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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **Dahlman**, *et al.*	)	
Serial No.: TBA	)	Examiner (Unknown)
Filed: TBA	)	Group Art Unit (Unknown)
For: **Transmission of System Information on a Downlink Shared Channel**	)	
Attorney Docket No. 4015-6727	)	

Cary, North Carolina
11 December 2009

PRELIMINARY AMENDMENT

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Sir:

Please be advised that this is a **U.S. National Stage Filing of PCT Application PCT/SE2008/050407.**

Prior to examination, please amend the application as indicated below.

Amendments to the Claims

1. (Currently amended) A method of transmitting system information on the downlink of a wireless communication network comprising:

transmitting ~~(410)~~ system information in recurring time windows overlaid on a sequence of transmit channel subframes;

dynamically selecting ~~(402)~~ which subframes within a given time window are to be used for carrying the system information; and

including ~~(406 / 408)~~ an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

2. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a contiguous set of subframes within the given time window.

3. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a non-contiguous set of subframes within the given time window.

4. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting which subframes to use for transmitting system information in view of competing transmission priorities associated with other control or data signaling.

5. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information comprises using an RNTI (Radio Network Temporary Identifier) to denote that the subframe carries system information.

6. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using an end-of-system-information indicator in a last subframe of the given time window that carries system information.

7. (Original) The method of claim 1, further comprising varying window sizes of the recurring time windows.

8. (Original) The method of claim 1, further comprising dynamically configuring a window size for the recurring time windows.

9. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using different indicators corresponding to different types of system information, such that the indicator used for a particular subframe indicates the type of system information carried in that subframe.

10. (Currently amended) A network transmitter ~~(110)~~ comprising a baseband processor ~~(130)~~ configured to:

generate system information in recurring time windows overlaid on a sequence of transmit channel subframes;

dynamically select which subframes within a given time window are to be used for carrying system information; and

include an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

11. (Original) The network transmitter of claim 10, wherein the network transmitter comprises a radio base station configured for operation in accordance with 3GPP E-UTRA standards.

12. (Currently amended) A method of transmitting system information on a downlink shared channel structured as successive subframes, the method comprising:

transmitting ~~(400 – 416)~~ system information in regularly occurring time windows, each time window spanning some number of successive subframes; and

indicating ~~(406 / 408)~~ to receiving user equipment which subframes within a given time window carry system information.

13. (Original) The method of claim 12, wherein indicating to receiving user equipment which subframes within a given time window carry system information includes indicating

the last subframe within the given time window that carries system information, thereby allowing the receiving user equipment to cease monitoring for system information within the given time window.

14. (Original) The method of claim 12, further comprising dynamically selecting which subframes within a given time window are to be used for carrying system information.

15. (Currently amended) A method for a mobile station to receive system information from a supporting wireless communication network, the method comprising:

beginning monitoring ~~(500 and 502)~~ for the receipt of system information at the start of each time window in a succession of recurring time windows used for the transmission of system information, each said time window spanning a number of signal subframes;

within each time window, monitoring ~~(504 – 510)~~ each signal subframe for an indication of system information and reading system information from the signal subframe if such information is present; and

terminating monitoring ~~(512)~~ at least at the end of the time window.

16. (Original) The method of claim 15, further comprising recognizing an end-of-system-information indicator in a signal subframe received within the time window and terminating monitoring for the time window in response.

17. (Original) The method of claim 15, further comprising adapting to changing or configurable window sizes used for the time window.

18. (Original) The method of claim 15, further comprising storing a default window size for monitoring for system information transmissions.

19. (Original) The method of claim 18, further comprising monitoring for system information transmissions based on a specified window size indicated in received information rather than the default window size.

20. (Original) The method of claim 15, further comprising recognizing different types of system information based on recognizing different system information indicators in different signal subframes.

21. (Currently amended) A mobile station ~~(120)~~ comprising a baseband processor ~~(140)~~ operable to:

begin monitoring for the receipt of system information at the start of each time window in a succession of recurring time windows used for the transmission of system information, each said time window spanning a number of signal subframes;

within each time window, monitor each signal subframe for an indication of system information and reading system information from the signal subframe if such information is present; and

terminate monitoring at least at the end of the time window.

22. (Original) The mobile station of claim 21, wherein the baseband processor is operable to recognize an end-of-system-information indicator in a signal subframe received within the time window and terminate monitoring for the time window in response.

23. (Original) The mobile station of claim 21, wherein the baseband processor is operable to adapt to changing or configurable window sizes used for the time window.

24. (Original) The mobile station of claim 21, wherein the baseband processor is operable to monitor for system information transmissions based on a specified window size indicated in received information rather than a default window size.

25. (Original) The mobile station of claim 21, wherein the baseband processor is operable to recognize different types of system information based on different system information indicators detected in different signal subframes.

Remarks

Applicant submits the foregoing claim amendments prior to examination on the merits for consideration by the Examiner. The amendments revise claims 1-25 by removing reference numbers. The claims are otherwise unchanged; thus, no new matter has been added.

Applicant respectfully requests that the Examiner enter the amendments prior to examination on the merits.

Respectfully submitted,

COATS & BENNETT P.L.L.C.

Date: 11 December 2009

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	
	Filing Date	
	First Named Inventor	Dahlman
	Art Unit	
	Examiner Name	
	Attorney Docket Number	4015-6727

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	1	1799003	EP	A1	2007-06-20	Matsushita Electric Industrial Co., Ltd.		☐
	2	2007/052917	WO	A1	2007-05-10	LG Electronics, Inc.		☐

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	Examiner Name	
	Attorney Docket Number	4015-6727

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	1	3RD GENERATION PARTNERSHIP PROJECT. "System Information Scheduling and Change Notification." 3GPP TSG-RAN2 Meeting #58, Tdoc R2-071912, Kobe, Japan, 7-11 May 2007.	☐
	2	3RD GENERATION PARTNERSHIP PROJECT. "Draft Text Proposal Capturing Agreements on System Information." 3GPP TSG-RAN2 Meeting #58, Tdoc R2-072205, Kobe, Japan, 7-11 May 2007.	☐
	3	3RD GENERATION PARTNERSHIP PROJECT. "Transmission of Dynamic System Information." 3GPP TSG-RAN2 Meeting #58bis, R2-072543, Orlando, FL, US, 25-29 June 2007.	☐
	4	3RD GENERATION PARTNERSHIP PROJECT. "Transmission of Dynamic System Information." 3GPP TSG-RAN2 Ad-hoc Meeting, Tdoc R2-075559, Vienna, Austria, 13-14 December 2007.	☐
	5	3RD GENERATION PARTNERSHIP PROJECT. 3GPP TS 36.300 V8.0.0 (2007-03). 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access network (E-UTAN); Overall description; Stage 2 (Release 8).	☐

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	First Named Inventor	Dahlman
	Art Unit	
	Examiner Name	
	Attorney Docket Number	4015-6727

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).

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☐ See attached certification statement.

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

☒ None

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	/Michael D. Murphy/	Date (YYYY-MM-DD)	2009-12-11
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(54) **Mapping of broadcast system information to transport channels in a mobile communication system**

(57) The present invention relates to a method and transmission apparatus for transmitting broadcast system information in a mobile communication system. Further, the invention relates to a method and mobile terminal receiving the broadcast system information. To provide an improved method for broadcasting broadcast system information the invention suggests mapping different partitions of broadcast system information to a shared transport channel or a broadcast transport channel for transmission. The mapping may take into account parameters inherent to the mobile terminals to which the broadcast system information is to be transmitted and/or parameters inherent to the different partitions of broadcast system information.

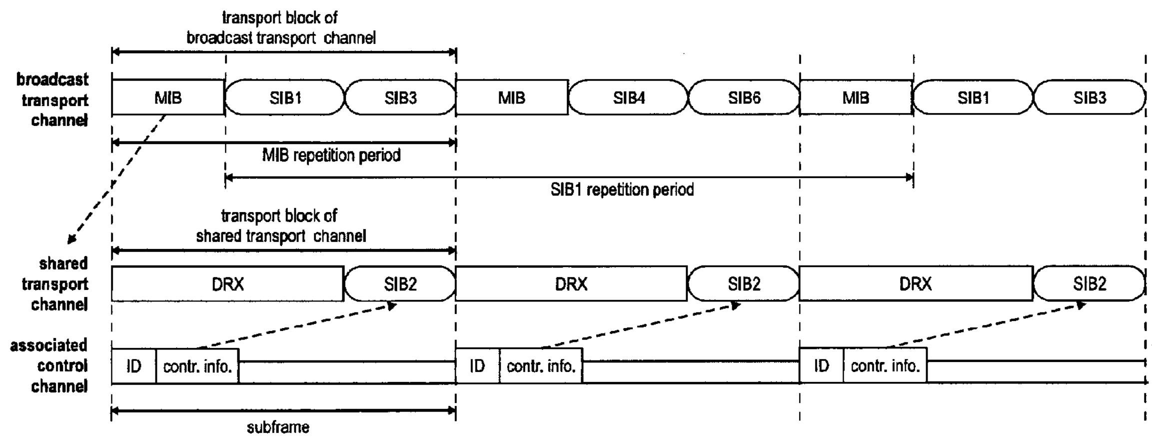

Fig. 10

EP 1 799 003 A1

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a method and transmission apparatus for transmitting broadcast system information in a mobile communication system. Further, the invention relates to a method and mobile terminal receiving the broadcast system information.

