対して２つのＳＲＳサブバンド１，２を設け、各サブバンドに３つのＳＲＳが配置される場合の例を図１７Ａおよび図１７Ｂに示す。

[0091] 図１７Ａに示す例のように、ＳＲＳサブバンド１内に配置されるＳＲＳの

配置および間隔は、ＳＲＳサブバンド１の帯域幅の変動に対応してＳＲＳサブバンド１内でＣＱＩ推定帯域幅を均等にカバーするように変更される。同様にＳＲＳサブバンド２内に配置されるＳＲＳの配置および間隔は、ＳＲＳサブバンド２の帯域幅の変動に対応してＳＲＳサブバンド２内でＣＱＩ推定帯域幅を均等にカバーするように変更される。

[0092] また、図１７Ｂに示す例のように、ＳＲＳサブバンドの帯域幅がそれぞれ異なっていても良い。この場合は、ＳＲＳサブバンド内のＳＲＳの配置および間隔を、ＳＲＳサブバンド毎に、ＣＱＩ推定帯域幅を均等にカバーするように変更すると良い。

[0093] なお、図１７Ａおよび図１７ＢではＳＲＳサブバンド数が２の場合を一例に挙げた。しかし本発明では、ＳＲＳサブバンド数は３以上であっても良い。また、図１７Ａおよび図１７ＢではＳＲＳサブバンド内のＳＲＳ数が３の場合を一例に挙げた。しかし本発明では、ＳＲＳサブバンド内に３以外の複数のＳＲＳが配置されても良い。

[0094] また、上記各実施の形態では、ＳＲＳ送信帯域幅内においてＳＲＳと隣り合うＳＲＳの周波数間隔も均等になるような配置例を挙げて説明した。しかし実際のシステムにおいては、ＳＲＳ帯域幅やＳＲＳの周波数割当位置は離散的な値をとる。したがって、ＳＲＳ送信帯域幅が１つのＳＲＳ帯域幅で割り切れない場合が発生する。このような場合、割り切れずに残る端数の周波数割当単位を利用せずに、割り切れる範囲の周波数領域にＣＱＩ推定帯域幅を均等にカバーするようにＳＲＳを配置しても良い（図１８Ａ）。または、割り切れずに残る端数の周波数割当単位を各ＳＲＳの間に１つずつ割り当てる構成をとるようにしても良い（図１８Ｂ）。

[0095] ここで、図１８Ａおよび図１８ＢのＲＢ（Resource Block）は周波数領域における割当単位を表す。図１８Ａおよび図１８Ｂは、ＳＲＳ帯域幅を４ＲＢ、ＳＲＳ送信帯域幅を１８ＲＢとした場合の一例である。

[0096] また、上記各実施の形態では、ＳＲＳがＳＲＳ送信帯域幅において所定の時間間隔で周波数ホッピング（周波数多重）する場合について説明した。し

かし本発明はこれに限定されない。本発明は、周波数ホッピングを行わない場合においても、上記各実施の形態で述べた効果と同様の効果を得ることができる。

[0097] 上記各実施の形態におけるＳＲＳの配置は、ＲＢ単位でも、サブキャリア単位でも良く、いずれかに限定されるものではない。

[0098] また、回線品質情報を示すＣＱＩは、ＣＳＩ(Channel State Information)などと表されることがある。

[0099] また、基地局装置は、Node Ｂ、移動局装置はＵＥと表現されることもある。

[0100] また、上記各実施の形態では、本発明をハードウェアで構成する場合を例にとって説明したが、本発明はソフトウェアで実現することも可能である。

[0101] また、上記各実施の形態の説明に用いた各機能ブロックは、典型的には集積回路であるＬＳＩとして実現される。これらは個別に１チップ化されても良いし、一部または全てを含むように１チップ化されても良い。ここでは、ＬＳＩとしたが、集積度の違いにより、ＩＣ、システムＬＳＩ、スーパーＬＳＩ、ウルトラＬＳＩと呼称されることもある。

[0102] また、集積回路化の手法はＬＳＩに限るものではなく、専用回路または汎用プロセッサで実現しても良い。ＬＳＩ製造後に、プログラムすることが可能なＦＰＧＡ（Field Programmable Gate Array）や、ＬＳＩ内部の回路セルの接続や設定を再構成可能なリコンフィギュラブル・プロセッサーを利用しても良い。

[0103] さらには、半導体技術の進歩または派生する別技術によりＬＳＩに置き換わる集積回路化の技術が登場すれば、当然、その技術を用いて機能ブロックの集積化を行っても良い。バイオ技術の適用等が可能性としてありえる。

[0104] ２００７年８月１４日出願の特願２００７－２１１５４８および２００８年２月５日出願の特願２００８－０２５５３５の日本出願に含まれる明細書、図面および要約書の開示内容は、すべて本願に援用される。

産業上の利用可能性

[0105] 本発明は、移動体通信システム等に適用することができる。

請求の範囲

[1] 上り回線データチャネルの品質を測定するための参照信号を生成する生成手段と、

前記参照信号を送信する参照信号送信帯域に、前記参照信号を周波数多重して配置する配置手段と、

前記参照信号送信帯域幅の変動に応じて、前記参照信号の１多重単位の帯域幅を変更せずに、周波数的に均等となるように前記周波数多重の多重位置を制御する制御手段と、

を具備する無線通信装置。

[2] 前記制御手段は、

前記参照信号送信帯域幅の変動に応じて前記参照信号の周波数多重数を変更する、

請求項１記載の無線通信装置。

[3] 前記制御手段は、

さらに前記周波数多重された前記参照信号の全体的な送信期間を一定とし、前記参照信号が時間的に均等に送信されるように送信間隔を制御する、

請求項１記載の無線通信装置。

[4] 前記制御手段は、

前記参照信号の周波数多重数および前記送信間隔を、前記参照信号送信帯域幅の変動にかかわらず、前記参照信号送信帯域幅が最小時の値に固定する、

請求項３記載の無線通信装置。

[5] 前記制御手段は、

前記参照信号の周波数多重数および前記送信間隔を、前記参照信号送信帯域幅の変動にかかわらず、前記参照信号送信帯域幅が最大時の値に固定し、周波数多重される前記参照信号の一部の帯域が重なるように制御を行う、

請求項３記載の無線通信装置。

[6] 前記制御手段は、

前記参照信号送信帯域幅の変動にかかわらず、周波数／時間領域における前記参照信号の所定の帯域のホッピングパターンを変更しない、

請求項１記載の無線通信装置。

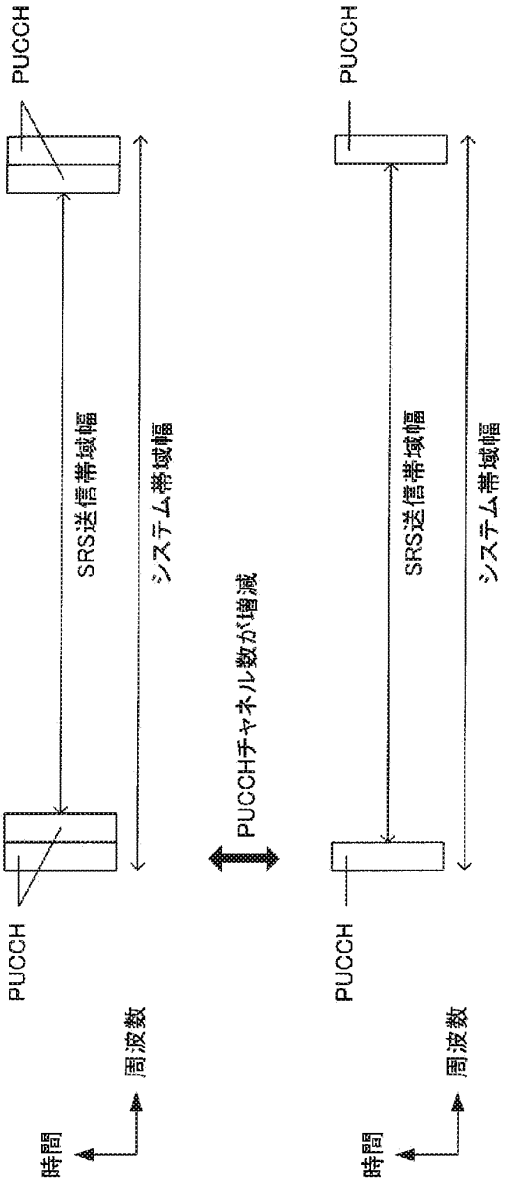
[7] 上り回線データチャネルの品質を推定するための参照信号を生成するステップと、

前記参照信号を送信する参照信号送信帯域に、前記参照信号を周波数多重して配置するステップと、

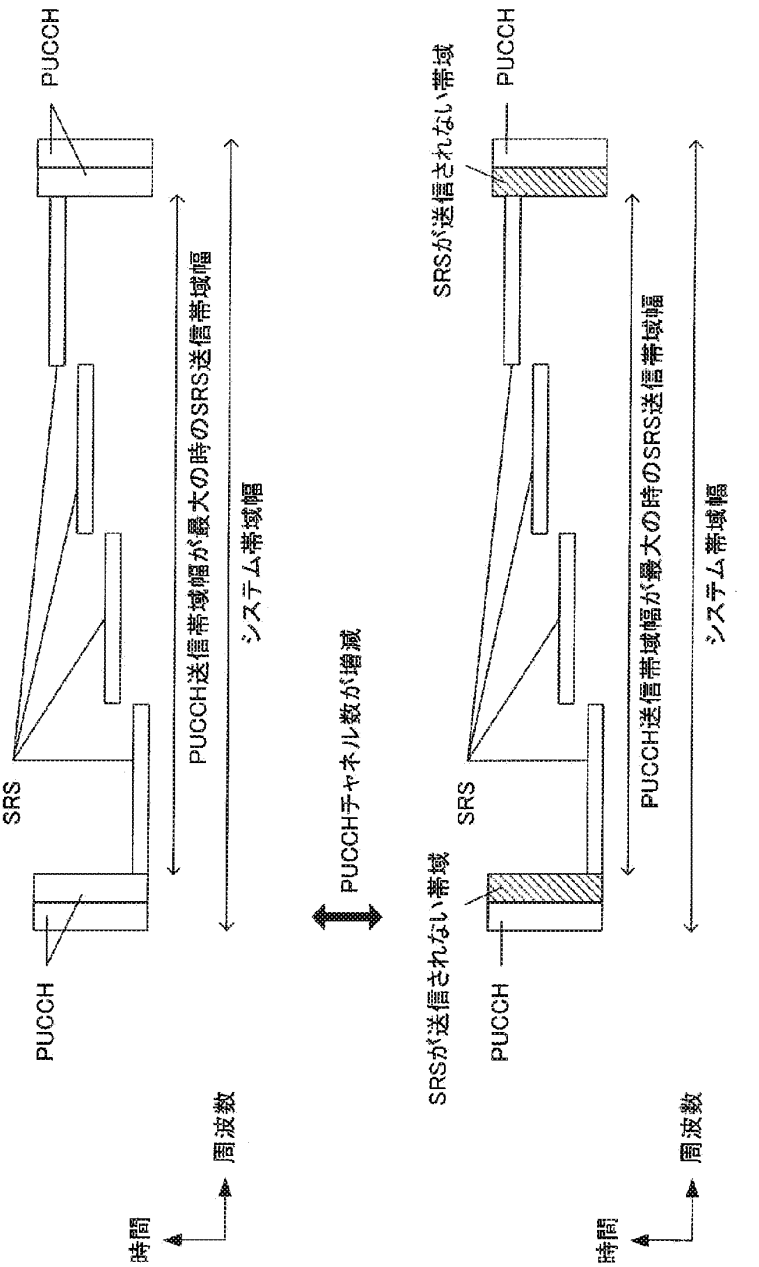
前記参照信号送信帯域幅の変動に応じて、前記参照信号の１多重単位の帯域幅を変更せずに、周波数的に均等となるように前記周波数多重の多重位置を制御するステップと、

を具備する無線通信方法。

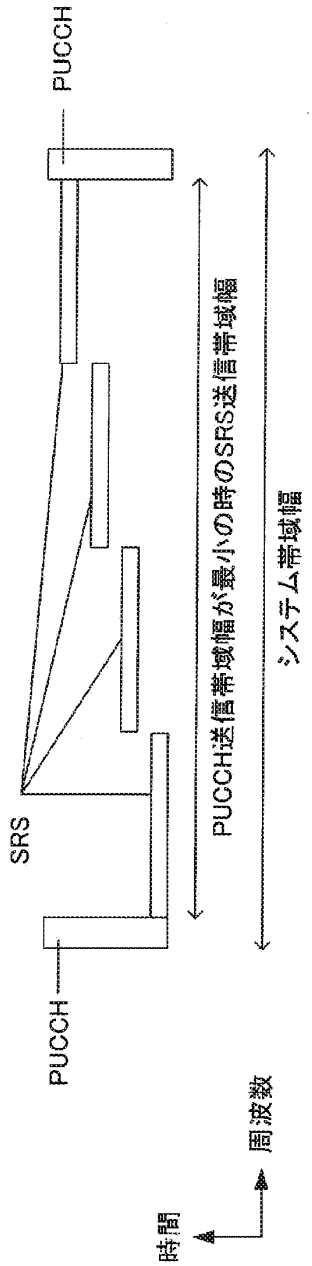
[図1]


PUCCH
SRS送信帯域幅
システム帯域幅
PUCCH
時間
周波数
PUCCHチャネル数が増減
PUCCH
SRS送信帯域幅
システム帯域幅
PUCCH
時間
周波数

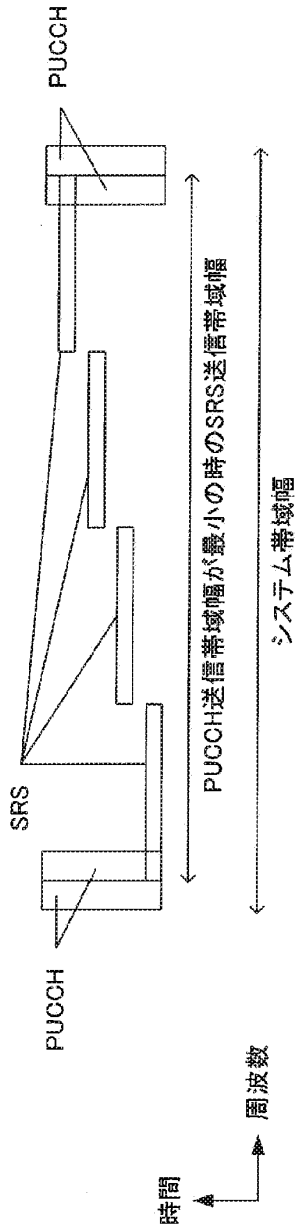
[図2]