TECHNICAL BACKGROUND

[0002] W-CDMA (Wideband Code Division Multiple Access) is a radio interface for IMT-2000 system (International Mobile Telecommunication system), which was standardized for use as the 3rd generation wireless mobile telecommunication system. It provides a variety of services such as voice services and multimedia mobile communication services in a flexible and efficient way. The standardization bodies in Japan, Europe, USA, and other countries have jointly organized a project called the 3rd Generation Partnership Project (3GPP) to produce common radio interface specifications for W-CDMA.

[0003] The standardized European version of IMT-2000 is commonly called UMTS (Universal Mobile Telecommunication System). The first release of the specification of UMTS has been published in 1999 (Release 99). In the mean time several improvements to the standard have been standardized by the 3GPP in Release 4, Release 5 and Release 6. A discussion on further improvements is ongoing under the scope of Release 7 and Study Item on Evolved UTRA and UTRAN.

UMTS Architecture

[0004] The high level Release 99/4/5 architecture of Universal Mobile Telecommunication System (UMTS) is shown in Fig. 1 (see 3GPP TR 25.401: "UTRAN Overall Description", incorporated herein by reference, available from http://www.3gpp.org). The UMTS system consists of a number of network elements each having a defined function. Though the network elements are defined by their respective function, a similar physical implementation of the network elements is common but not mandatory.

[0005] The network elements are functionally grouped into the Core Network (CN) 101, the UMTS Terrestrial Radio Access Network (UTRAN) 102 and the User Equipment (UE) 103. The UTRAN 102 is responsible for handling all radio-related functionality, while the CN 101 is responsible for routing calls and data connections to external networks. The interconnections of these network elements are defined by open interfaces (Iu, Uu). It should be noted that UMTS system is modular and it is therefore possible to have several network elements of the same type.

[0006] In the sequel two different architectures will be discussed. They are defined with respect to logical distribution of functions across network elements. In actual network deployment, each architecture may have different physical realizations meaning that two or more network elements may be combined into a single physical node.

[0007] Fig. 2 illustrates the current architecture of UTRAN. A number of Radio Network Controllers (RNCs) 201, 202 are connected to the CN 101. Functionally, the RNC 201, 202 owns and controls the radio resources in its domain and typically terminates the Radio Resource Control protocol on the access network side. Each RNC 201, 202 controls one or several base stations (Node Bs) 203, 204, 205, 206, which in turn communicate with the user equipments. An RNC controlling several base stations is called Controlling RNC (C-RNC) for these base stations. A set of controlled base stations accompanied by their C-RNC is referred to as Radio Network Subsystem (RNS) 207, 208. For each connection between User Equipment and the UTRAN, one RNS is the Serving RNS (S-RNS). It maintains the so-called Iu connection with the Core Network (CN) 101. When required, the Drift RNS 302 (D-RNS) 302 supports the Serving RNS (S-RNS) 301 by providing radio resources as shown in Fig. 3. Respective RNCs are called Serving RNC (S-RNC) and Drift RNC (D-RNC). It is also possible and often the case that C-RNC and D-RNC are identical and therefore abbreviations S-RNC or RNC are used. Commonly, a Drift RNS 302 is used for soft handovers of UEs between different RNS.

General Description of the Protocol Model of the UTRAN Terrestrial Interfaces

[0008] Fig. 4 shows an overview of the protocol model of the UTRAN in an UMTS network. For a better understanding, only a brief description is provided herein; further details may be found in Holma et al., "WCDMA for UMTS", Third Edition, Wiley & Sons, Inc., October 2004, Chapter 5, incorporated herein by reference.

[0009] On the horizontal plane, the protocol model can be split into the radio network layer and the transport network layer. All UTRAN-related issues are visible and handled on the radio network layer, while transport network layer typically represents standard transport technology that is selected to be used for data transport for the UTRAN without any UTRAN-specific changes.

[0010] On the vertical plane, the protocol model can be split into control plane and user plane. The control plane is used for UMTS-specific control signaling (i.e. signaling related to radio and transport interfaces) and includes the Application Protocol (AP), e.g. RANAP on the Iu interfaces, RNSAP on the Iur interfaces, NBAP on the Iub and RRC on Uu interfaces. The control plane functions and Application Protocol allows setting up traffic radio bearers to the UEs via so-called signaling radio bearers.

[0011] While the control plane protocols are responsible for the UMTS-specific control signaling, the user plane transports the data streams sent by and sent to the users, such as voice calls, streaming data, packets of packet-switched services, etc. For transport, the user plane contains the so-called traffic radio bearers (also sometimes referred to as Data Bearers).

[0012] The transport network control plane is used for control signaling within the transport network layer and does not include any radio network layer related information. The transport network control plane includes the ALCAP protocol, which is used to set up the traffic bearers for exchanging user plane information and the signaling bearers required for communicating ALCAP protocol messages. Due to the presence of the transport network control plane, it is possible that the Application Protocol within the control plane may operate completely independent from the technology selected for data transport on the traffic radio bearers in the user plane. The transport network control plane controls the operation of the transport network user plane.

UTRA Radio Interface Protocol architecture

[0013] An overview of the radio interface protocol architecture of the UTRAN is shown in Fig. 5. Generally, the radio interface protocol architecture of the UTRAN implements Layers 1 to 3 of the OSI protocol stack. The protocols terminated in the UTRAN are also referred to as the access stratum (protocols). In contrast to the access stratum, all protocols not terminated in the UTRAN are typically also referred to as the non-access stratum protocols.

[0014] As has been discussed with respect to Fig. 4, the vertical split of the protocols into user plane and control plane is illustrated. The Radio Resource Control (RRC) protocol is a Layer 3 protocol of the control plane which controls the protocols in the lower layers of the UTRA Radio Interface (Uu).

[0015] The RRC protocol is typically terminated in the RNC of the UTRAN, however other network elements have also been considered for terminating the RRC protocol in the UTRAN, e.g. the Node Bs. The RRC protocol is used for signaling of control information to control access to radio resources of the radio interface to the UEs. Further, there is also the possibility that the RRC protocol encapsulates and transports non-access stratum messages, which are usually related to control within the non-access stratum.

[0016] In the control plane, the RRC protocol relays the control information to Layer 2, i.e. the Radio Link Control (RLC) protocol, via signaling radio bearers through Service Access Points (SAPs). In the user plane the non-access stratum protocol entities may use traffic radio bearers to directly access Layer 2 via SAPs. The access may be made to the RLC directly or to the Packed Data Convergence Protocol which in turn provides its PDUs to the RLC protocol entity.

[0017] The RLC offers the SAPs to the higher layers. The RRC configuration defines how RLC will handle the packets, e.g. whether RLC is operating in transparent, acknowledged or unacknowledged mode. The service provided to the higher layers in the control plane and user plane by the RRC or PDCP are also referred to as signaling radio bearer and traffic radio bearer, respectively.

[0018] The MAC/RLC layer in turn offers its services to the RLC layer by means of so-called logical channels. The logical channels essentially define what kind of data is transported. The physical layer offers its services to the MAC/RLC layer, the so-called transport channels. The transport channels define how and with which characteristics the data received from the MAC layer are transmitted via the physical channels.

Logical and Transport Channels in UTRAN

[0019] In this section the mapping between logical channels and transport channels will be outlined referring for exemplary purposes to the UMTS architecture. The mapping of logical channels to transport channels may be utilized for some of the signaling messages within a RRC connection establishment procedure.

[0020] The characteristics and mapping of logical and transport channels for UTRA and E-UTRA are summarized in the following tables. Logical channels are mainly described by data type to be transmitted whereas transport channels are mainly described by respective transmission types and identification method.

[0021] The table below contains a description of logical and transport channels for UTRA and E-UTRA, respectively.