PUCCH
SRS
PUCCH
PUCCH送信帯域幅が最大の時のSRS送信帯域幅
システム帯域幅
PUCCHチャネル数が増減
SRSが送信されない帯域
PUCCH
SRS
SRSが送信されない帯域
PUCCH
PUCCH送信帯域幅が最大の時のSRS送信帯域幅
システム帯域幅
時間
周波数
時間
周波数

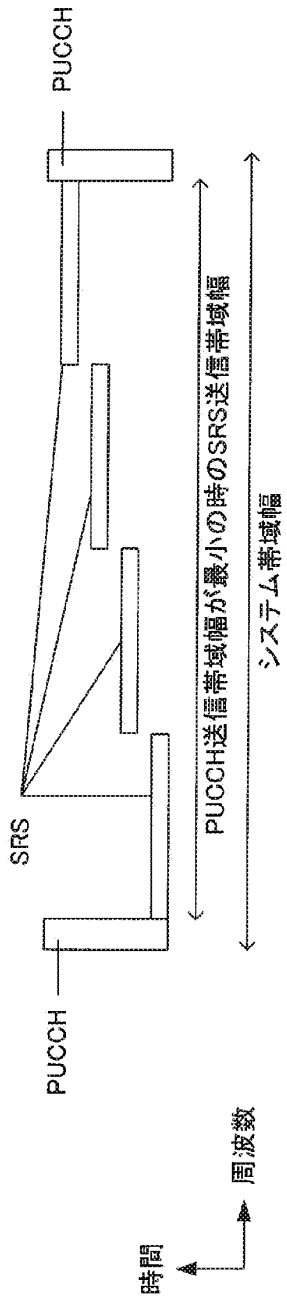
[図3A]



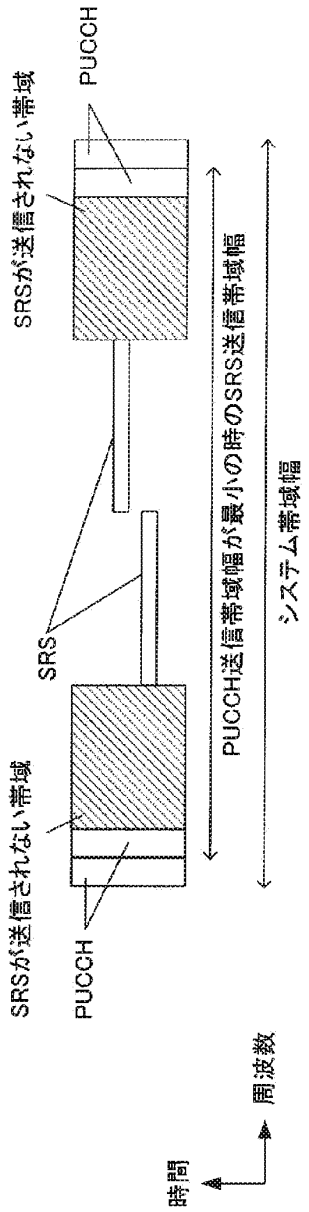
[図3B]



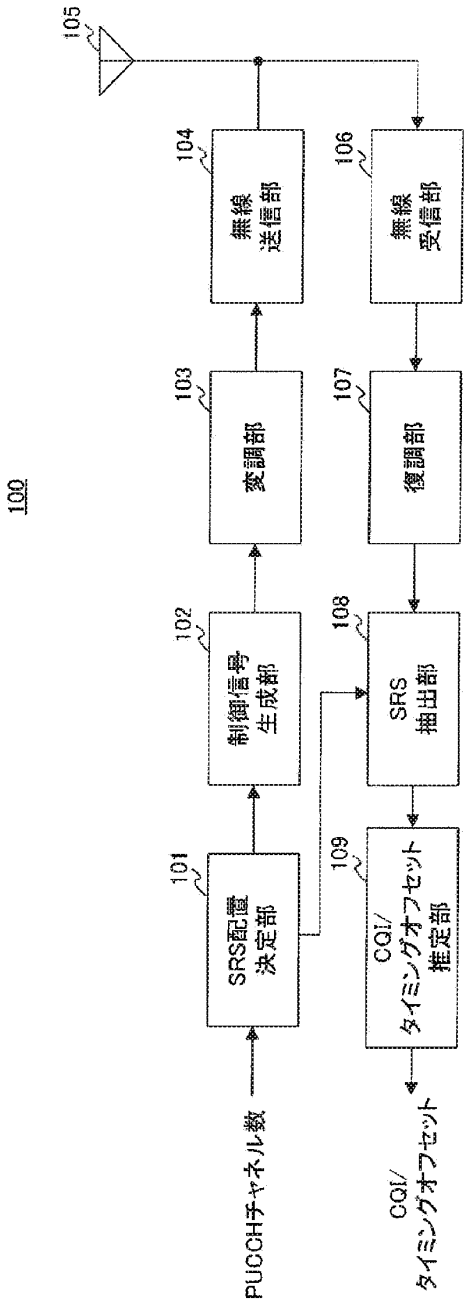
[図4A]



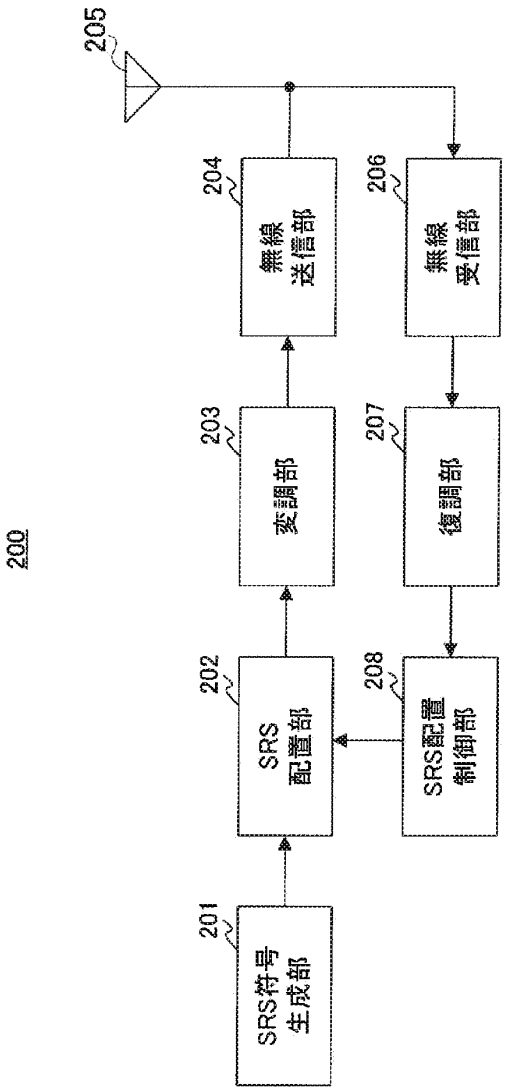
[図4B]


PUCCH
SRSが送信されない帯域
SRS
PUCCH送信帯域幅が最小の時のSRS送信帯域幅
システム帯域幅
SRSが送信されない帯域
PUCCH
周波数
時間

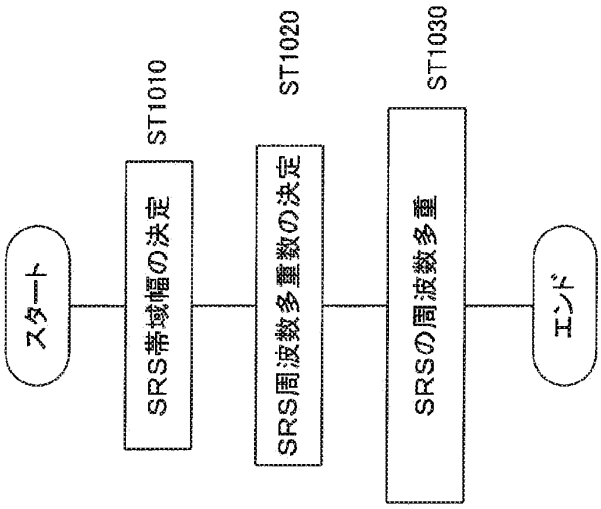
[図5]


100
105
104
無線送信部
106
無線受信部
103
変調部
107
復調部
102
制御信号生成部
108
SRS抽出部
101
SRS配置決定部
109
CQI/タイミングオフセット推定部
PUCCHチャネル数
CQI/タイミングオフセット

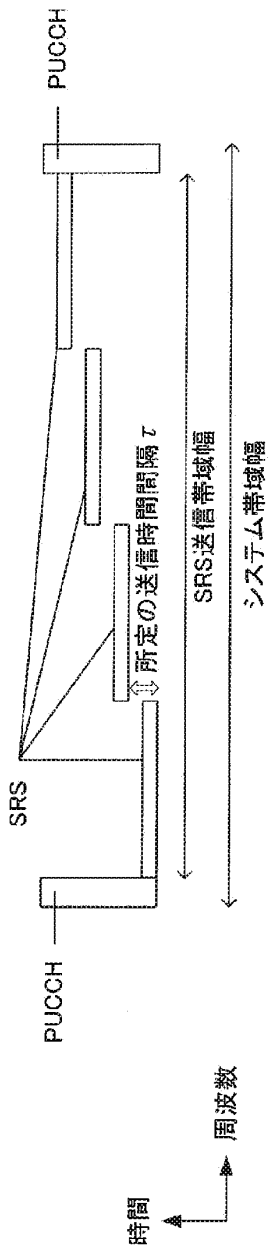
[図6]


200
205
204
無線送信部
206
無線受信部
203
変調部
207
復調部
202
SRS配置部
208
SRS配置制御部
201
SRS符号生成部

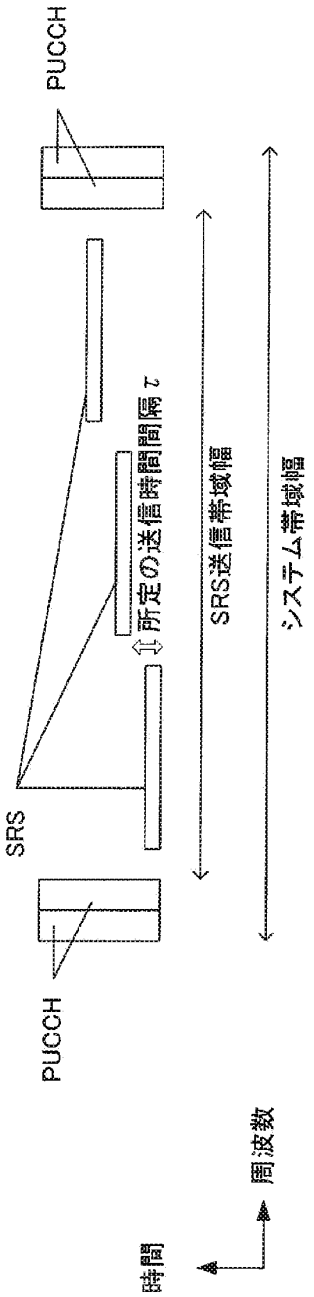
[図7]


スタート
ST1010
SRS帯域幅の決定
ST1020
SRS周波数多重数の決定
ST1030
SRSの周波数多重
エンド

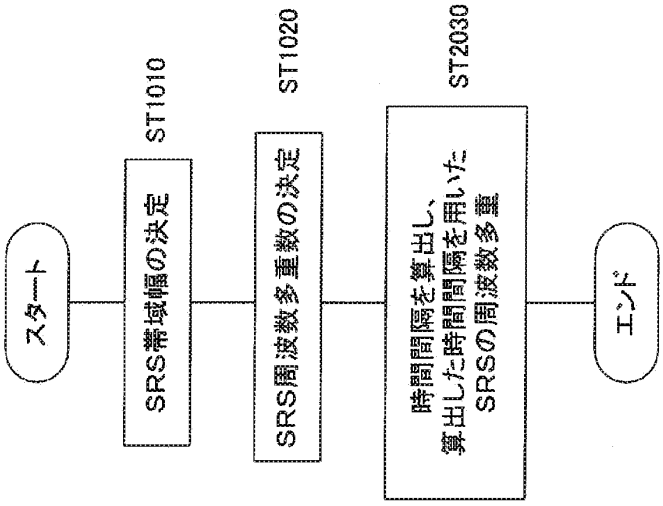
[図8A]



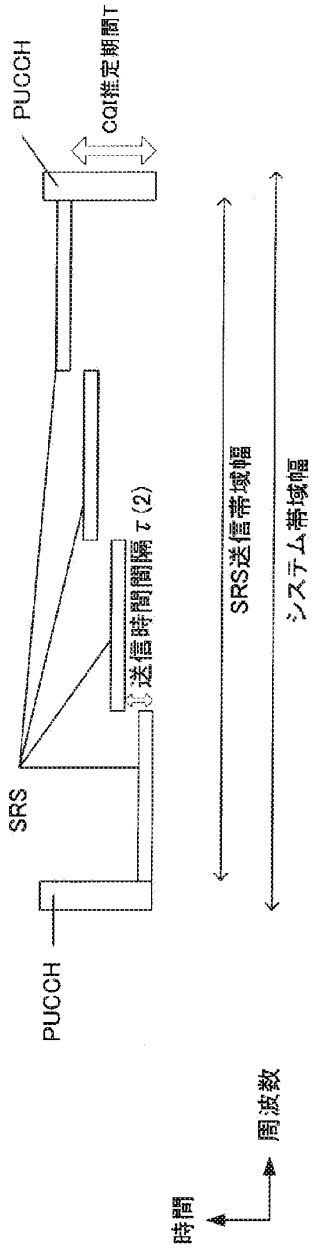
[図8B]



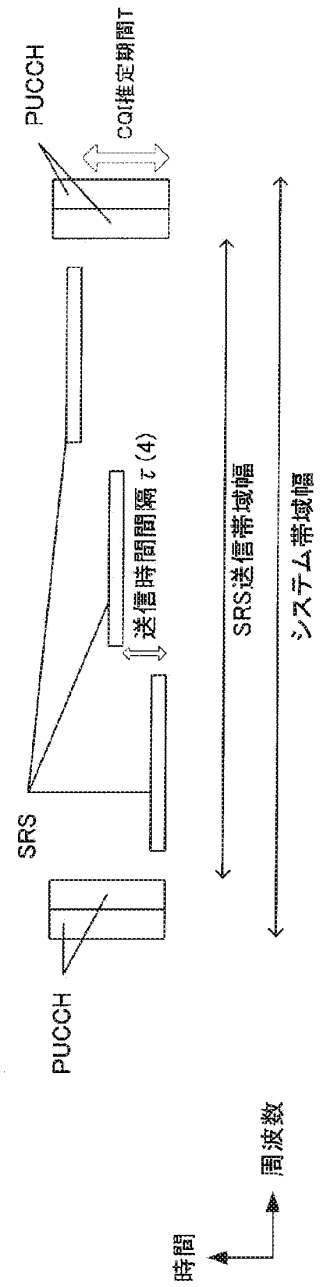
[図9]


スタート
ST1010
SRS帯域幅の決定
ST1020
SRS周波数多重数の決定
ST2030
時間間隔を算出し、
算出した時間間隔を用いた
SRSの周波数多重
エンド

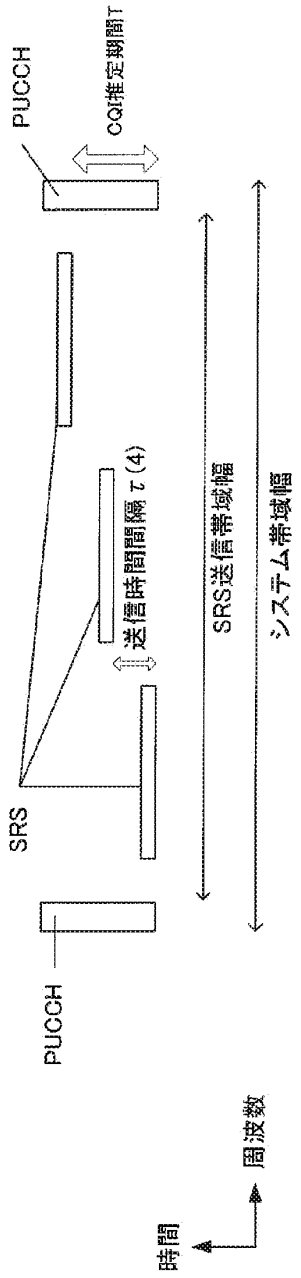
[図10A]



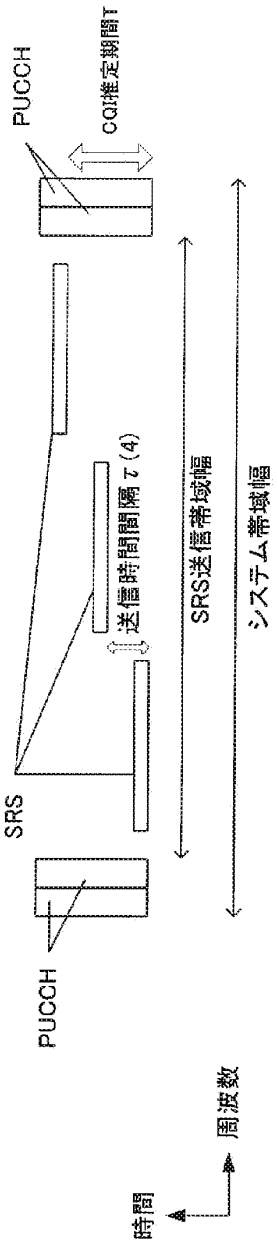
[図10B]



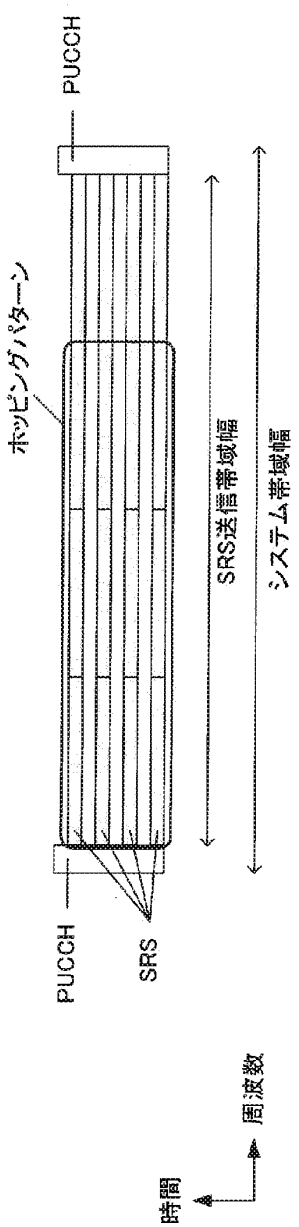
[図11A]



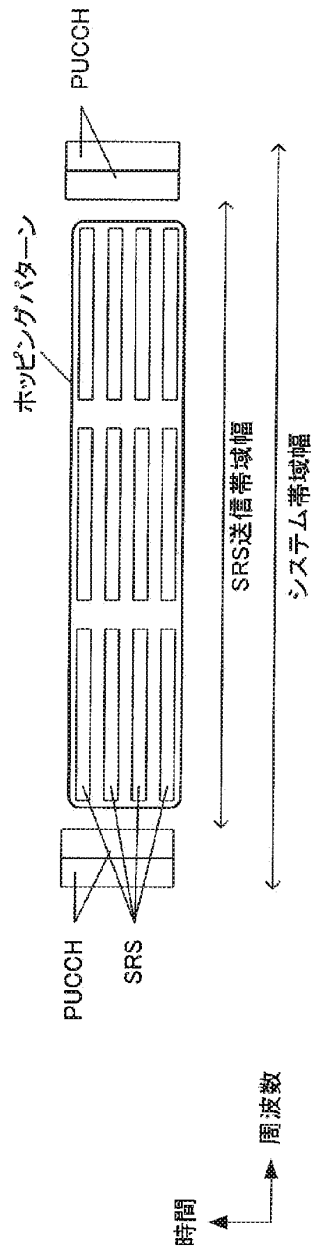
[図11B]



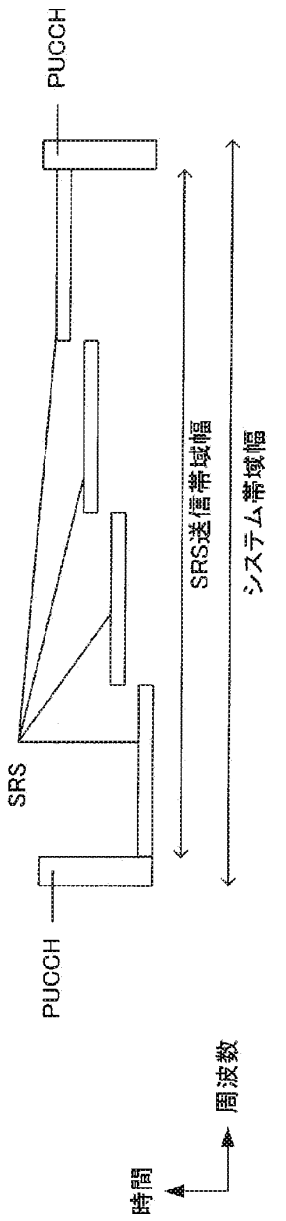
[図12A]



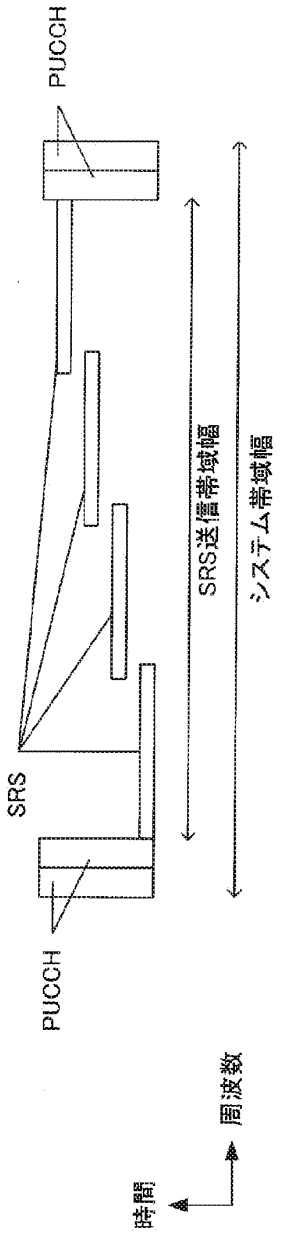
[図12B]



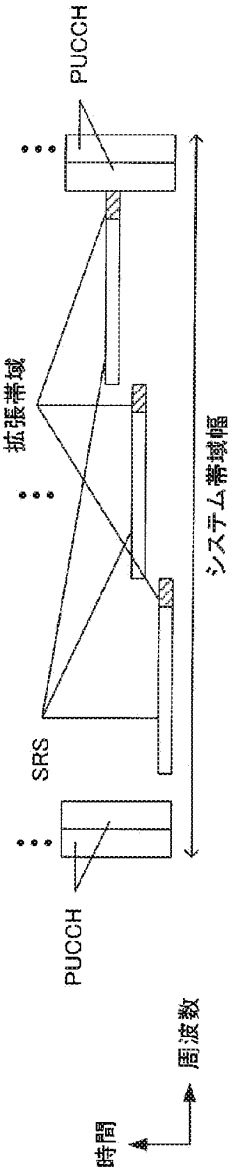
[図13A]



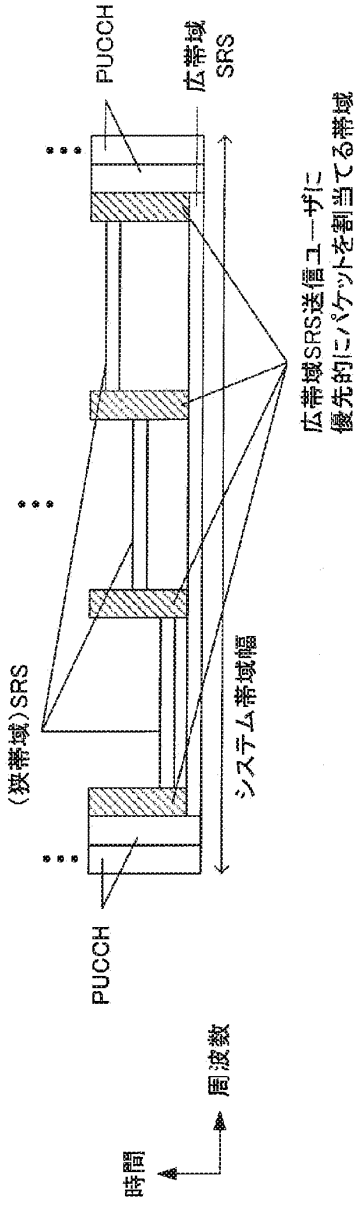
[図13B]



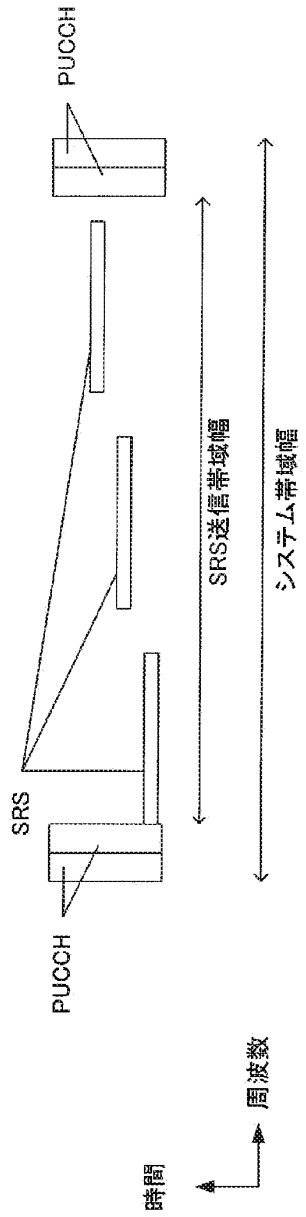
[図14A]



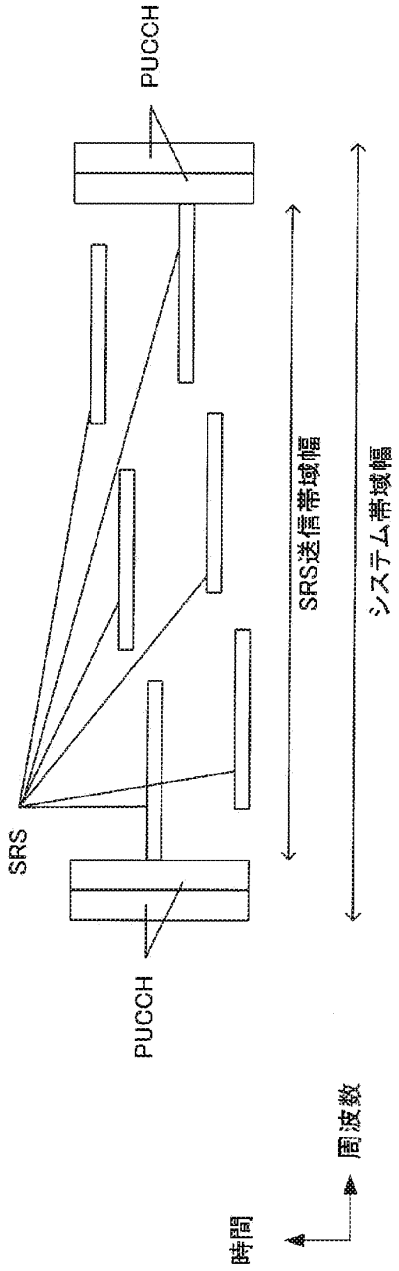
[図14B]