Table 1

Logical (LCH) or Transport Channel (TrCH) type vs. channel characteristic and mapping		Channel characteristic				Mapping (LCH -> TrCH)
		Data Type	**Transmission Type**	**Direction: Uplink (UL) or Downlink (DL)**	**Identification method**	
L C H	BCCH (Broadcast Control CHannel)	system information (broadcast)	N/A	DL	N/A	BCCH -> BCH
	CCCH (Common Control CHannel)	common service control (unicast)	N/A	UL or DL	N/A, Note: this logical channel is mainly used for transmission of control plane information prior to identifier assignment to UE by radio access network	CCCH -> FACH, RACH
	DCCH (Dedicated Control CHannel)	dedicated service control (unicast)	N/A	UL or DL	N/A	DCCH -> FACH, RACH, DCH
T r C H	BCH (Broadcast CHannel)	N/A	Common channel with static configuration	DL	N/A due to broadcast data type	N/A
	FACH (Forward Access CHannel)	N/A	Common channel with semi-static configuration	DL	Layer 2 inband when carrying DCCH, N/A otherwise	N/A
	RACH (Random Access CHannel)	N/A	Common channel with semi-static configuration and contention-based access	UL	Layer2inband when carrying DCCH, N/A otherwise	N/A
	DCH (Dedicated CHannel)	N/A	Dedicated channel with semi-static configuration	UL or DL	N/A since this is dedicated transport channel	N/A

[0022] Please note that mapping of DCCH in the table above may be possible on a Fractional Dedicated Channel in downlink direction for UMTS Release 6 and on Enhanced Dedicated Transport Channel in uplink for UMTS Release 6 of the Evolved UTRA. These options have however not been considered in the table for the sake of simplicity.

[0023] For UTRA, identification of transport channels as shown in the table above is Layer 2 inband. Layer 2 inband identification means that header of a Layer 2 MAC PDU contains UE identifier pointing at a specific UE as a destination or source of information for downlink or uplink direction, respectively. Consequently, for mapping of logical channels containing data of system information and common service control type identification is not needed. Identification is applicable only to common transport channels (RACH and FACH) apart from broadcast common transport channel (BCH).

[0024] The following table shows an exemplary description of logical channels and transport channels in the Evolved UTRA (E-UTRA).

Table 2

Logical (LCH) or Transport Channel (TrCH) type vs. channel characteristic and mapping		Channel characteristic				Mapping (LCH -> TrCH)
		Data Type	**Transmission Type**	**Direction: Uplink (UL) or Downlink (DL)**	**Identification method**	
LCH	BCCH (Broadcast Control CHannel)	system information (broadca st)	N/A	DL	N/A	BCCH -> Evolved-BCH
	CCCH (Common Control CHannel)	common service control (unicast)	N/A	UL or DL	N/A, Note: this logical channel is mainly used for transmission of control plane information prior to identifier assignment to UE by radio access network	CCCH -> SDCH (in downlink direction only), CACH
	DCCH (Dedicated Control CHannel)	dedicated service control (unicast)	N/A	UL or DL	N/A	DCCH-> SDCH, SUCH
TrCH	Evolved-BCH (Evolved Broadcast CHannel)	N/A	Common channel with static configuration	DL	N/A due to broadcast data type	N/A
	CACH (Contention Access CHannel)	N/A	Common channel with semi-static configuration and contention -based access	UL	Layer 2 inband when carrying DCCH, N/A otherwise	N/A
	SDCH (Shared Downlink CHannel)	N/A	Shared channel with dynamic configuration and scheduled access	DL	Layer 1 outband	N/A
	SUCH (Shared Uplink CHannel)	N/A	Dedicated channel with semi-static configuration	UL	Layer 1 outband	N/A

[0025] It can be noted that legacy FACH is not used and that shared channels are used instead of legacy DCH. It is assumed that associated physical channels in downlink direction are used for both SDCH and SUCH. An example of associated physical channel could be Shared Control Signaling CHannel (SCSCH).

[0026] The transmission types description in the respective column of the table above should be understood as follows. A static configuration means that the transport format attributes of the channel, e.g. modulation, forward error correction scheme etc. are system-specific and are not subject to change by the network. In a semi-static configuration the transport format attributes of the channel, e.g. modulation, forward error correction scheme etc. are subject to change by reconfiguration procedure. The procedure is fairly slow introducing latency of the order of 100 ms. Finally, in a dynamic configuration the transport format attributes of the channel, e.g. modulation, forward error correction scheme etc. are subject to change by signaling on associated control channels. The procedure is fairly fast relative to semi-static reconfiguration and may introduce a delay of the order of several sub-frames (1 sub-frame - 0.5 ms). Dynamic configuration may be carried out so as to optimally match transmission format to temporal variations of radio channel in which case it may be referred to as link adaptation.

Information that may be transmitted by this channel is given in the table below:

[0027]

Table 3

	Control signaling for downlink	Control signaling for uplink
Physical control	➢ Demodulation • Chunk allocation information • Data modulation • Transport block size	➢ Transmission power control bits ➢ Transmission timing control bits ➢ ACK/NACK bit for the reservation channel and fast access channel
L2 control	➢ Scheduling • UE identity ➢ H-ARQ • H-ARQ process information • Redundancy version • New data indicator	➢ Scheduling • UE identity • Chunk allocation information • Data modulation • Transport block size ➢ H-ARQ • ACK/NACK

[0028] It can be seen from the table that UE identification information is contained in both downlink and uplink directions. Thus, by virtue of Layer 1 outband identification, having decoded the data on the SCSCH and having determined that the identifier transmitted on the associated physical channel corresponds to the identifier assigned to the UE during the RRC connection establishment procedure, the UE can receive physical channels on which respective shared transport channels are mapped and further process Layer 2 PDUs (Protocol Data Units) corresponding to SDCH and SUCH shared transport channels. Identification for CACH transport channel is analogous to the identification for RACH transport channel in E-UTRA. It can be concluded that identification is applicable to common and shared transport channels (CACH, SDCH and SUCH) apart from evolved broadcast common transport channel (Evolved-BCH). Identification for said common transport channels is of L2 inband type, while the identification for shared transport channels is of Layer 1 outband type.

[0029] From the definitions of "Layer 2 inband" and "Layer 1 outband" identification one could infer that there is one and only one identifier per UE. Hence, once a Signaling Radio Bearer has been established, the UE has been assigned identifier that can be used for Traffic Radio Bearer as well. However, it is possible that multiple identifiers per UE are defined and used per configured transport channel.

Spectrum allocation

[0030] With respect to stand-alone operation of the mobile terminals spectrum allocations of different sizes (e.g. 1.25 MHz, 2.50 MHz, 5.00 MHz, 10.00 MHz, 15.00 MHz and 20.00 MHz) have been suggested in 3GPP TR 25.912, " Requirements for Evolved UTRA (E-UTRA) and Evolved UTRAN (E-UTRAN)", version 7.1.0 (available at http://www.3gpp.org) . It can be shown that data rate of evolved Primary Common Control Physical Channel (P-CCPCH - in legacy system, the BCH transport channel is mapped to the P-CCPCH) varies depending on size of spectrum allocation (as indicated in the table below), assuming that configuration of Evolved Broadcast Transport Channel is semi-static.

Table 4

[MHz]	1.25	2.50	5.00	10.00	15.00	20.00
[kbps]	4.00	8.00	16.00	32.00	48.00	64.00,

[0031] It can concluded that the UE reading time for reading a predetermined amount of data from the physical channels depends upon spectrum allocation. Therefore, for smaller spectrum allocations, the UE reading time and thereby power consumption is increased. Furthermore, when the data size implies the transmission of the data over several transmission time intervals (TTIs), the UE has to power its receiver to receive data at all TTIs in which the data is provided. For larger spectrum allocations, the UE reading time is decreased, but if several data portions are sent in one TTI, UE may need to decode irrelevant portions in that TTI, since the receivers may typically only be tuned to receive data of a complete TTI. This may also lead to unnecessarily increased UE power consumption.

[0032] The potential shortcomings outlined above are illustrated in Fig. 8 and 9 for the transmission of broadcast system information (BSI), which is typically partitioned into system information blocks (SIBs) in UMTS (Fig. 7). From Fig. 8, it can be recognized that for a spectrum allocation size of 5.00 MHz, the UE has to receive contents of the broadcast control channel BCCH over two successive TTIs to acquire information contained in SIB8, even though possibly MIB (at a given time instant) and SIB7/9/10 may not be of interest for the UE. Also, for larger spectrum allocations, e.g. of the size 10.00 MHz, as shown in Fig. 4, the UE decodes the master information block MIB and SIB1. In addition, the UE also decodes SIB2 and SIB3 even though the contents of these information blocks may not be necessary for system access or elementary mobility functions.

SUMMARY OF THE INVENTION

[0033] The object of the invention is to suggest an improved method for broadcasting broadcast system information.

[0034] The object is solved by the subject matter of the independent claims. Advantageous embodiments of the invention are subject matters to the dependent claims.

[0035] According to an aspect of the invention, different partitions of broadcast system information are mapped to a shared transport channel or a broadcast transport channel for transmission. According to an embodiment of the invention, the mapping may take into account parameters inherent to the mobile terminals to which the broadcast system information is to be transmitted and/or parameters inherent to the different partitions of broadcast system information.

[0036] In an embodiment of the invention, a method for transmitting broadcast system information in a radio access network of a mobile communication system is provided. According to the method, system information blocks of a broadcast control logical channel is mapped to a shared transport channel or a broadcast transport channel depending on a property of a respective system information block or the mobile terminals to receive the broadcast system information, and the system information blocks are transmitted via the shared transport channel and the broadcast transport channel, respectively.

[0037] For example, the intrinsic property of a system information block may be at least one of the temporal variability of the information contained in the system information block, the size of the system information block, the necessity of the information comprised in the system information block for system access, and the necessity of the information comprised in the system information block for tracking user location within the mobile communication system.

[0038] Examples for an intrinsic property of the mobile terminals may be a capability to support an optional feature within the mobile communication system.

[0039] In another embodiment of the invention, a master information block of a broadcast control logical channel is transmitted periodically via the broadcast transport channel. The master information block may comprise control information associated to a respective one of the system information blocks. The associated control information may indicate whether a respective system information block is mapped to the broadcast transport channel or the shared transport channel.

[0040] In case a system information block is mapped to the shared transport channel, in a variation of the embodiment, the associated control information comprises transmission format and timing of a respective system information block transmitted via the shared transport channel.

[0041] In a further variation, the associated control information specifies at least the position of the respective system information block on the broadcast transport channel, the time interval at which the respective system information block is transmitted and a timer value- or value tag-based update mechanism to be utilized to update the information of the respective system information block.

[0042] In a further embodiment of the invention the control information is transmitted on a control channel associated to the shared data channel. The control information may indicate to the transmission format and timing of a respective system information block transmitted via the shared transport channel.

[0043] In a variation of the embodiment, the control information further comprises identification of the logical channel-to-transport channel mapping.

[0044] In another embodiment of the invention part of control information is transmitted in the headers of shared transport channel packets and comprises an identification of the logical channel to transport channel mapping.

[0045] In both embodiments above, the identification of the logical channel-to-transport channel mapping may be made by including a plurality of configured or default identifiers to the control information as transmitted on master information block.

[0046] In a further embodiment of the invention the system broadcast information comprises information on the configuration of at least one shared transport channel of a neighboring radio cell.

[0047] Another embodiment of the invention relates to the reception of broadcast system information in a radio access network of a mobile communication system by a mobile terminal. The mobile terminal may receive a master information block of a broadcast control logical channel via a broadcast transport channel. The master information block may comprise control information associated to a respective one of a plurality of system information blocks used to convey the broadcast system information. Further, the associated control information may indicate to the mobile terminal whether a respective system information block of a plurality of system information blocks conveying the broadcast system information is mapped to the broadcast transport channel or a shared transport channel. The mobile terminal may receive system information blocks of a broadcast control logical channel on a shared transport channel or a broadcast transport channel according to the indication in the master information block.

[0048] In case a system information block is to be received via the shared transport channel, a variation of the embodiment foresees comprising a configuration of the shared transport channel to which the system information block is mapped, further associated control information in the master information block, and identifying the shared transport channel on which the system information block is mapped among a plurality of shared transport channels based on the indication in the associated control information of the master information block to receive the system information block via the identified shared channel and transmitted configured or default identifier. The configuration may for example be a set of transmission format parameters. The indication of the mapping of individual SIBs to the shared transport channel may for example be made by using configured or default identifiers, each identifying an associated transport channel in the system.

[0049] In another embodiment of the invention the mobile terminal may receive control information on a physical control channel associated to the shared data channel. The associated control information may indicate the transmission format and timing of a respective system information block transmitted via the shared transport channel. The mobile terminal may utilize the indicated transmission format and timing for receiving the respective system information block via the shared transport channel.

[0050] Further, in an embodiment of the invention, the system broadcast information received by the mobile terminal may also comprise information on the configuration of at least one shared transport channel of a neighboring radio cell and the mobile terminal may use the information on the configuration of at least one shared transport channel of a neighboring radio cell for receiving broadcast system information in the neighboring radio cell, in case the mobile terminal is handed over to the neighboring radio cell.

[0051] Another embodiment of the invention provides a transmission apparatus in a radio access network for transmitting broadcast system information in the radio access network of a mobile communication system. The transmission apparatus may comprise a processor to map system information blocks of a broadcast control logical channel to a shared transport channel and a broadcast transport channel depending on a property of a respective system information block or the mobile terminals to receive the broadcast system information. Further, it may comprise a transmitter to transmit the system information blocks via the shared transport channel and the broadcast transport channel, respectively.

[0052] In a variation of the embodiment, the transmission apparatus is configured to perform the steps of the method for transmitting broadcast system information according to one of the various embodiments and variations described herein.

[0053] A further embodiment of the invention relates to a mobile terminal for receiving broadcast system information in a radio access network of a mobile communication system. According to this exemplary embodiment the mobile terminal comprises a receiver for receiving a master information block of a broadcast control logical channel via a broadcast transport channel. Moreover, the mobile terminal may be configured with a processor for obtaining control information from the master information block. This control information is associated to a respective one of a plurality of system information blocks used to convey the broadcast system information and may indicate whether a respective system information block is mapped to the broadcast transport channel or a shared transport channel. The receiver may further receive system information blocks of a broadcast control logical channel on a shared transport channel or a broadcast transport channel according to the indication in the master information block.

[0054] The mobile terminal according to another embodiment of the invention may be configured to perform the steps of the method for receiving broadcast system information according to one of the different embodiments and variations described herein.

[0055] Other embodiment of the invention relates to the implementation of the different aspects of the invention in software. Therefore, an embodiment of the invention provides a computer-readable medium storing instructions that, when executed by a processor of a transmission apparatus, causes the transmission apparatus to transmit broadcast system information in a radio access network of a mobile communication system. In this embodiment, the transmission apparatus is caused to transmit broadcast system information by mapping system information blocks of a broadcast control logical channel to a shared transport channel or a broadcast transport channel depending on a property of a respective system information block or the mobile terminals to receive the broadcast system information, and by transmitting the system information blocks via the shared transport channel and the broadcast transport channel, respectively.

[0056] The computer-readable medium according to another embodiment of the invention may further store instructions that cause the processor of the transmission apparatus to execute the steps of the method for transmitting broadcast system information according to one of the embodiments and variants described herein.

[0057] A further embodiment of the invention provides a computer-readable medium storing instructions that, when executed by a processor of a mobile terminal, causes the mobile terminal to receive broadcast system information in a radio access network of a mobile communication system.

[0058] The mobile terminal may be caused to receive broadcast system information by receiving a master information block of a broadcast control logical channel via a broadcast transport channel and by receiving system information blocks of a broadcast control logical channel on a shared transport channel or a broadcast transport channel according to the indication in the master information block. The master information block may comprise control information associated to a respective one of a plurality of system information blocks used to convey the broadcast system information. The associated control information indicates whether a respective system information block is mapped to the broadcast transport channel or a shared transport channel.

[0059] The computer-readable medium in another embodiment of the invention further stores instructions causing the processor of the mobile terminal to execute the steps of the method for receiving broadcast system information according to one of the various embodiment and variants thereof described herein.

BRIEF DESCRIPTION OF THE FIGURES

[0060] In the following the invention is described in more detail in reference to the attached figures and drawings. Similar or corresponding details in the figures are marked with the same reference numerals.