PUCCH
広帯域
SRS
広帯域SRS送信ユーザに
優先的にパケットを割当てる帯域
(狭帯域)SRS
システム帯域幅
PUCCH
周波数
時間

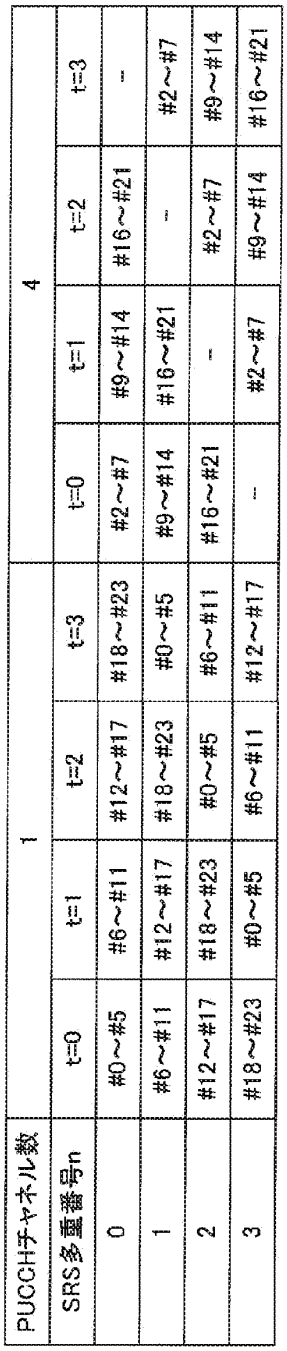
[図15A]



[図15B]

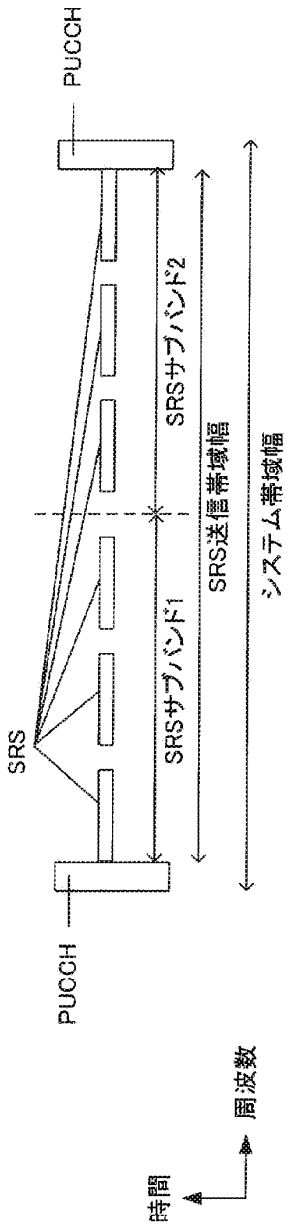


[図16]

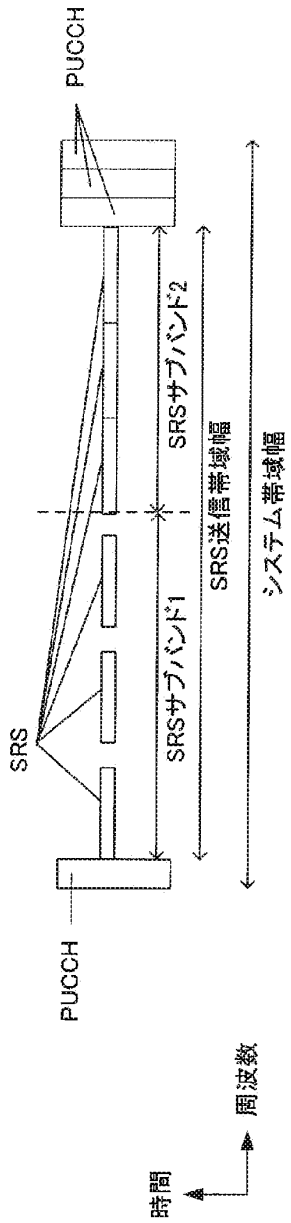


PUCCHチャネル数	1				4			
SRS多重番号n	t=0	t=1	t=2	t=3	t=0	t=1	t=2	t=3
0	#0～#5	#6～#11	#12～#17	#18～#23	#2～#7	#9～#14	#16～#21	-
1	#6～#11	#12～#17	#18～#23	#0～#5	#9～#14	#16～#21	-	#2～#7
2	#12～#17	#18～#23	#0～#5	#6～#11	#16～#21	-	#2～#7	#9～#14
3	#18～#23	#0～#5	#6～#11	#12～#17	-	#2～#7	#9～#14	#16～#21

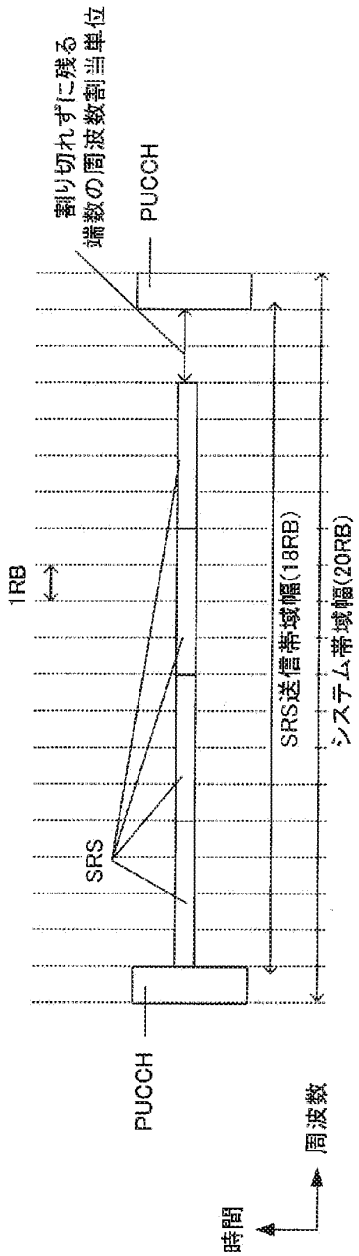
[図17A]


PUCCH
SRSサブバンド2
SRS送信帯域幅
システム帯域幅
SRS
SRSサブバンド1
PUCCH
周波数
時間

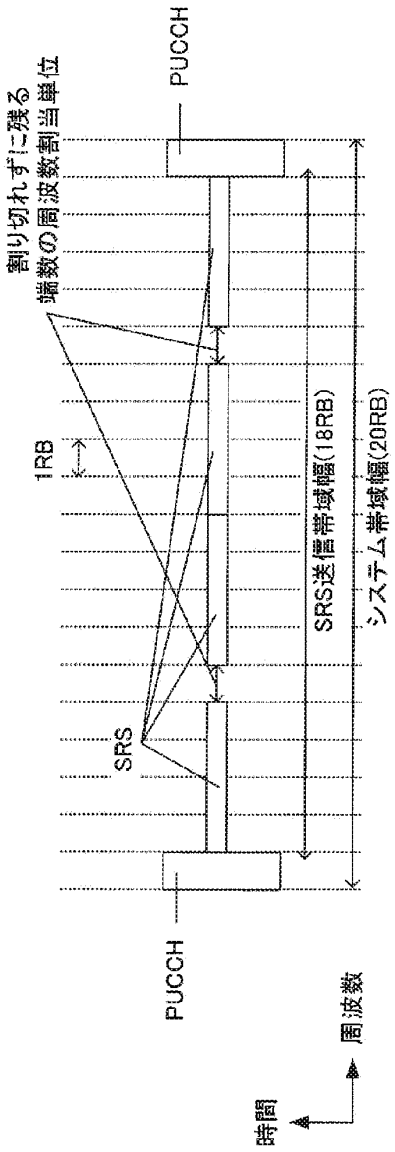
[図17B]


PUCCH
SRSサブバンド2
SRS送信帯域幅
システム帯域幅
SRS
SRSサブバンド1
PUCCH
周波数
時間

[図18A]


割り切れずに残る
端数の周波数割当単位
PUCCH
1RB
SRS
SRS送信帯域幅(18RB)
システム帯域幅(20RB)
PUCCH
周波数
時間

[図18B]


PUCCH
割り切れずに残る
端数の周波数割当単位
1RB
SRS
SRS送信帯域幅(18RB)
システム帯域幅(20RB)
PUCCH
周波数
時間

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2008/002212

A. CLASSIFICATION OF SUBJECT MATTER
H04Q7/38(2006.01)i, *H04B1/713*(2006.01)i, *H04J1/00*(2006.01)i

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)
H04B7/24-7/26, H04Q7/00-7/38

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2008
Kokai Jitsuyo Shinan Koho	1971-2008	Toroku Jitsuyo Shinan Koho	1994-2008

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Huawei, 3GPP R1-072095, Multiplexing of E-UTRA Uplink Sounding Reference Signals, 2007.05, all pages	1-7
A	Freescale Semiconductor, 3GPP R1-072528, On the Need for Sounding RS Hopping, 2007.05, all pages	1-7

☐ Further documents are listed in the continuation of Box C. ☐ 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 application or patent 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
09 October, 2008 (09.10.08)	21 October, 2008 (21.10.08)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (April 2007)

国際調査報告	国際出願番号　ＰＣＴ／ＪＰ２００８／００２２１２

A.　発明の属する分野の分類（国際特許分類（ＩＰＣ））

Int.Cl.　H04Q7/38(2006.01)i, H04B1/713(2006.01)i, H04J1/00(2006.01)i

B.　調査を行った分野

調査を行った最小限資料（国際特許分類（ＩＰＣ））

Int.Cl.　H04B7/24-7/26, H04Q7/00-7/38

最小限資料以外の資料で調査を行った分野に含まれるもの

日本国実用新案公報	１９２２－１９９６年
日本国公開実用新案公報	１９７１－２００８年
日本国実用新案登録公報	１９９６－２００８年
日本国登録実用新案公報	１９９４－２００８年

国際調査で使用した電子データベース（データベースの名称、調査に使用した用語）

C.　関連すると認められる文献

引用文献のカテゴリー＊	引用文献名　及び一部の箇所が関連するときは、その関連する箇所の表示	関連する請求の範囲の番号
A	Huawei, 3GPP R1-072095, Multiplexing of E-UTRA Uplink Sounding Reference Signals, 2007.05, 全頁	1-7
A	Freescale Semiconductor, 3GPP R1-072528, On the Need for Sounding RS Hopping, 2007.05, 全頁	1-7

☐　Ｃ欄の続きにも文献が列挙されている。

☐　パテントファミリーに関する別紙を参照。

＊　引用文献のカテゴリー
「A」特に関連のある文献ではなく、一般的技術水準を示すもの
「E」国際出願日前の出願または特許であるが、国際出願日以後に公表されたもの
「L」優先権主張に疑義を提起する文献又は他の文献の発行日若しくは他の特別な理由を確立するために引用する文献（理由を付す）
「O」口頭による開示、使用、展示等に言及する文献
「P」国際出願日前で、かつ優先権の主張の基礎となる出願の日の後に公表された文献
「T」国際出願日又は優先日後に公表された文献であって出願と矛盾するものではなく、発明の原理又は理論の理解のために引用するもの
「X」特に関連のある文献であって、当該文献のみで発明の新規性又は進歩性がないと考えられるもの
「Y」特に関連のある文献であって、当該文献と他の１以上の文献との、当業者にとって自明である組合せによって進歩性がないと考えられるもの
「&」同一パテントファミリー文献

国際調査を完了した日	国際調査報告の発送日
０９．１０．２００８	２１．１０．２００８

国際調査機関の名称及びあて先	特許庁審査官（権限のある職員）	５Ｊ	４０５７
日本国特許庁（ＩＳＡ／ＪＰ） 郵便番号１００－８９１５ 東京都千代田区霞が関三丁目４番３号	佐藤　聡史 電話番号　０３－３５８１－１１０１　内線　３５３４		

様式ＰＣＴ／ＩＳＡ／２１０（第２ページ）（２００７年４月）

Electronic Patent Application Fee Transmittal

Application Number:	12896993
Filing Date:	04-Oct-2010
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Filer:	Edward Milton Roney/Kenyatta Upchurch
Attorney Docket Number:	4015-6942 / P30138-US2

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($)
Miscellaneous:				
RCE- 2nd and Subsequent Request	1820	1	1700	1700
		Total in USD ($)		**1700**

Electronic Acknowledgement Receipt	
EFS ID:	26112144
Application Number:	12896993
International Application Number:	
Confirmation Number:	1015
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Customer Number:	24112
Filer:	Edward Milton Roney/Kenyatta Upchurch
Filer Authorized By:	Edward Milton Roney
Attorney Docket Number:	4015-6942 / P30138-US2
Receipt Date:	20-JUN-2016
Filing Date:	04-OCT-2010
Time Stamp:	13:53:10
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	EFT
Payment was successfully received in RAM	$1700
RAM confirmation Number	062116INTEFSW13541200
Deposit Account	null
Authorized User	Kenyatta Upchurch
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	P30138_US2_RCE_Transmittal.pdf	697932 3ae26281f7b246ca45f860e6041957568700 02ec	no	3
Warnings:					
Information:					
2		P30138_US2_Response_Amendment_accompanying_RCE.pdf	106601 c286ac46edfe6a16c69b6230b27019f33436 f45e	yes	16

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Amendment Submitted/Entered with Filing of CPA/RCE	1	1
Claims	2	15
Applicant Arguments/Remarks Made in an Amendment	16	16

Warnings:					
Information:					
3	Information Disclosure Statement (IDS) Form (SB08)	P30138_US2_Supplemental_IDS.pdf	1035799 0b8838ee159575bbc8c5e8e61ba3b51ea95 33090	no	4
Warnings:					
Information:					
4	Foreign Reference	P30138_US2_CN101765208A_CN.pdf	24416952 0c8e2e60e6d4548a52d10b43964952afc6c b2d54	no	19
Warnings:					
Information:					
5	Foreign Reference	P30138_US2_CN101765208A_Machine_Translation.pdf	12917613 ca3e85bf90e31f81fd26cf40bd716c2c2be5 2de5	no	23
Warnings:					
Information:					
6	Foreign Reference	P30138_US2_WO2009022474A1_Part1.pdf	25856824 b2828076ecb4007559ec535afa6dc0ef190c 45ed	no	30

Warnings:					
Information:					
7	Foreign Reference	P30138_US2_WO2009022474A1_Part2.pdf	8730449 436090c0354b5a884f1417e66daa381b1e940642	no	26
Warnings:					
Information:					
8	Non Patent Literature	P30138_US2_R1-093821.pdf	262701 1fea66e83b0e7a6254aeccd4c422f67dc231c638	no	9
Warnings:					
Information:					
9	Non Patent Literature	P30138_US2_R2-091165.pdf	192819 bdbda9fb2d15a27a697e6d26f9f4546877e5a251	no	2
Warnings:					
Information:					
10	Non Patent Literature	P30138_US2_R2-082485.pdf	194013 bbc482be8619fd052d465f00fd52cd48bbd81252	no	4
Warnings:					
Information:					
11	Fee Worksheet (SB06)	fee-info.pdf	30502 ae0d0bbc6266da1c89cbc6114a0a8c3eb3b86d92	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	74442205	

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.

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 12/896,993	Filing Date 10/04/2010	☐ 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 **06/20/2016**

	(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))	* 48	Minus	** 52	= 0	X $80 =	0
Independent (37 CFR 1.16(h))	* 8	Minus	***8	= 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
/KAREN VESTAL/

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

24112 7590 07/07/2016
COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

EXAMINER	
TALUKDER, MD K	
ART UNIT	PAPER NUMBER
2648	

DATE MAILED: 07/07/2016

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/896,993	10/04/2010	David Astely	4015-6942 / P30138-US2	1015

TITLE OF INVENTION: PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced

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	10/07/2016

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)

24112 7590 07/07/2016
COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

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.
12/896,993	10/04/2010	David Astely	4015-6942 / P30138-US2	1015

TITLE OF INVENTION: PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced

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	10/07/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS
TALUKDER, MD K	2648	455-509000

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

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.
12/896,993	10/04/2010	David Astely	4015-6942 / P30138-US2	1015

24112 7590 07/07/2016

COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

EXAMINER	
TALUKDER, MD K	
ART UNIT	PAPER NUMBER
2648	

DATE MAILED: 07/07/2016

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.
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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. 12/896,993	Applicant(s) ASTELY ET AL.	
	Examiner MD TALUKDER	Art Unit 2648	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 *06/20/2016*.
   ☐ 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 *1-17,19-25,27-34,36 and 38-52*. 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 _____
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 _____.

/MD TALUKDER/
Primary Examiner, Art Unit 2648

Notice of References Cited	Application/Control No. 12/896,993	Applicant(s)/Patent Under Reexamination ASTELY ET AL.	
	Examiner MD TALUKDER	Art Unit 2648	Page 1 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2002/0160784 A1	10-2002	Kuwahara, Soichi	H04W28/26	455/452.1
*	B	US-2010/0003997 A1	01-2010	KOYANAGI; Kenichiro	H04L1/0003	455/450
*	C	US-2010/0098012 A1	04-2010	Bala; Erdem	H04L5/001	370/329
*	D	US-2010/0208679 A1	08-2010	Papasakellariou; Aris	H04L1/1614	370/329
*	E	US-2010/0232373 A1	09-2010	Nory; Ravikiran	H04W72/1289	370/329
*	F	US-2010/0271970 A1	10-2010	Pan; Kyle Jung-Lin	H04L1/0026	370/252
*	G	US-2010/0285809 A1	11-2010	Lindstrom; Magnus	H04L5/001	455/450
*	H	US-2010/0296389 A1	11-2010	Khandekar; Aamod Dinkar	H04L5/0007	370/216
*	I	US-2010/0322173 A1	12-2010	Marinier; Paul	H04W76/048	370/329
*	J	US-2011/0007695 A1	01-2011	Choi; Hyung-Nam	H04L5/0007	370/329
*	K	US-2011/0007699 A1	01-2011	Moon; Sung Ho	H04L5/0053	370/329
*	L	US-2011/0081913 A1	04-2011	Lee; Jung A.	H04L5/003	455/450
*	M	US-2011/0081932 A1	04-2011	Astely; David	H04L5/001	455/509

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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Notice of References Cited	Application/Control No. 12/896,993	Applicant(s)/Patent Under Reexamination ASTELY ET AL.	
	Examiner MD TALUKDER	Art Unit 2648	Page 2 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2011/0243039 A1	10-2011	PAPASAKELLARIOU; Aris	H04L1/1861	370/280
*	B	US-2011/0310856 A1	12-2011	Hariharan; Priya	H04L1/1607	370/336
*	C	US-2012/0020317 A1	01-2012	Ishii; Hiroyuki	H04L1/1854	370/329
*	D	US-2012/0051306 A1	03-2012	Chung; Jae Hoon	H04L1/1893	370/329
*	E	US-2012/0082125 A1	04-2012	Huang; Yada	H04L5/0007	370/329
*	F	US-2012/0140708 A1	06-2012	Choudhury; Sayantan	H04W72/082	370/328
*	G	US-8,265,030 B2	09-2012	Miki; Nobuhiko	H04W72/1257	370/330
*	H	US-2012/0314675 A1	12-2012	Vujcic; Dragan	H04L5/001	370/329
*	I	US-2013/0010721 A1	01-2013	Aiba; Tatsushi	H04W72/0406	370/329
*	J	US-2013/0003700 A1	01-2013	Zhang; Jian	H04W76/028	370/331
*	K	US-2013/0034073 A1	02-2013	Aiba; Tatsushi	H04L1/0026	370/329
*	L	US-8,447,343 B2	05-2013	Gerstenberger; Dirk	H04W52/10	370/248
*	M	US-2013/0136084 A1	05-2013	ZHANG; Yuantao	H04W72/0413	370/329

FOREIGN PATENT DOCUMENTS

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Notice of References Cited	Application/Control No. 12/896,993	Applicant(s)/Patent Under Reexamination ASTELY ET AL.	
	Examiner MD TALUKDER	Art Unit 2648	Page 3 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-8,472,368 B2	06-2013	Baldemair; Robert	H04L5/0053	370/318
*	B	US-8,634,358 B2	01-2014	Damnjanovic; Jelena M.	H04L1/1861	370/329
*	C	US-8,792,830 B2	07-2014	Lim; Suhwan	H04L25/02	375/260
	D	US-				
	E	US-				
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	J	US-				
	K	US-				
	L	US-				
	M	US-				

FOREIGN PATENT DOCUMENTS

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BIB DATA SHEET

CONFIRMATION NO. 1015

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/896,993	10/04/2010	455	2648	4015-6942 / P30138-US2

APPLICANTS

INVENTORS

David Astely, Bromma, SWEDEN;
Robert Baldemair, Solna, SWEDEN;
Dirk Gerstenberger, Stockholm, SWEDEN;
Daniel Larsson, Solna, SWEDEN;
Lars Lindbom, Karlstad, SWEDEN;
Stefan Parkvall, Stockholm, SWEDEN;

**** CONTINUING DATA ***************************

This appln claims benefit of 61/248,661 10/05/2009

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

10/18/2010

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /MD K TALUKDER/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		SWEDEN	12	48 ~~XX~~	6

ADDRESS

COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518
UNITED STATES

TITLE

PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced

FILING FEE RECEIVED		
4888	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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	12896993
	Filing Date	2010-10-04
	First Named Inventor	David Astely et al.
	Art Unit	2648
	Examiner Name	Md K. Talukder
	Attorney Docket Number	4015-6942 / P30138-US2

U.S.PATENTS						
Examiner Initial*	Cite No	Patent Number	Kind Code1	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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U.S.PATENT APPLICATION PUBLICATIONS						
Examiner Initial*	Cite No	Publication Number	Kind Code1	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20120147847	A1	2012-06-14	Matsumoto et al.	Corresponds to WO2009022474A1

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	1	101765208	CN	A	2010-06-30	Huawei Technologies Co., Ltd	Machine Translation Included	
	2	2009022474	WO	A1	2009-02-19	Panasonic Corp.	Corresponds to US2012/0147847A1	

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NON-PATENT LITERATURE DOCUMENTS

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.T./

Receipt date: 06/20/2016	Application Number	12896993 12896993 - GAU: 2648
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Filing Date	2010-10-04
(Not for submission under 37 CFR 1.99)	First Named Inventor	David Astely et al.
	Art Unit	2648
	Examiner Name	Md K. Talukder
	Attorney Docket Number	4015-6942 / P30138-US2

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	ZTE (source), "ACK/NACK Design for LTE-Advanced,"'TSG-RAN WG1 #58bis, R1-093821, Miyazaki, Japan, October 12-16, 2009.	
	2	Infineon Technologies (source), "Clarification of UL DPCCH slot format information usage in IE 'DTX-DRX Information','3GPP TSG-RAN WG2 Meeting #65, Tdoc R2-091165, Athens, Greece February 9-13, 2009.	
	3	NTT DocCoMo, Inc. (source), "UL ACK/NACK resource allocation for DL semi-persisent scheduling," 3GPP TSG RAN WG2 #62, R2-082485 (resubmission of R2-081857), Kansas City, Missouri, USA, May 5-9, 2008.	

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/Md Talukder/	Date Considered	06/24/2016

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.T./

Ets v4d2.1 fr

Receipt date: 06/20/2016	Application Number	12896993	12896993 - GAU: 2648
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)	Filing Date	2010-10-04	
	First Named Inventor	David Astely et al.	
	Art Unit	2648	
	Examiner Name	Md K. Talukder	
	Attorney Docket Number	4015-6942 / P30138-US2	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the 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 the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Edward M. Roney/	Date (YYYY-MM-DD)	2016-06-20
Name/Print	Edward M. Roney	Registration Number	62048

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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.**

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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.

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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.

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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.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.T./

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12896993	ASTELY ET AL.
	Examiner	**Art Unit**
	MD TALUKDER	2648

CPC						
Symbol					**Type**	**Version**
H04L		5	/	0053	F	2013-01-01
H04L		5	/	0005	A	2013-01-01
H04L		5	/	001	I	2013-01-01
H04L		5	/	0094	I	2013-01-01
H04W		8	/	24	A	2013-01-01
H04W		28	/	26	A	2013-01-01
H04W		48	/	16	A	2013-01-01
H04W		72	/	0453	A	2013-01-01
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CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
			/					
			/					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	48	
/MD TALUKDER/ Primary Examiner.Art Unit 2648	06/24/2016	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	10

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12896993	ASTELY ET AL.
	Examiner	**Art Unit**
	MD TALUKDER	2648

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION	
CLASS	SUBCLASS	CLAIMED	NON-CLAIMED
455	509	H 0 4 B 7 / 00 (2006.01.01)	

CROSS REFERENCE(S)					
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
455	522	456.6	137	103	
370	329	331			

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	48	
/MD TALUKDER/ Primary Examiner.Art Unit 2648	06/24/2016	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	10

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	12896993	ASTELY ET AL.
	Examiner	**Art Unit**
	MD TALUKDER	2648

☒ 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	1	17	17	33	36										
2	2	18	19	34	38										
3	3	19	20	35	39										
4	4	20	21	36	40										
5	5	21	22	37	41										
6	6	22	23	38	42										
7	7	23	24	39	43										
8	8	24	25	40	44										
9	9	25	27	41	45										
10	10	26	28	42	46										
11	11	27	29	43	47										
12	12	28	30	44	48										
13	13	29	31	45	49										
14	14	30	32	46	50										
15	15	31	33	47	51										
16	16	32	34	48	52										

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	48	
/MD TALUKDER/ Primary Examiner.Art Unit 2648	06/24/2016	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	10

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2	("20120147847").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/06/24 21:17
L2	21	455/$.ccls. and ((first 1st) adj6 component adj3 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/06/24 21:58
L3	33	("20120127950" | "20110310819" | "20120275395" | "20120287828" | "20120039291" | "20100271970" | "20120307781" | "20110286436" | "20120224535" | "20120140708" | "20110310820" | "20120163288" | "20110299486" | "20100098012" | "20120082125 " | "20120294273" | "20110268048").pn.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/06/24 22:03
L7	13	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources) same component adj carrier	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/06/24 22:18
S1	1	"12896993"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 17:09
S2	367	((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:04
S3	176	S2 and (radio near3 resource)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:09
S4	28	S2 and (radio near3 resource) and (component with carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/10 19:09
S5	173	(downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second	US-PGPUB; USPAT;	OR	ON	2012/12/11 09:04

		2nd other next) with (channel resource)) and (control with information)	USOCR; DERWENT; IBM_TDB			
S6	137	S5 and (scheduling)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:04
S7	36	("20120263121" | "20110310856" | "20120127950" | "20110310819 " | "20120275395" | "20120287828" | "20120039291" | "20100271970" | "20120307781" | "20110286436" | "20120224535" | "20120140708" | "20110310820" | "20120163288" | "20110299486" | "20100098012" | "20120082125 " | "20120294273" | "20110268048" | "20120113910").pn.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 09:15
S8	127	(downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (carrier adj aggregation)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 10:16
S9	2	"20110292887"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:17
S11	25	((first 1st) adj6 component adj3 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:22
S12	1718	((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:47
S13	66	(carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 11:47
S14	10842	455/509,522,456.6,137,103,575.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:41
S15	28232	370/329,252,331.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:41
S16	102	(S14 S15) and (downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 13:42
S17	1	"13140333"	US-PGPUB; USPAT;	OR	ON	2012/12/11 14:18

			USOCR; DERWENT; IBM_TDB			
S18	2	"20110310856"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:18
S19	38	((first 1st) adj6 component adj3 carrier) same ((radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:31
S20	38	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:31
S21	27	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj4 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:32
S22	38	(((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:32
S23	24	(carrier adj aggregation) and (schedul$3 near3 (downlink DL) with ((first primary initial) near6 (resource radio frequency frame)))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 14:48
S24	8	("7551898" | "7649960" | "7656843" | "7773699").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:14
S25	2	"20110292900"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:36
S26	2	"20100271970"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:37
S27	3	"8050202"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:38
S28	1	"20120307689"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:45
S29	2	"8160017"	US-PGPUB; USPAT;	OR	ON	2012/12/11 15:48