Fig. 1	shows the high-level architecture of UMTS,
Fig. 2	shows the architecture of the UTRAN according to UMTS R99/4/5,
Fig. 3	shows a Drift and a Serving Radio Subsystem in a UMTS network,
Fig. 4	shows an overview of the protocol model of the UTRAN in an UMTS network,
Fig. 5	shows an overview of the radio interface protocol architecture of the UTRAN,
Fig. 6	shows the structure of a Master Information Block (MIB),
Fig. 7 to 9	show examples of transmissions of Broadcast System Information (BSI) in System Information Blocks (SIBs) at different using different channel bandwidths,
Fig. 10	shows an exemplary mapping of system information blocks of broadcast system information to a broadcast transport channel and a shared transport channel using Layer 1 outband identification according to an embodiment of the invention,
Fig. 11	shows an exemplary format of a Master Information Block used in the mapping of system information blocks in Fig. 10 according to an embodiment of the invention,
Fig. 12	shows an exemplary mapping of system information blocks of broadcast system information to a broadcast transport channel and a shared transport channel using Layer 2 inband identification according to an embodiment of the invention,
Fig. 13	shows an exemplary format of a Master Information Block used in the mapping of system information

blocks in Fig. 12 according to an embodiment of the invention,

Fig. 14 to 17 show different examples of mapping of system information blocks to a shared transport channel and a broadcast transport channel based on different criteria according to different embodiments of the invention, and

Fig. 18 shows a mapping of system information blocks of broadcast system information comprising information on a shared transport channel in a neighboring radio cell to a broadcast transport channel and a shared transport channel and a handover of a mobile terminal to the neighboring radio cell according to an embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0061] The following paragraphs will describe various embodiments of the invention. For exemplary purposes only, most of the embodiments are outlined in relation to a UMTS communication system and the terminology used in the subsequent sections mainly relates to the UMTS terminology, as the invention may be advantageously used in this type of communication system. However, the terminology used and the description of the embodiments with respect to a UMTS system is not intended to limit the principles and ideas of the invention to such system.

[0062] Also the detailed explanations given in the Technical Background section above are intended to better understand the mostly UMTS specific exemplary embodiments described in the following and should not be understood as limiting general ideas underlying the invention to the described specific implementations of processes and functions in a mobile communication network.

[0063] According to one aspect of the invention, it is proposed to map broadcast system information of logical channels to a shared transport channel and/or to a broadcast transport channel. Broadcast system information may for example be information transmitted over a broadcast control logical channel.

[0064] In an embodiment of the invention, the mapping of different portions of the broadcast system information, also referred to as system information blocks herein, to either one of the two transport channels is based on a certain criterion or certain criteria. For example, criteria that may be used as a basis for the mapping decision may be intrinsic property of a system information block or an intrinsic property of the mobile terminals to which the system information is to be broadcast.

[0065] Examples for an intrinsic property of a system information block may be temporal variability of the information contained in the system information block or the size of the system information block. Another intrinsic property of a system information block is for example the necessity of the information comprised in the system information block for system access or the necessity of the information comprised in the system information block for tracking user location within the mobile communication system.

[0066] An intrinsic property of the mobile terminals may for example be the capability of terminals to support feature (s) defined optional within the mobile communication system.

[0067] The mapping of system information blocks to a shared or broadcast transport channel can be advantageous in that the acquisition of this information by mobile terminals in terms of terminal processing time and power consumption may be optimized. Other advantages that may be achieved when applying the invention may be improved reading time for broadcast system information of mobile terminals for all sizes of standalone spectrum allocations, greater flexibility of operators in configuring transport channels for broadcast and increased scheduling efficiency of system information, which may be a result from mapping system information to a shared transport channel.

[0068] Another aspect of the invention is the behavior of the mobile terminals to receive the broadcast system information. According to another embodiment of the invention, the mobile terminals will receive a master information block on the broadcast transport channel, which indicates the mapping of individual SIBs to either the broadcast transport channel or the shared transport channel. Based on the indication of the mapping used, the mobile terminals will receive the SIBs either on the broadcast control channel or the shared control channel. In another embodiment of the invention, Layer 1 outband or Layer 2 inband identification is used for providing the mobile terminals with control information necessary to appropriately receive the SIBs, as will be outlined in more detail below.

[0069] In the following the structure of system broadcast information and their allocation to different System Information Blocks (SIBs) according to an exemplary embodiment of the invention is outlined considering a UMTS system. The structure of the information transmitted on the broadcast control channel - a logical channel - may be tree-like. A so-called Master Information Block (MIB) forms the root of the tree structure, whereas the so-called System Information Blocks (SIBs) represent its branches. The MIB information may be transmitted less frequently than the SIBs carrying the broadcast system information. The information in the MIB may also not need to be read by the individual terminals each time the MIB information is transmitted.

[0070] The structure of the information on the BCCH is shown for exemplary purpose in Fig. 6. One part of MIB may for example be reserved for information upon each System Information Block. The control information associated to a respective SIB and comprised in the reserved parts may have the following structure. Each control information associated to a SIB may indicate the position of SIB on the broadcast transport channel on which it is transmitted relative to common timing reference. Further, a repetition period of SIB may be indicated. This repetition period indicates the periodicity at which the respective SIB is transmitted. The control information may further include a timer value for timer-based update mechanism or, alternatively, a value tag for tag-based update of the SIB information.

[0071] For SIBs whose reference in MIB contains timer value, a mobile terminal may update system information after expiry of value indicated in timer field of MIB. For SIBs whose reference in MIB contains value tag, a mobile terminal may update system information after the value of tag as indicated in respective field of MIB has been changed with respect to the value from the previous update. Respective exemplary MIB formats according to different embodiments of the invention will be described with reference to Fig. 11 and 13 below.

[0072] The table below shows an exemplary overview of the categorization and types of system information blocks in an UMTS legacy system (see 3GPP TS 25.331, "Radio Resource Control (RRC)", version 6.7.0, section 8.1.1, incorporated herein by reference; available at http://www.3gpp.org) that may be used in the different embodiments of the invention described herein. In this example, the classification of the system broadcast information into the different SIBs is based on the content and temporal variability.

Table 5

SIB	Content	Temporal Variability
SIB1	NAS info, UE timers/counters	low
SIB2	URA identity	low
SIB3	Cell selection parameters	low
SIB4	Cell selection par. for connected mode	low
SIB5	Common physical channels configuration	medium
SIB6	Common physical channels configuration	medium
SIB7	Interference/ dynamic persistence level	high
SIB11	Measurement control	medium
SIB12	Measurement control information for connected mode	medium
SIB13	ANSI-41 info	low
SIB14	Outer loop power control information	medium
SIB15	Positioning information	low
SIB16	Preconfiguration	medium
SIB17	Configuration of shared physical channels in connected mode	high
SIB18	PLMN IDs of neighboring cells	low

[0073] The contents of the table illustrated above should be only considered as one possible example of the contents and classification of the broadcast system information. Also the classification of the frequency at which the different portions of the system information is broadcast and its classification into the different SIBs is intended to serve only for exemplary purposes and is not intended to limit the invention to this example. It is recognized that in the ongoing development and improvement of existing mobile communication systems, the content, format, periodicity of transmission, etc. may change.

[0074] Fig. 10 shows an exemplary mapping of system information blocks of broadcast system information to a broadcast transport channel and a shared transport channel using Layer 1 outband identification according to an embodiment of the invention. In Fig. 10, the data mapped to three different channels, a broadcast transport channel, a shared transport channel and a physical control channel associated to the shared transport channel, is shown. The control channel is associated to the shared transport channel in that it contains control information describing transmission format and timing of the data on the shared transport channel. In another embodiment of the invention the parameters describing transmission format may define the format for an OFDMA based radio access as described in Tdoc R1-050604 of the 3GPP TSG RAN WG #1 ad hoc, "Downlink Channelization and Multiplexing for EUTRA", June 2005 (available at http://www.3gpp.org), incorporated herein by reference).

[0075] Further, the mobile terminal (or, equivalently, logical to transport channel mapping) to receive the system information may be designated by respective Layer 1 outband identification as discussed previously. Accordingly, the logical-to-transport channel mapping is indicated on the associated physical control channel (e.g. SCSCH).

[0076] The broadcast system information provided on the broadcast control logical channel (e.g. the BCCH in UMTS), is mapped to the shared transport channel and the broadcast transport channel of Fig. 10.

[0077] For the broadcast transport channel, three transport blocks are shown in Fig. 10. In the exemplary embodiment, a Master Information Block (MIB) is transmitted periodically (MIB repetition period). For example, the MIB may be transmitted at the beginning of each transport block or after a predetermined time span, such as a given number of transmission time intervals (TTIs). Further, a transport block may comprise one or more System Information Blocks (SIBs). A SIB comprises a portion of the system broadcast information to be transmitted. For example, each SIB may comprise a predetermined or configurable set of information of a certain category as exemplified in the Table 5.