			USOCR; DERWENT; IBM_TDB			
S30	2	"20100232373"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 15:48
S31	2	"20090016278"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 17:16
S32	2	"8265030"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 17:19
S33	3	"2008139923"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2012/12/11 18:17
S34	14	("20100098012" | "20100232373" | "20110310856" | "20120020317" | "20120082125" | "20120140708" | "8265030").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/29 17:19
S35	7	"455"/$.ccls. and (carrier adj aggregation) and (schedul$3 near3 (downlink DL) with ((first primary initial) near6 (resource radio frequency frame)))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/29 17:22
S36	9	"455"/$.ccls. and (((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/29 21:37
S38	4	("20070053294" | "20100290405").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/30 12:42
S39	16	("7596114" | "20050013279" | "20030219028" | "20070217406" | "20020105970" | "20060050664" | "20090303938" | "20070064669").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/05/30 12:42
S40	290	(first 1st) with (component near2 carrier) with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 10:07
S41	114	(first 1st) with (component near2 carrier) with down$1link and receiv$3 near3 control near3 information	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 10:09
S42	47	(first 1st) near3 (radio adj resource) and (second other another 2nd) near3 (radio adj	US-PGPUB; USPAT;	OR	ON	2013/06/17 12:29

		resource) and component adj carrier	USOCR; DERWENT; IBM_TDB			
S43	26	S42 and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:31
S44	5	(first 1st) near3 (radio adj resource) and (second other another 2nd) near3 (radio adj resource) same (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:46
S45	26	(first 1st) near3 (radio adj resource) and (second other another 2nd) near3 (radio adj resource) and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:47
S46	31	(second other another 2nd) near3 (radio adj resource) and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:49
S47	0	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj aggregation) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:51
S48	0	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component) and (schedul$3 near3 (down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:52
S49	1	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component) and ((down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:53
S50	1	@ad<"20091005" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component) and ((down$link DL reverse$1link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:55
S51	1	@ad<"20091003" and (second other another 2nd) near3 (radio adj resource) and (carrier adj component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 12:56
S52	20	(second other another 2nd) near3 (radio adj resource) and (carrier adj component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 13:31
S53	16	(set near3 radio near3 resource) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:14
S54	27	(set near3 ((radio near3 resource) (resource adj block))) same component adj carrier	US-PGPUB; USPAT;	OR	ON	2013/06/17 14:19

			USOCR; DERWENT; IBM_TDB			
S55	755	(((radio near3 resource) (resource adj block))) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:25
S56	70	((second 2nd other) with ((radio near3 resource) (resource adj block))) same component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:26
S57	327	(((radio near3 resource) (resource adj block))) same component adj carrier and (schedul$3 near3 downlink reverse)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:27
S58	29	((second 2nd other) with ((radio near3 resource) (resource adj block))) same component adj carrier and (schedul$3 near3 down$1link reverse$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:27
S59	24	((second 2nd other) with ((radio near3 resource) (resource adj block))) same (component adj carrier) same (down$1link reverse$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:31
S60	10	("20090097447" | "20110081856" | "20090116427" | "20100232373" | "8331307").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 14:49
S61	2562	(schedul$3 near3 downlink) and ((radio adj resource) (resource adj block)) and component	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:16
S62	739	(schedul$3 near3 downlink) and ((radio adj resource) (resource adj block)) and component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:17
S63	259	(schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) and component adj carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:17
S64	39	(schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (component adj carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:18
S65	1	@ad<"20091005" and (schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (component adj carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:18
S66	1	@ad<"20091005" and (schedul$3 near3 downlink) same ((radio adj resource) (resource	US-PGPUB; USPAT;	OR	ON	2013/06/17 15:20

		adj block)) same (CC (component adj carrier))	USOCR; DERWENT; IBM_TDB			
S67	47	(schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 15:20
S68	356	"455"/$.ccls. and ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 17:10
S70	19	"455"/$.ccls. and (carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/17 17:17
S71	0	("2013/0107855").URPN.	USPAT	OR	ON	2013/06/18 09:15
S72	0	("2013/0107855").URPN.	US-PGPUB; USPAT	OR	ON	2013/06/18 09:16
S73	408	set near3 (radio frequency) near2 (resource band) same downlink and component	US-PGPUB; USPAT	OR	ON	2013/06/18 09:18
S74	17	set near3 (radio frequency) near2 (resource band) same downlink same (component adj carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 09:19
S75	19	(set group Cluster) near3 (radio frequency) near2 (resource band) same downlink same (component adj carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 09:21
S76	12	("8457060" | "20110310819" | "20100271970" | "20130034073" | "20100098012" | "20110310856" | "20110317653" | "20130083742" | "20130083741" | "20120114021" | "20120275395" | "20110317645" | "20110310856").pn.	US-PGPUB; USPAT	OR	ON	2013/06/18 09:31
S77	200	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource)	US-PGPUB; USPAT	OR	ON	2013/06/18 10:37
S78	2911	(UL up$link) with (set group) near6 (radio resource)	US-PGPUB; USPAT	OR	ON	2013/06/18 10:38
S79	110	S77 and S78	US-PGPUB; USPAT	OR	ON	2013/06/18 10:38
S80	3	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (set group) near6 (radio resource) with (2nd second other another) near2 component	US-PGPUB; USPAT	OR	ON	2013/06/18 10:47
S81	28	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 11:17
S82	5	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (second 2nd) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 11:20
S83	4	(1st first first primary initia) near3 (set group) near6 (radio resource) with (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 13:50
S84	3	(set group) near6 (radio resource) with (2nd	US-PGPUB;	OR	ON	2013/06/18

		second other another) near6 (DL down$link) near3 (component near3 carrier)	USPAT			13:52
S85	42	(set group) near6 (radio resource) with (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 13:58
S86	30	(set group) near3 ((radio resource)(resource near2 block)) with (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2013/06/18 14:07
S87	2	(second 2nd) near3 (down$1link DL) with ((component near3 carrier) CC) same (set group) with ((radio near2 resource) (resource near2 block))	US-PGPUB; USPAT	OR	ON	2013/06/18 14:14
S88	21	reserv$3 with component near3 carrier and (second near2 (radio frequency band))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/25 15:31
S89	36	"739528"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 09:34
S90	30	"5754138"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 09:35
S91	2046	(carrier near3 aggregation) and up$1link with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 10:24
S92	1052	(carrier near3 aggregation) and (component near3 carrier) same up$1link with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 10:26
S93	110	(carrier near3 aggregation) and (component near3 carrier) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 10:27
S95	17	("370"/$.ccls "455"/$.ccls.) and (aggregation) and (CC (component near3 carrier)) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 15:22
S96	67	370/329,341,348,395.4.ccls. and (carrier near3 aggregation) and (component near3 carrier) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 15:26
S97	345368	schedule (DL (down adj link) down$1link) and (carrier near3 aggregation) and ((UL up$link) adj6 associat$4 near4 (DL down$link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 16:45
S98	9	schedule near3 (DL (down adj link) down$1link) and (carrier near3 aggregation) same((UL up$link) adj6 associat$4 near4 (DL down$link))	US-PGPUB; USPAT; USOCR;	OR	ON	2013/06/26 16:46

			DERWENT; IBM_TDB			
S99	35	(schedule allocat$4) near3 (DL (down adj link) down$1link) and (carrier near3 aggregation) same((UL up$link) adj6 associat$4 near4 (DL down$link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 16:48
S100	0	(1st first) near3 (radio band resource frequency) with (1st first) near3 (CCcomponent adj carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 17:14
S101	216	(1st first) near3 (radio band resource frequency) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 17:14
S102	43	(1st first) near3 (radio band resource frequency) with (reserv$3 schedul$3 allocat$3) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/26 17:15
S103	22	("20100142455" | "20120009923" | "20100254329" | "20100091678" | "20110194501" | "20130010619" | "20080310359" | "20060274712" | "20100227569" | "20120208583" | "20110267978").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/27 09:57
S104	10	("20100254329" | "20100195624" | "20100023282" | "20090274100" | "20080316957").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2013/06/27 10:15
S105	50	("20100322173" | "20110081913" | "20130010721" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:25
S106	13348	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:40
S107	4330	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:42
S108	4200	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT;	OR	ON	2014/04/22 13:43

			USOCR; DERWENT; IBM_TDB			
S109	3823	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:44
S110	6130	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:44
S111	370	(S106 S107 S108 S109 S110) and (schedul$4 near3 down$1link) and (component near3 carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:45
S112	365	(S106 S107 S108 S109 S110) and (schedul$4 near3 down$1link) and (component near3 carrier) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:46
S113	357	(S106 S107 S108 S109 S110) and (schedul$4 near3 down$1link) and (component near carrier) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:47
S114	13	(S106 S107 S108 S109 S110) and (DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (component near3 carrier)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 13:47
S115	40	(H03F3/211, H04B7/0617, H04B7/0669, H04B1/3833, H04M1/0247, H04M1/0237, H04L29/08657, G01S5/0252, G01S5/02, H04W52/367, H04W52/12, H04W52/40, H04W88/08, H04W72/044, H04W72/042).cpc. and (carrier near3 aggregation) and (component near3 carrier) same up$1link with associat$3 with down$1link	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/22 14:17
S116	8750	(H04W88/08, H04W72/044, H04W72/042l).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:21
S117	4336	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:22
S118	4205	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:23
S119	4144	(H04L29/08657, G01S19/14, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT;	OR	ON	2014/04/26 14:23

			IBM_TDB			
S120	3826	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:24
S121	47	(H04W88/08, H04W72/044, H04W72/042).cpc. and (1st first) near3 (radio band resource frequency) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 14:27
S122	25	(S116 S117 S118 S119 S120).cpc. and (1st first) near3 (radio band resource frequency) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/26 15:35
S123	13432	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S124	4341	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S125	4208	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S126	3833	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S127	6154	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S128	98	(S123 S124 S125 S126 S127) and (schedul$4 near3 down$1link) and (component near3 carrier) and single with carrier same (plurality multiple several) with (DL down$1link) with carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S129	52	(S123 S124 S125 S126 S127) and (schedul$4 near3 down$1link) and (component near3 carrier) and single near6 carrier same (plurality multiple several) near3 (DL down$1link) with carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:04
S130	4	(S123 S124 S125 S126 S127) and (schedul$4) with component near3 carrier and (single near3 (DL down$1link)) with (first with resource) and (multiple plurality several) near3 (DL downlink) with second with resource	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:37
S131	2	(up$1link UL) and (schedul$4) with component near3 carrier same (single near3 (DL down$1link)) with (first with resource) same (multiple plurality several) near3 (DL downlink)	US-PGPUB; USPAT; USOCR; DERWENT;	OR	ON	2014/04/30 11:40

		with second with resource	IBM_TDB			
S132	2	(schedul$4) with component near3 carrier same (single near3 (DL down$1link)) with (first with resource) same (multiple plurality several) near3 (DL downlink) with second with resource	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:42
S133	2	(schedul$4) same (single near3 (DL down$1link)) with (first with resource) same (multiple plurality several) near3 (DL downlink) with second with resource	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:44
S134	2	(schedul$4) same (single near3 (DL down$1link)) with (first with (frequency resource block)) same (multiple plurality several) near3 (DL downlink) with second with (frequency block resource)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:45
S135	16	(single near3 (DL down$1link)) with (first with (frequency resource block)) same (multiple plurality several) near3 (DL downlink) with second with (frequency block resource)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 11:45
S136	1	allocation with (PUSCH PUCCH UL (up$1link)) and "20100232373"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 14:19
S137	1	allocation and (PUSCH PUCCH UL (up$1link)) and "20100232373"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 14:21
S138	2	"20100271970"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/04/30 14:32
S139	54	("20100322173" | "20110081913" | "20130010721" | "8634358" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20110243039" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 11:49
S140	15049	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S141	4737	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT;	OR	ON	2014/10/15 13:44

			IBM_TDB			
S142	4341	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S143	4030	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S144	6785	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S145	96	(S140 S141 S142 S143 S144) and (schedul$4 near3 down$1link) and (component near3 carrier) and single with carrier same (plurality multiple several) with (DL down$1link) with carrier same (frequency resources)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:44
S146	1	"13315135"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 13:54
S147	2	"20080151845"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 14:58
S148	41	"455"/$.ccls. and (carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 15:45
S149	3	"455"/451,452.1.ccls. and (carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/15 18:01
S150	33889	455/451,452.1,509,456.1,522,137,103,575.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:25
S151	0	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel Bin) same (sererv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:32
S152	0	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel Bin) same (rererv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:33
S153	4	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel Bin) same (reserv$4 sav$4) near3 (other 2nd second another) adj3 (resource	US-PGPUB; USPAT; USOCR; DERWENT;	OR	ON	2014/10/23 11:34

		frequency channel Bin)	IBM_TDB			
S154	3	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel Bin) same (reserv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin) and (CC component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:37
S155	4	"455"/$.ccls. and (((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj6 (radio resource frame)) and (reserv$4 sav$4 us$3) near3 (other 2nd second another) adj3 (resource frequency channel Bin) and (CC component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 11:39
S156	15	("20050013279" | "20030219028" | "20070217406" | "20020105970" | "20060050664" | "20090303938" | "20070064669").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 12:07
S157	10	"455"/$.ccls. and (schedul$3 near3 downlink) same ((radio adj resource) (resource adj block)) same (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/23 12:07
S158	0	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel) same (rererv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 15:22
S161	15374	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S162	4758	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S163	4377	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S164	4042	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S165	6867	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/10/31 17:18
S167	1	"14170939"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/17 09:46
S168	499	(component near2 carrier) with (primary near2	US-PGPUB;	OR	ON	2014/11/18

		cell)	USPAT; USOCR; DERWENT; IBM_TDB			14:07
S169	401	"370"/$.ccls. and (component near2 carrier) with (primary near2 cell)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:07
S170	378	"370"/$.ccls. and (component adj2 carrier) with (primary adj2 cell)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:07
S171	185	"370"/$.ccls. and (component adj2 carrier) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:08
S172	4	"370"/$.ccls. and single near3 (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:17
S173	4	single near4 (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:19
S174	287	"370"/$.ccls. and (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:21
S175	1	@ad<"20091004" and "370"/$.ccls. and (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:22
S176	287	"370"/$.ccls. and (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2014/11/18 14:22
S177	29	("20100322173" | "20110081913" | "20130010721" | "8634358" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20110243039" | "8792830" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20020160784" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT	OR	OFF	2015/10/01 11:34