[0078] The MIB used in the exemplary embodiment shown in Fig. 10 is illustrated in Fig. 11 in further detail. The structure of system broadcast information according to this embodiment of the invention is also tree-like, as has been outlined above. The MIB comprises different partitions of control information each of these partitions being associated to a respective SIB.

[0079] For those SIBs that are mapped to the broadcast transport channel for transmission, the control information associated to a respective SIB may have the following structure. Each control information associated to a SIB (pointer to SIB #n) indicates the position of the SIB on the broadcast transport channel on which it is transmitted relative to common timing reference. Further, a repetition period of SIB indicating the periodicity at which the respective SIB is transmitted may be indicated. In the exemplary embodiment shown in Fig. 10, the control information in the MIB associated to SIB1, SIB3, SIB 4 and SIB6 have this structure.

[0080] In contrast to SIB1, SIB3, SIB 4 and SIB6, SIB2 is transmitted via the shared transport channel. The MIB control information relating to SIB2 has a different structure than the control information for the set of SIBs. According to the exemplary embodiment, the control information for SIB2 in the MIB comprises an indication of the shared transport channel on which SIB2 is transmitted. This indication is illustrated by the dashed arrow pointing from the MIB to the shared transport channel in Fig. 10.

[0081] Based on the control information in the MIB, the mobile terminals may recognize which SIBs are transmitted and to which channel they are mapped. I.e. in the exemplary embodiment, the mobile terminals determine that SIB1, SIB3, SIB4 and SIB6 are mapped to and transmitted on the broadcast transport channel, while SIB2 is mapped to and transmitted on the shared transport channel.

[0082] As indicated above, Layer 1 outband identification is used for indicating the logical channel-to-transport channel mapping to the receiving mobile terminals. For this purpose and identification of the mapping is transmitted on the associated control channel (see "ID"). This identification may for example use default or configured identifiers of the logical channel to which a respective transport channel is to be mapped on the receiving side. These identifiers may be transmitted by in the MIB.

[0083] The identifiers may for example be HEX-values:

- ■ 0x0000 00FF logical channel BCCH (Broadcast Control Channel) is mapped upon SDCH,
- ■ 0x0100 01 FF logical channel PCCH (Paging Control Channel) is mapped upon SDCH and
- ■ 0x0200 FFFF logical channel DCCH/DTCH (Dedicated Control Channel/ Dedicated Transport Channel) is mapped upon SDCH

[0084] The identifiers used may be default values or may be configured by the system.

[0085] The control channel associated to the shared transport channel comprises control information, which indicates the scheduling of the SIB on the shared transport channel. The control information may at least indicate temporal position of the SIB(s) mapped to the shared channel on that channel for a respective SIB. In another embodiment of the invention the control information on the associated control channel is scheduling information as shown in Table 3 above and may comprise information on chunk allocation, data modulation and transport block size. According to an embodiment of the invention the transmission format parameters may be defined as in in Tdoc R1-050604 3GPP TSG RAN WG1 ad hoc "Downlink Channelisation and Multiplexing for EUTRA". mentioned above,

[0086] Hence, in the exemplary embodiment shown in Fig. 10, the MIB control information indicate to the mobile terminal that SIB2 has been mapped to the shared transport channel, while the control information for SIB on the associated control channel indicates the temporal position of SIB2 on the shared channel to a receiving mobile terminal and transmission format.

[0087] According to one embodiment of the invention, the temporal position can be given as dynamically changing scheduling information with respect to common system timing reference. An exemplary implementation is for example described in the TS 25.331 "Radio Resource Control (RRC)" mentioned above. As explained above, the transmission format may indicate at least chunk allocation, data modulation and transport block size. Finally, although not explicitly mentioned, a configuration of the associated physical control channel (e.g. SCSCH) may also be necessary.

[0088] Returning to the transmission of broadcast system information in UMTS systems for exemplary purposes only, Layer 1 outband identification and transmission of scheduling information are specific for shared downlink transport channel while scheduling information of system information blocks conveyed via broadcast transport channel is transmitted within the Master Information Block of the broadcast transport channel, that is within Layer 2 transport blocks. The configuration of the broadcast transport channel may be for example semi-static, while the configuration of the shared downlink transport channel may be semi-static or dynamic. The flexibility of dynamic configuration of the shared transport channel in this embodiment of the invention may be advantageous from radio resource utilization perspective since fast scheduling of broadcast system information could be efficiently supported.

[0089] In an exemplary embodiment of the invention, the shared transport channel may be the Shared Downlink CHannel (SDCH) of a UMTS system, while the broadcast transport channel may be the Broadcast CHannel (BCH); the control channel associated to the SDCH may be the Shared Control Signaling Channel (SCSCH).

[0090] Fig. 12 shows another exemplary mapping of system information blocks of broadcast system information to a broadcast transport channel and a shared transport channel using Layer 2 inband identification according to another embodiment of the invention.

[0091] In the exemplary embodiment illustrated in Fig. 12, a shared channel is used without the need of an associated (physical) control channel for identification. As in the embodiment of the invention described with respect to Fig. 10 and 11, also in the embodiment shown in Fig. 12 broadcast system information is mapped to a broadcast transport channel and a shared transport channel. The identifier ("ID) indicating the logical channel-to-transport channel mapping and semi-static configuration information (timing and transmission format) of the shared channel (e.g. SDCH) and configuration of associated physical control channel (e.g. SCSCH) are transmitted inband. This means that both pieces of information are transmitted at Layer 2. For example, the identification ("ID") may be provided within the header of Layer 2 packets of the shared transport channel, while the configuration information of shared channel may be provided within MIB.

[0092] The identifier ID may be a default identifier or may be configured/assigned through MIB of the broadcast transport channel, as described above. Fig. 13 shows an exemplary format of a Master Information Block used in the mapping of system information blocks in Fig. 12. The structure of the control information for SIBs mapped to the broadcast transport channel is similar to that in the MIB shown in Fig. 11. The MIB control information of the SIBs mapped to the shared transport channel may in addition comprise an indication of the shared transport channel to which they have been mapped respectively.

[0093] In the following paragraphs the mapping of the system information blocks transporting the individual portions of the broadcast system information of the broadcast control logical channel according to different embodiments will be described. In the following embodiments of the invention described with respect to Fig. 14 to 18, the broadcast system information is transmitted in system information blocks that are mapped to a broadcast transport channel or a shared transport channel using either Layer 1 outband identification (Fig. 10 and 11) or Layer 2 inband identification (Fig. 12 and 13). As will be explained in the following, the mapping may be based for example on a property / properties inherent to a respective SIB or the mobile terminals to receive the SIBs.

[0094] Fig. 8 and 9 show the transmission of broadcast information over broadcast transport channel on a time axis. Fig. 8 is plotted for spectrum allocation of 5 MHz and broadcast data rate of 16 kbps. Fig. 9 is plotted for spectrum allocation of 10 MHz and broadcast data rate of 32 kbps.

[0095] In Fig. 14 to 18, the spectrum allocation of either 5 MHz or 10 MHz is assumed and respective data rates of 16 or 32 kbps are (usually unevenly) distributed between broadcast and shared transport channel. By mapping broadcast system information to broadcast and shared transport channels a more flexible transmission scheme for broadcast system information may be in comparison to cases where broadcast system information is mapped only to a broadcast transport channel. For example, in Fig. 15 the data rate of broadcast and shared transport channel is divided in ratio 3: 1 since the resulting data rate on the shared channel is sufficient to transmit SIB1 over the shared transport channel in one TTI, as will be explained below.

[0096] It should be noted that the actual resource utilization is not precisely plotted in Fig. 8, 9 and 14 to 18.

[0097] According to one embodiment of the invention, a criterion based on which the mapping of SIBs to either a shared transport channel or a broadcast transport channel is decided, may be the importance of the information of a respective SIB for mobile terminals.

[0098] Information important for mobile terminals may for example be system information that is necessary to be received, stored and kept up-to-date by mobile terminal in order to perform system access and elementary mobility procedures.

[0099] Considering for exemplary purposes only a UMTS system, system access may designate the procedure aimed at establishing signaling connection (signaling radio bearer). Hence, in this exemplary scenario the important information is information necessary for the mobile terminal to establish a signaling connection. Elementary mobility procedures on the other hand designate the procedures aimed at tracking user location by the network on tracking area level - without established signaling connection - and on cell level - with established signaling connection.

[0100] Following the definition of important information and considering the exemplary classification of broadcast system information as shown in Table 5, SIB1, SIB2, SIB3, SIB5, SIB6, SIB17 and SIB18 may be classified as information important for mobile terminals, since they are necessary for performing system access and elementary mobility procedures. On the other hand, for example SIB13 and SIB15 may be classified as information not important (optional) for mobile terminals since they are not necessary for performing system access and elementary mobility procedures.

[0101] Fig. 14 shows an exemplary mapping of system information blocks to a shared transport channel having a 5 MHz spectrum allocation and a data rate of 8 kbps and a broadcast control channel also having a 5 MHz spectrum allocation and a data rate of 8 kbps according to an embodiment of the invention. Fig. 14 proposes a mapping overcoming the problems discussed with respect to Fig. 8, where the mobile terminal had to receive two successive TTIs to obtain the important SIB8. In Fig. 14, SIB8 is now mapped to the shared transport channel, which allows transmitting SIB8 in a single TTI, thereby reducing power consumption of the mobile terminal. Further, the MIB can be transmitted simultaneously (i.e. in the same TTI) as SIB8 which allows the mobile terminal to acquire the important information in SIB8 faster compared to the scenario in Fig.8.

[0102] In the exemplary embodiment shown in Fig. 14, the mapping of SIB8 to the shared channel has been based on the importance of the information contained in SIB8 for the mobile terminals. Another criterion may be the size of the SIBs. For example, SIBs larger than a predetermined threshold may be mapped to the shared transport channel. For example, this option may be of advantage, if several TTIs would be required for the transmission of the SIB of broadcast transport channel and/or the shared transport channel can be sent with higher data rate than that used for the broadcast transport channel.

[0103] Fig. 15 shows an exemplary mapping of system information blocks to a shared transport channel having a 10 MHz spectrum allocation and a data rate of 24 kbps and a broadcast control channel also having a 10 MHz spectrum allocation and a data rate of 8 kbps according to an embodiment of the invention. This exemplary embodiment illustrates an improvement of the system information allocation in Fig. 9, where SIB1 has been the only SIB containing information relevant for the mobile terminal (the MIB may not be read every time it is transmitted). Though the mobile terminal may only be interested in the content of SIB1 of Fig. 9, it would need to read the whole content broadcast on the broadcast transport channel within a TTI, since receivers may typically only be tuned to receive data within a whole TTI.

[0104] According to the embodiment illustrated in Fig. 15, the SIB(s) comprising information important for the mobile terminals are mapped to the shared transport channel, while SIBs carrying optional information, i.e. information not important for the mobile terminals are mapped to the broadcast transport channel. Assuming that the content of SIB2 and SIB3 in Fig. 15 is optional information and that the mobile terminal may not need to read the MIB in this TTI, the mobile terminal may only read the shared transport channel carrying SIB1 from the shared transport channel and may save power by not reading the broadcast transport channel in that TTI.

[0105] Further, considering that the data rates on shared transport channel and broadcast transport channel may vary from each other, another benefit of the mapping of SIBs to a shared transport channel offering a lower data rate than the broadcast transport channel may be an increase in the reliability of the transmitted information in the SIBs transmitted on the shared transport channel. Since a lower data rate may also imply a lower coding rate and/or a lower order modulation scheme being used compared to the configuration of the broadcast control channel, the information transmitted via the shared transport channel may have a higher reliability. In UMTS systems, the configuration of the broadcast transport channel may be static and hence its data rate may not be changed.

[0106] Another criterion that may be considered for mapping of SIBs to a shared transport channel or a broadcast transport channel may be the features supported by the mobile terminals within a certain cell. For example, if none of the mobile terminals currently present in a cell are supporting positioning based on GPS (Global Positioning System), the related SIB may be omitted from broadcast on the broadcast transport channel and may be instead transmitted via a shared transport channel. Advantageously, the SIB may be transmitted during discontinuous reception (DRX) periods on the shared transport channel, if mobile terminals supporting GPS connect / are handed over to the cell. Hence resources can be dynamically shared with user plane data.

[0107] Fig. 16 shows a mapping of SIBs to a shared or broadcast transport channel based on the variability of the information in the respective SIB according to an embodiment of the invention. SIBs that comprise broadcast system information of high variability may be mapped to the shared transport channel. Considering a classification of broadcast system information as shown in Table 5 above, e.g. physical channel configuration, interference and dynamic persistence level may be considered SIBs comprising information undergoing frequent changes. Further, as indicated above, depending on the data rate distribution between the broadcast transport channel and the shared transport channel, the transmission of frequently changing SIBs via the shared transport channel may allow for lower repetition periods or alternatively increase the reliability of the transmission of the respective SIBs.

[0108] To generically classify information according to temporal variability, rates f1 and f2 (f1<f2) describing frequency

of change of this information may be considered. For example, an information (SIB) may be classified to be of low temporal variability, if its rate of change f relates to f1 as f<=f1. Analogously, information may be of high temporal variability, if its rate of change f relates to f2 as f>=f2. Finally, information is of medium temporal variability, if its rate of change f relates to f1 and f2 as f1<f<f2.

[0109] Another possible mapping of SIBs to a shared transport channel and a broadcast transport channel according to a further embodiment of the invention is shown in Fig. 17. In this exemplary embodiment only optional information (i.e. information not important for the mobile terminals) is mapped upon shared channel. The optional information may for example be ANSI 42 information or GPS information. This mapping may be beneficial in that the mobile terminals would only need to acquire necessary information from broadcast transport channel and without reading shared transport channel. Only if a mobile terminal would support a feature for which the optional information is needed, it may read the respective SIBs from the shared transport channel.

[0110] In another embodiment of the invention, the configuration of shared transport channel used for the transmission of broadcast system information in neighboring cells may be broadcast to the mobile terminals of a cell. Accordingly, Fig. 18 shows a mapping of system information blocks of broadcast system information comprising information on a shared transport channel in a neighboring radio cell to a broadcast transport channel and a shared transport channel and a handover of a mobile terminal to the neighboring radio cell according to an embodiment of the invention. In the exemplary embodiment, it may be assumed that the shared transport channel in a respective cell is used to provide system broadcast information to the mobile terminals that is important information, i.e. information necessary to perform system access and elementary mobility procedures.

[0111] In Fig. 18, at the time instant n+1 (the time instants are given by the number of TTIs having past since a given starting time) the mobile terminal starts receiving the MIB via the broadcast transport channel. Further it may be assumed that SIB8 in each radio cell comprises information necessary to perform system access and elementary mobility procedures. The dashed blocks are intended to indicate, that the mobile terminal receiving the information is located in a source cell, when receiving the information. The MIB received in the TTI following time instant n+1 may comprise an indication to the shared transport channel at which SIB8 is broadcast in a neighboring cell(s). Alternatively, a SIB containing this information may be specified by the MIB (for example SIB3 read by the mobile terminal at the TTI starting at time instant n).

[0112] Upon the time instant n+2, the mobile terminal is handed over from its source cell to another cell, the target cell. Since it has already acquired the control information necessary to receive SIB8 on the shared transport channel, the mobile terminal may already read SIB8 from the shared transport channel of the target cell at time instant n+2. Hence, the mobile terminal may not need to receive the first MIB in the target cell transmitted at time instant n+3 on the broadcast transport channel to be able to read SIB8 from the shared transport channel at time instant n+4.

[0113] More generally, information on the configuration of the neighboring cells (including the target cell) may be provided as part of the broadcast system information within a cell. The configuration information on the neighboring cells may be for example included in a system information block or may be provided as part of the MIB to the mobile terminals of a radio cell. The configuration information may depend on the respective mapping used for transmission of the broadcast system information via the shared transport channel and the broadcast transport channel in a respective neighboring cell.

[0114] If a configuration as shown in Fig. 10 is used, the MIB may comprise chunk allocation and possibly modulation format, transport block size etc. of the control physical channel associated to the shared transport channel in the neighboring cell(s). The associated physical control channel in the neighboring cell then contains chunk allocation, modulation format, transport block size etc. for the shared transport channel in the neighboring cell. This information may be changed on a dynamic basis in the neighboring cell.

[0115] Alternatively, when using a configuration as shown in Fig. 12, the MIB in the source cell may comprise chunk allocation, modulation format, transport block size etc. for the shared transport channel in the neighboring cell(s). This information may for example be changed on semi-static basis in the neighboring cell.

[0116] In Fig. 10 to 18 illustrating various exemplary embodiments of the invention, the different SIBs have been distinguished by different numbers (SIB1, SIB2, SIB3, etc.). These numbers are merely intended to exemplarily indicate different information comprised by the respective SIB. However, in another embodiment of the invention the numbering of SIBs may indicate their respective content as indicated e.g. in Table 5.