S178	21250	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:24
S179	5857	(H04W52/367, H04W52/12, H04W52/40).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:24
S180	5079	(H04L29/08657, G01S5/0252, G01S5/02).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:24
S181	4391	(H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:24
S182	8620	(H03F3/211, H04B7/0617, H04B7/0669).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:24
S183	221	(S178 S179 S180 S181 S182) and (schedul$4 near3 down$1link) and (component near3 carrier) and single with carrier same (plurality multiple several) with (DL down$1link) with carrier same (frequency)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:24
S184	552	((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in. and ericsson.as.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:56
S185	1	S183 and S184	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 17:56
S186	21	455/$.ccls. and ((first 1st) adj6 component adj3 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/01 18:11
S187	24	("20100322173" | "20110081913" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20110243039" | "8792830" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20020160784" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT	OR	OFF	2015/10/02 12:23
S188	1	"14030298"	US-PGPUB;	OR	OFF	2015/10/02

			USPAT			15:41
S189	198	((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/03 16:15
S190	1	"14102508"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:17
S191	0	"14158378"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:17
S192	1	"14097736"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:17
S193	2	"14006545"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:17
S194	1	"13875620"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:18
S195	1	"13905342"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:18
S196	1	"13477988"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:18
S197	2	"13293245"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:18
S198	1	"13875620"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:19
S199	2	"13993807"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:19
S200	1	"13898465"	US-PGPUB; USPAT; USOCR; DERWENT;	OR	ON	2015/10/13 14:19

			IBM_TDB			
S201	1	"13883792"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:19
S202	1	"13996405"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:19
S203	1	"13883002"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:20
S204	0	"14812058"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:20
S205	7	"8915660"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:20
S206	1	"13909538"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:21
S207	1	"13924238"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:22
S208	1	"13898465"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:23
S209	2	"13993807"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:23
S210	58	("20100322173" | "20110081913" | "20130010721" | "8634358" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20110243039" | "8792830" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20020160784" | "20110310856" | "20100232373" | "20100296389" | "20120020317" |	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:25

		"20100098012" | "20130034073" | "8447343" | "8472368").PN.				
S211	1	"13906370"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:38
S212	58	("20100322173" | "20110081913" | "20130010721" | "8634358" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100232373" | "20120051306" | "20120082125" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20110243039" | "8792830" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20020160784" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20130034073" | "8447343" | "8472368").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:51
S213	0	(H04W88/08, H04W72/044, H04W72/042).cpc. and (H04W52/367, H04W52/12, H04W52/40).cpc. and (H04L29/08657, G01S5/0252, G01S5/02).cpc. and (H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:55
S214	36289	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:56
S215	3	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and single near3 (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 14:56
S216	553	((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in. and ericsson.as.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 17:05
S217	553	(((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in.) and ericsson.as.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 17:05
S218	131	(((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in.) and ericsson.as. and carrier adj aggregation	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 17:07
S219	48	"455"/$.ccls. and (carrier near3 aggregation) and ((first 1st) adj6 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 carrier) same ((2nd second) adj6 (radio resource frame)) and carrier adj aggregation	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2015/10/13 17:27
S220	48	(H04W88/08, H04W72/044, H04W72/042).cpc.	US-PGPUB;	OR	ON	2016/03/09

		and ((first 1st) adj6 component adj3 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	USPAT; USOCR; DERWENT; IBM_TDB			15:13
S221	15	(set group) near6 (radio resource) with (2nd second other another) near6 (DL down$link) near3 (component near3 carrier)	US-PGPUB; USPAT	OR	ON	2016/03/09 15:26
S222	35	455/509,522,456.6,137,103,575.ccls. and (downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (carrier adj aggregation)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/09 15:45
S223	0	(H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj4 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/09 15:48
S224	0	(((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in.) and ericsson.as. and single near3 (CC (component adj2 carrier)) with (primary adj2 cell) with (DL down$1link)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/09 16:14
S225	32	(((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in.) and ericsson.as. and (CC (component adj2 carrier)) with (primary adj2 cell)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/09 16:14
S226	130	455/$.ccls. and (downlink near3 carrier) and (uplink near3 (primary first initial) near3 carrier) and ((second 2nd other next) with (channel resource)) and (control with information)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/09 17:02
S227	30	("20120127950" | "20110310819" | "20120275395" | "20120287828" | "20120039291" | "20100271970" | "20120307781" | "20110286436" | "20120224535" | "20120140708" | "20120163288" | "20110299486" | "20100098012" | "20120082125 " | "20120294273").pn.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/09 18:32
S228	10	(carrier adj aggregation) and (schedul$3 near3 (downlink DL) with ((first primary initial) near6 (resource radio frequency frame))) and ((first 1st) adj6 component adj3 carrier) same ((1st first) adj6 (radio resource frame)) and ((2nd second) adj6 component adj3 carrier) same ((2nd second) adj6 (radio resource frame))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/09 20:46
S229	3	"20070030661"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/09 21:31
S230	76	370/329,252,331.ccls. and (((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another)	US-PGPUB; USPAT; USOCR; DERWENT;	OR	ON	2016/03/10 09:26

		adj4 (radio resource frame))	IBM_TDB			
S231	0	(H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/16 11:49
S233	0	(H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near6 carrier	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/03/16 11:54
S234	18	(H04L5/0053, H04L5/001, H04L5/0094, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/16 11:59
S235	18	(H04L5/0053, H04L5/001, H04L5/0094, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/16 12:04
S236	7	(H04L5/0053, H04L5/001, H04L5/0094, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/16 12:06
S237	0	455/509,522,456.6,137,103,575.ccls. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/03/16 12:31
S238	7	(A01B12/006, H04L5/0053, H04L5/001, H04L5/0094, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/03/16 12:39
S239	4	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/03/16 12:47
S240	0	((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in. and ericsson.as. and (schedul$3 assigin$3) with (primary adj cell) same2	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2016/03/16 13:28

		(multiple several set) near3 component adj2 carrier	DERWENT; IBM_TDB			
S246	60	("20100322173" | "20110081913" | "20130010721" | "8634358" | "20110007699" | "8792830" | "20120140708" | "20100271970" | "20100285809" | "20110007699" | "20130003700" | "20100003997" | "20100232373" | "20130003700" | "8447343" | "8634358" | "20100232373" | "20120051306" | "20100296389" | "20120140708" | "20130010721" | "20130136084" | "20120082125" | "20020160784" | "20110081913" | "20110081932" | "20110243039" | "20120020317" | "20100098012" | "20100003997" | "20100208679" | "20110310856" | "20120082125" | "20120140708" | "20130136084" | "8265030" | "20110243039" | "8792830" | "20120051306" | "20120314675" | "8472368" | "20120147847" | "20120020317" | "8265030" | "20110007695" | "20110081932" | "20120314675" | "20020160784" | "20100271970" | "20100285809" | "20130034073" | "8265030" | "20110310856" | "20100232373" | "20100296389" | "20120020317" | "20100098012" | "20110310856" | "20120082125" | "20100098012" | "20130034073" | "8447343" | "8472368" | "20100208679" | "20100322173" | "20110007695").PN.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/06/24 11:47
S247	1	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	USPAT	OR	ON	2016/06/24 11:50
S248	7	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/06/24 11:51
S249	269	((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in. and 455/$.ccls.	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/06/24 11:55
S250	2	((david near2 astely) (robert near2 baldemair) (dirk near2 gerstenberger) (daniel near2 larsson) (lars near2 lindbom) (stefan near2 parkvall)).in. and (carrier adj aggregation) and (schedul$3 near3 (downlink DL) with ((first primary initial) near6 (resource radio frequency frame)))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/06/24 11:56

S251	5	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel Bin) same (reserv$4 sav$4) near3 (other 2nd second another next) adj3 (resource frequency channel Bin) and (CC component)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/06/24 11:57
S252	1	"12896993"	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/06/24 12:05
S253	61	370/329,252,331.ccls. and (((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj4 (radio resource frame)) and (set group) near6 (radio resource)	US-PGPUB; USPAT	OR	ON	2016/06/24 12:21
S254	2	("20120147847").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/06/24 12:48
S257	29	455/509,522,456.6,137,103,575.ccls. and (schedul$3 assigin$3) with component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/06/24 14:30
S258	22	455/$.ccls. and (1st first) near3 (radio band resource frequency) with (reserv$3 schedul$3 allocat$3) with (1st first) near3 (CC (component adj carrier))	US-PGPUB; USPAT; USOCR; DERWENT; IBM_TDB	OR	ON	2016/06/24 14:32

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L4	14	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	USPAT	OR	ON	2016/06/24 22:15
L5	66	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	US-PGPUB; USPAT	OR	ON	2016/06/24 22:15
L6	13	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj	US-PGPUB; USPAT	OR	ON	2016/06/24 22:17

		cell) same2 (multiple several set) and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources) same component adj carrier				
S159	0	455/451,452.1,509,456.1,522,137,103,575.ccls. and (control$4) with (resource frequency channel) same (rererv$4 sav$4) near3 (other 2nd second another) adj3 (resource frequency channel Bin)	US-PGPUB; USPAT	OR	ON	2014/10/31 15:24
S160	5	(DL down$link) with (1st first first primary initia) near3 (set group) near6 (radio resource) and (DL down$link) with (set group) near6 (radio resource) with (2nd second other another) near2 component	US-PGPUB; USPAT	OR	ON	2014/10/31 15:26
S241	0	(H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier	US-PGPUB; USPAT	OR	ON	2016/03/16 11:50
S242	7	(H04L5/0053, H04L5/001, H04L5/0094, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	US-PGPUB; USPAT	OR	ON	2016/03/16 12:38
S243	7	(A01B12/006, H04L5/0053, H04L5/001, H04L5/0094, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	US-PGPUB; USPAT	OR	ON	2016/03/16 12:39
S244	1	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	USPAT	OR	ON	2016/03/16 12:47
S245	4	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3 component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)	US-PGPUB; USPAT	OR	ON	2016/03/16 12:47
S255	7	(H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237).cpc. and (schedul$3 assigin$3) with (primary adj cell) same2 (multiple several set) near3	US-PGPUB; USPAT	OR	ON	2016/06/24 11:48

		component adj2 carrier and (control$4 adjust$3) near6 (DL (down$link)) and (second 2nd another other) near3 (radio frequency band resources)				
S256	61	370/329,252,331.ccls. and (((first 1st) adj6 component adj3 carrier) same ((radio resource frame))) and ((2nd second) adj6 component adj3 carrier) same ((2nd second other another) adj4 (radio resource frame)) and (set group) near6 (radio resource)	US-PGPUB; USPAT	OR	ON	2016/06/24 12:22

6/ 24/ 2016 10:20:46 PM
C:\ Users\ mtalukder\ Documents\ EAST\ Workspaces\ 12896993.wsp

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12896993	ASTELY ET AL.
	Examiner	Art Unit
	MD TALUKDER	2648

CPC- SEARCHED		
Symbol	Date	Examiner
H04W88/08, H04W72/044, H04W72/042	4/22/2014 & 4/30/2014 & 10/31/2014	
H04W52/367, H04W52/12, H04W52/40	4/22/2014 & 4/30/2014 & 10/31/2014	Talukder
H04L29/08657, G01S5/0252, G01S5/02	4/22/2014 & 4/30/2014 & 10/31/2014	Talukder
H04B1/3833, H04M1/0247, H04M1/0237	4/22/2014 & 4/30/2014	Talukder
H03F3/211, H04B7/0617, H04B7/0669	4/22/2014 & 4/30/2014	
H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237	10/13/2015	Talukder
H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237	3/16/2016	Talukder
H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237	6/24/2016	Talukder

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
455	509,522,456.6,137,103,575	12/11/2012	Talukder
370	329,252,331	12/11/2012	Talukder
455	Text	6/17/2013	Talukder
370	329,341,348,395.4	6/26/2013	Talukder

US CLASSIFICATION SEARCHED			
Class	**Subclass**	**Date**	**Examiner**
455	All	10/13/2015	Talukder
455	509,522,456.6,137,103,575	3/9/2016	Talukder
370	29,252,331	3/9/2016	Talukder
455	509,522,456.6,137,103,575	6/24/2016	Talukder
370	29,252,331	6/24/2016	Talukder
			Talukder

SEARCH NOTES		
Search Notes	**Date**	**Examiner**
East Search	12/10/2012	talukder
East Search	12/11/2012	talukder
East Search	6/17/2013	talukder
East Search	6/18/2013	talukder
East Search	6/26/2013	talukder
East Search	6/27/2013	Talukder
East Search	4/22/2014 & 4/30/2014	Talukder
Text Srarched	10/31/2014	Talukder
Assignee Searched	10/13/2015	Talukder
Inventor Searched	10/13/2015	Talukder
East Searched	10/13/2015	Talukder
Assignee Searched	3/9/2016	Talukder
Inventor Searched	3/9/2016	Talukder
East Searched	3/9/2016	Talukder
Assignee Searched	6/24/2016	Talukder
Inventor Searched	6/24/2016	Talukder
East Searched	6/24/2016	Talukder
		Talukder

INTERFERENCE SEARCH			
US Class/ CPC Symbol	**US Subclass / CPC Group**	**Date**	**Examiner**

INTERFERENCE SEARCH			
US Class/ CPC Symbol	**US Subclass / CPC Group**	**Date**	**Examiner**
H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237		3/16/2016	Talukder
455	All	3/16/2016	Talukder
455	All	6/24/2016	Talukder
H04W88/08, H04W72/044, H04W72/042, H04W52/367, H04W52/12, H04W52/40, H04L29/08657, G01S5/0252, G01S5/02, H04B1/3833, H04M1/0247, H04M1/0237		6/24/2016	Talukder
			Talukder

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)

24112 7590 07/07/2016
COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

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.
12/896,993	10/04/2010	David Astely	4015-6942 / P30138-US2	1015

TITLE OF INVENTION: PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced

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	10/07/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS
TALUKDER, MD K	2648	455-509000

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 Coats & Bennett, PLLC
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: Telefonaktiebolaget LM Ericsson (publ)
(B) RESIDENCE: (CITY and STATE OR COUNTRY): Stockholm, Sweden

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 18-1167 (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 /Edward M. Roney/ Date 09/30/2016
Typed or printed name Edward M. Roney Registration No. 62048

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

Electronic Patent Application Fee Transmittal

Application Number:	12896993
Filing Date:	04-Oct-2010
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Filer:	Edward Milton Roney/Kenyatta Upchurch
Attorney Docket Number:	4015-6942 / P30138-US2

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($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**960**

Electronic Acknowledgement Receipt	
EFS ID:	27090416
Application Number:	12896993
International Application Number:	
Confirmation Number:	1015
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Customer Number:	24112
Filer:	Edward Milton Roney/Kenyatta Upchurch
Filer Authorized By:	Edward Milton Roney
Attorney Docket Number:	4015-6942 / P30138-US2
Receipt Date:	30-SEP-2016
Filing Date:	04-OCT-2010
Time Stamp:	15:24:12
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	EFT
Payment was successfully received in RAM	$960
RAM confirmation Number	100316INTEFSW15260500
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

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)	P30138_US2_Issue_Fee_Transmittal.pdf	561313 dea8cc29f6c58856f88397e3ce3c483cbc702953	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30556 bc803d57b83fa80ab4e28a90c763455d6c988fdf	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	591869		

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.

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.
12/896,993	11/15/2016	9497004	4015-6942 / P30138-US2	1015

24112 7590 10/26/2016

COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

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 612 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):

David Astely, Bromma, SWEDEN;
Robert Baldemair, Solna, SWEDEN;
Dirk Gerstenberger, Stockholm, SWEDEN;
Daniel Larsson, Solna, SWEDEN;
Lars Lindbom, Karlstad, SWEDEN;
Stefan Parkvall, Stockholm, SWEDEN;

PTO/SB/44 (09-07)
Approved for use through 08/31/2013. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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(Also Form PTO-1050)

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 9,497,004 B2

APPLICATION NO. : 12/896,993

ISSUE DATE : November 15, 2016

INVENTOR(S) : Astely, et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On Page 2, in Field (56), under "OTHER PUBLICATIONS", in Column 2, Line 19, delete "=Rance," and insert - - France. - -, therefor.

On Page 2, in Field (56), under "OTHER PUBLICATIONS", in Column 2, Line 24, delete "DPCCH" and insert - - PDCCH - -, therefor.

In Column 4, Line 48, delete "muitipath" and insert - - multipath - -, therefor.

In Column 7, Line 31, delete "or" and insert - - of - -, therefor.

In Column 7, Line 47, delete "as" and insert - - as: - -, therefor.

In Column 9, Line 1, delete "simuitaneousiy" and insert - - simultaneously - -, therefor.

In Column 10, Line 53, delete "Mapping" and insert - - mapping - -, therefor.

In Column 11, Line 8, delete "ion" and insert - - on - -, therefor.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

6300 Legacy, MS EVR 1-C-11
Plano, TX 75024
972-583-8656

PTO/SB/44 (09-07)
Approved for use through 08/31/2013. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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(Also Form PTO-1050)

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 9,497,004 B2

APPLICATION NO. : 12/896,993

ISSUE DATE : November 15, 2016

INVENTOR(S) : Astely, et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Column 11, Line 51, delete "downiink" and insert - - downlink - -, therefor.

In Column 14, Line 51, in Claim 17, delete "transmission," and insert - - transmissions, - -, therefor.

In Column 15, Line 2, in Claim 17, delete "on" and insert - - in - -, therefor.

In Column 15, Line 25, in Claim 22, delete "on said" and insert - - in said - -, therefor.

In Column 15, Line 64, in Claim 24, delete "on" and insert - - in - -, therefor.

In Column 16, Line 22, in Claim 29, delete "on" and insert - - in - -, therefor.

In Column 16, Line 36, in Claim 31, delete "transmission" and insert - - transmissions - -, therefor.

In Column 16, Line 46, in Claim 31, delete "transmission" and insert - - transmissions - -, therefor.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

6300 Legacy, MS EVR 1-C-11
Plano, TX 75024
972-583-8656

PTO/SB/44 (09-07)
Approved for use through 08/31/2013. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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(Also Form PTO-1050)

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 9,497,004 B2

APPLICATION NO. : 12/896,993

ISSUE DATE : November 15, 2016

INVENTOR(S) : Astely, et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Column 16, Line 49, in Claim 31, delete "on" and insert - - in - -, therefor.

In Column 17, Line 18, in Claim 32, delete "resources on" and insert - - resources on a - -, therefor.

In Column 17, Line 29, in Claim 32, delete "on" and insert - - in - -, therefor.

In Column 18, Line 39, in Claim 39, delete "on" and insert - - in - -, therefor.

In Column 19, Line 12, in Claim 40, delete "on" and insert - - in - -, therefor.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

6300 Legacy, MS EVR 1-C-11
Plano, TX 75024
972-583-8656

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.

Electronic Patent Application Fee Transmittal

Application Number:	12896993
Filing Date:	04-Oct-2010
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Filer:	Steven Ware Smith/Michelle Sanderson
Attorney Docket Number:	4015-6942 / P30138-US2

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:				
Certificate of correction	1811	1	100	100

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**100**

Electronic Acknowledgement Receipt

EFS ID:	28027113
Application Number:	12896993
International Application Number:	
Confirmation Number:	1015
Title of Invention:	PUCCH Resource Allocation for Carrier Aggregation in LTE-Advanced
First Named Inventor/Applicant Name:	David Astely
Customer Number:	24112
Filer:	Steven Ware Smith/Michelle Sanderson
Filer Authorized By:	Steven Ware Smith
Attorney Docket Number:	4015-6942 / P30138-US2
Receipt Date:	10-JAN-2017
Filing Date:	04-OCT-2010
Time Stamp:	18:03:40
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$100
RAM confirmation Number	011117INTEFSW00004418501379
Deposit Account	501379
Authorized User	Michelle Sanderson
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.20 (Post Issuance fees)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	P30138-US2_2017-01-10_CoC_Request_Letter.pdf	94634 ec5ec16201781d6ecd0b5dffbe5e1740f59fb1a2	no	4
Warnings:					
Information:					
2	Request for Certificate of Correction	P30138-US2_2017-01-10_CoC_PTO-1050.pdf	119656 255dbd5135f0eacd62d0442100ab928da2a7ea0b	no	4
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30206 712e02b7bc4ec59b75f6cde78599cafc83223f7a	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	244496		

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 & TRADEMARK OFFICE

IN RE APPLICATION OF: U.S. Patent No. 9,497,004

USPTO CONFIRMATION CODE: 1015

APPLICATION NO.: 12/896,993

FILED: October 4, 2010

EXAMINER: MD Talukder

GROUP ART UNIT: 2648

FOR: PUCCH RESOURCE ALLOCATION FOR CARRIER AGGREGATION IN LTE-ADVANCED

37 CFR 1.322 & 37 CFR 1.323 REQUEST FOR CERTIFICATE OF CORRECTION FOR USPTO AND/OR APPLICANT MISTAKE

HONORABLE COMMISSIONER OF PATENTS & TRADEMARKS

SIR:

The following is a request for a certificate of correction in Serial Number 12/896,993, now Patent Number 9,497,004.

A certificate of correction under 35 USC 254 is respectfully requested in the above-identified patent.

The errors were the fault of both the applicant and USPTO and, accordingly, please charge **$100.00** to our Deposit Account No. 50-1379. In the event that a further fee is required, please charge the amount to the same Deposit Account.

The exact locations where the errors appear in the patent and patent application are as follows:

On Page 2, in Field (56), under "OTHER PUBLICATIONS", in Column 2, Line 19, delete "=Rance," and insert - - France. - -, therefor.
(LIST OF REFERENCES CITED BY APPLICANT AND CONSIDERED BY EXAMINER DATED MARCH 18, 2016, SHEET 2 (PAGE 242 OF FW), ENTRY 1, LINE 4)

On Page 2, in Field (56), under "OTHER PUBLICATIONS", in Column 2, Line 24, delete "DPCCH" and insert - - PDCCH - -, therefor.
(LIST OF REFERENCES CITED BY APPLICANT AND CONSIDERED BY EXAMINER DATED JULY 7, 2016, SHEET 2 (PAGE 17 OF FW), ENTRY 2, LINE 1)

In Column 4, Line 48, delete "muitipath" and insert - - multipath - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED OCTOBER 4, 2010, PAGE 7, PARAGRAPH [028], LINE 7)

In Column 7, Line 31, delete "or" and insert - - of - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED OCTOBER 4, 2010, PAGE 12, PARAGRAPH [043], LINE 4)

In Column 7, Line 47, delete "as" and insert - - as: - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED OCTOBER 4, 2010, PAGE 13, PARAGRAPH [045], LINE 4)

In Column 9, Line 1, delete "simuitaneousiy" and insert - - simultaneously - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED OCTOBER 4, 2010, PAGE 15, PARAGRAPH [052], LINE 8)

In Column 10, Line 53, delete "Mapping" and insert - - mapping - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED OCTOBER 4, 2010, PAGE 18, PARAGRAPH [058], LINE 9)

In Column 11, Line 8, delete "ion" and insert - - on - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED OCTOBER 4, 2010, PAGE 19, PARAGRAPH [060], LINE 3)

In Column 11, Line 51, delete "downiink" and insert - - downlink - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED OCTOBER 4, 2010, PAGE 20, PARAGRAPH [062], LINE 8)

In Column 14, Line 51, in Claim 17, delete "transmission," and insert - - transmissions, - -, therefor.
(AMENDMENTS TO THE CLAIMS DATED JUNE 20, 2016, PAGE 6 OF 16, CLAIM 17, LINE 8)

In Column 15, Line 2, in Claim 17, delete "on" and insert - - in - -, therefor.
(AMENDMENTS TO THE CLAIMS DATED JUNE 20, 2016, PAGE 6 OF 16, CLAIM 17, LINE 21)

In Column 15, Line 25, in Claim 22, delete "on said" and insert - - in said - -, therefor.
(AMENDMENTS TO THE CLAIMS DATED JUNE 20, 2016, PAGE 7 OF 16, CLAIM 23, LINE 3)

In Column 15, Line 64, in Claim 24, delete "on" and insert - - in - -, therefor.
(AMENDMENTS TO THE CLAIMS DATED JUNE 20, 2016, PAGE 8 OF 16, CLAIM 25, LINE 23)

In Column 16, Line 22, in Claim 29, delete "on" and insert - - in - -, therefor.
(AMENDMENTS TO THE CLAIMS DATED JUNE 20, 2016, PAGE 9 OF 16, CLAIM 31, LINE 3)

In Column 16, Line 36, in Claim 31, delete "transmission" and insert - - transmissions - -, therefor.
(AMENDMENTS TO THE CLAIMS DATED JUNE 20, 2016, PAGE 10 OF 16, CLAIM 33, LINE 5)

In Column 16, Line 46, in Claim 31, delete "transmission" and insert - - transmissions - -, therefor.
(AMENDMENTS TO THE CLAIMS DATED JUNE 20, 2016, PAGE 10 OF 16, CLAIM 33, LINE 12)

In Column 16, Line 49, in Claim 31, delete "on" and insert - - in - -, therefor.
(AMENDMENTS TO THE CLAIMS DATED JUNE 20, 2016, PAGE 10 OF 16, CLAIM 33, LINE 22)

In Column 17, Line 18, in Claim 32, delete "resources on" and insert - - resources on a - -, therefor.
(AMENDMENTS TO THE CLAIMS DATED JUNE 20, 2016, PAGE 11 OF 16, CLAIM 34, LINES 9-10)

In Column 17, Line 29, in Claim 32, delete "on" and insert - - in - -, therefor.
(AMENDMENTS TO THE CLAIMS DATED JUNE 20, 2016, PAGE 11 OF 16, CLAIM 34, LINE 24)

In Column 18, Line 39, in Claim 39, delete "on" and insert - - in - -, therefor.
(AMENDMENTS TO THE CLAIMS DATED JUNE 20, 2016, PAGE 13 OF 16, CLAIM 43, LINE 23)

In Column 19, Line 12, in Claim 40, delete "on" and insert - - in - -, therefor.
(AMENDMENTS TO THE CLAIMS DATED JUNE 20, 2016, PAGE 14 OF 16, CLAIM 44, LINE 26)

The requested corrections are attached on Form PTO 1050.

Respectfully Submitted

, 2016

DATE

/Ronald J. Ward,Reg#54870/

Ronald J. Ward
Registration No. 54,870
Attorney of Record

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 9,497,004 B2
APPLICATION NO. : 12/896993
DATED : November 15, 2016
INVENTOR(S) : Astely et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On the Title Page

On Page 2, item (56), under "OTHER PUBLICATIONS", Column 2, Line 19, delete "=Rance," and insert -- France. --, therefor.

On Page 2, item (56), under "OTHER PUBLICATIONS", Column 2, Line 24, delete "DPCCH" and insert -- PDCCH --, therefor.

In the Specification

Column 4, Line 48, delete "muitipath" and insert -- multipath --, therefor.

Column 7, Line 31, delete "or" and insert -- of --, therefor.

Column 7, Line 47, delete "as" and insert -- as: --, therefor.

Column 9, Line 1, delete "simuitaneousiy" and insert -- simultaneously --, therefor.

Column 10, Line 53, delete "Mapping" and insert -- mapping --, therefor.

Column 11, Line 8, delete "ion" and insert -- on --, therefor.

Column 11, Line 51, delete "downiink" and insert -- downlink --, therefor.

In the Claims

Column 14, Line 51, Claim 17, delete "transmission," and insert -- transmissions, --, therefor.

Column 15, Line 2, Claim 17, delete "on" and insert -- in --, therefor.

Signed and Sealed this
Twenty-first Day of February, 2017

Michelle K. Lee

Michelle K. Lee
Director of the United States Patent and Trademark Office

Column 15, Line 25, Claim 22, delete “on said” and insert -- in said --, therefor.

Column 15, Line 64, Claim 24, delete “on” and insert -- in --, therefor.

Column 16, Line 22, Claim 29, delete “on” and insert -- in --, therefor.

Column 16, Line 36, Claim 31, delete “transmission” and insert -- transmissions --, therefor.

Column 16, Line 46, Claim 31, delete “transmission” and insert -- transmissions --, therefor.

Column 16, Line 49, Claim 31, delete “on” and insert -- in --, therefor.

Column 17, Line 18, Claim 32, delete “resources on” and insert -- resources on a --, therefor.

Column 17, Line 29, Claim 32, delete “on” and insert -- in --, therefor.

Column 18, Line 39, Claim 39, delete “on” and insert -- in --, therefor.

Column 19, Line 12, Claim 40, delete “on” and insert -- in --, therefor.