[0117] Another embodiment of the invention relates to the implementation of the above described various embodiments using hardware and software. It is recognized that the various embodiments of the invention above may be implemented or performed using computing devices (processors). A computing device or processor may for example be general purpose processors, digital signal processors (DSP), application specific integrated circuits (ASIC), field programmable gate arrays (FPGA) or other programmable logic devices, etc. The various embodiments of the invention may also be performed or embodied by a combination of these devices.

[0118] Further, the various embodiments of the invention may also be implemented by means of software modules, which are executed by a processor or directly in hardware. Also a combination of software modules and a hardware implementation may be possible. The software modules may be stored on any kind of computer readable storage media, for example RAM, EPROM, EEPROM, flash memory, registers, hard disks, CD-ROM, DVD, etc.

Claims

1. A method for transmitting broadcast system information in a radio access network of a mobile communication system, the method comprising the following steps performed by a transmission apparatus:

    mapping system information blocks of a broadcast control logical channel to a shared transport channel or a broadcast transport channel depending on a property of a respective system information block or the mobile terminals to receive the broadcast system information, and
    transmitting the system information blocks via the shared transport channel and the broadcast transport channel, respectively.

2. The method according to claim 1, wherein the property of a system information block is at least one of the temporal variability of the information contained in the system information block, the size of the system information block, the necessity of the information comprised in the system information block for system access, and the necessity of the information comprised in the system information block for tracking user location within the mobile communication system.

3. The method according to claim 1 or 2, wherein the property of the mobile terminals is at least one of the capability to support an optional feature within the mobile communication system.

4. The method according to one of claims 1 to 3, further comprising the step of transmitting a master information block of a broadcast control logical channel periodically via the broadcast transport channel, wherein the master information block comprises control information associated to a respective one of the system information blocks, wherein the associated control information indicates whether a respective system information block is mapped to the broadcast transport channel or the shared transport channel.

5. The method according to claim 4, wherein in case a system information block is mapped to the shared transport channel, the associated control information comprises transmission format and timing of a respective system information block transmitted via the shared transport channel.

6. The method according to claim 4 or 5, wherein in case a system information block is mapped to the broadcast transport channel, the associated control information specifies at least the position of the respective system information block on the broadcast transport channel, the time interval at which the respective system information block is transmitted and a timer value- or value tag-based update mechanism to be utilized to update the information of the respective system information block.

7. The method according to one of claims 1 to 6, further comprising the step of transmitting control information on a control channel associated to the shared data channel, wherein the control information indicates to the transmission format and timing of a respective system information block transmitted via the shared transport channel.

8. The method according to the claim 7, wherein the control information further comprises identification of the logical channel to transport channel mapping.

9. The method according to one of claims 1 to 8, further comprising the step of transmitting control information via the shared transport channel, wherein the control information comprises an identification of the logical channel to transport channel mapping.

10. The method according to claim 8 or 9, wherein the identification of the logical channel to transport channel mapping is one of a plurality of configured or default identifiers.

11. The method according to claim 4, wherein the associated control information specifies at least the position of the respective system information block on the broadcast transport channel, the time interval at which the respective system information block is transmitted and a value- or value tag-based update mechanism to be utilized to update the information of the respective system information block.

12. The method according to one of claims 1 to 11, wherein the system broadcast information comprises information on the configuration of at least one shared transport channel of a neighboring radio cell.

13. A method for receiving broadcast system information in a radio access network of a mobile communication system, the method comprising the following steps performed by a mobile terminal:

receiving a master information block of a broadcast control logical channel via a broadcast transport channel, wherein the master information block comprises control information associated to a respective one of a plurality of system information blocks used to convey the broadcast system information, wherein the associated control information indicates whether a respective system information block is mapped to the broadcast transport channel or a shared transport channel, and
receiving system information blocks of a broadcast control logical channel on a shared transport channel and a broadcast transport channel according to the indication in the master information block.

14. The method according to claim 13, wherein in case a system information block is to be received via the shared transport channel, the associated control information in the master information block comprises a configuration of the shared transport channel to which the system information block is mapped, and
the method further comprises the step of identifying the shared transport channel on which the system information block is mapped among a plurality of shared transport channels based on the indication in the associated control information of the master information block to receive the system information block via the identified shared channel.

15. The method according to claim 13 or 14, further comprising the step of receiving control information on a control channel associated to the shared data channel, wherein the control information indicates the transmission format and timing of a respective system information block transmitted via the shared transport channel,
wherein the mobile terminal utilizes the indicated transmission format and timing for receiving the respective system information block on the shared transport channel.

16. The method according to one of claims 13 to 15, wherein the system broadcast information received by the mobile terminal comprises information on the configuration of at least one shared transport channel of a neighboring radio cell and
the method further comprises the step of utilizing the information on the configuration of at least one shared transport channel of a neighboring radio cell for receiving broadcast system information in the neighboring radio cell, in case the mobile terminal is handed over to the neighboring radio cell.

17. A transmission apparatus in a radio access network for transmitting broadcast system information in the radio access network of a mobile communication system, the apparatus comprising:

a processor for mapping system information blocks of a broadcast control logical channel to a shared transport channel and a broadcast transport channel depending on a property of a respective system information block or the mobile terminals to receive the broadcast system information, and
a transmitter for transmitting the system information blocks via the shared transport channel and the broadcast transport channel, respectively.

18. The apparatus according to claim 17, wherein the apparatus configured to perform the steps of the method according to one of claims 2 to 12.

19. A mobile terminal for receiving broadcast system information in a radio access network of a mobile communication system, the mobile terminal comprising:

a receiver for receiving a master information block of a broadcast control logical channel via a broadcast transport channel,
a processor for obtaining control information from the master information block, the control information being associated to a respective one of a plurality of system information blocks used to convey the broadcast system information, wherein the associated control information indicates whether a respective system information block is mapped to the broadcast transport channel or a shared transport channel, and

wherein the receiver is further adapted to receive system information blocks of a broadcast control logical channel on a shared transport channel and a broadcast transport channel according to the indication in the master information block.

20. The mobile terminal according to claim 19, wherein the apparatus configured to perform the steps of the method according to one of claims 13 to 16.

21. A computer-readable medium storing instructions that, when executed by a processor of a transmission apparatus, causes the transmission apparatus to transmit broadcast system information in a radio access network of a mobile communication system, by:

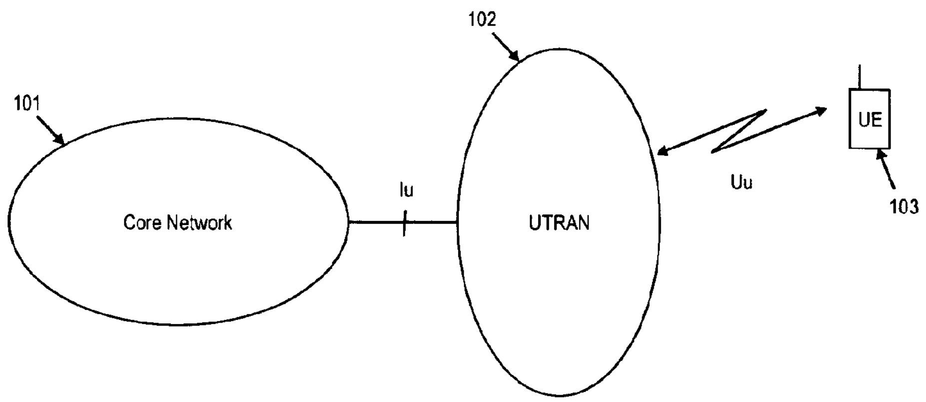
mapping system information blocks of a broadcast control logical channel to a shared transport channel or a broadcast transport channel depending on a property of a respective system information block or the mobile terminals to receive the broadcast system information, and
transmitting the system information blocks via the shared transport channel and the broadcast transport channel, respectively.

22. The computer-readable medium according to claim 21, further storing instructions causing the processor of the transmission apparatus to execute the steps of the method according to one of claims 1 to 12.

23. A computer-readable medium storing instructions that, when executed by a processor of a mobile terminal, causes the mobile terminal to receive broadcast system information in a radio access network of a mobile communication system, by:

receiving a master information block of a broadcast control logical channel via a broadcast transport channel, wherein the master information block comprises control information associated to a respective one of a plurality of system information blocks used to convey the broadcast system information, wherein the associated control information indicates whether a respective system information block is mapped to the broadcast transport channel or a shared transport channel, and
receiving system information blocks of a broadcast control logical channel on a shared transport channel or a broadcast transport channel according to the indication in the master information block.

24. The computer-readable medium according to claim 23, further storing instructions causing the processor of the mobile terminal to execute the steps of the method according to one of claims 13 to 16.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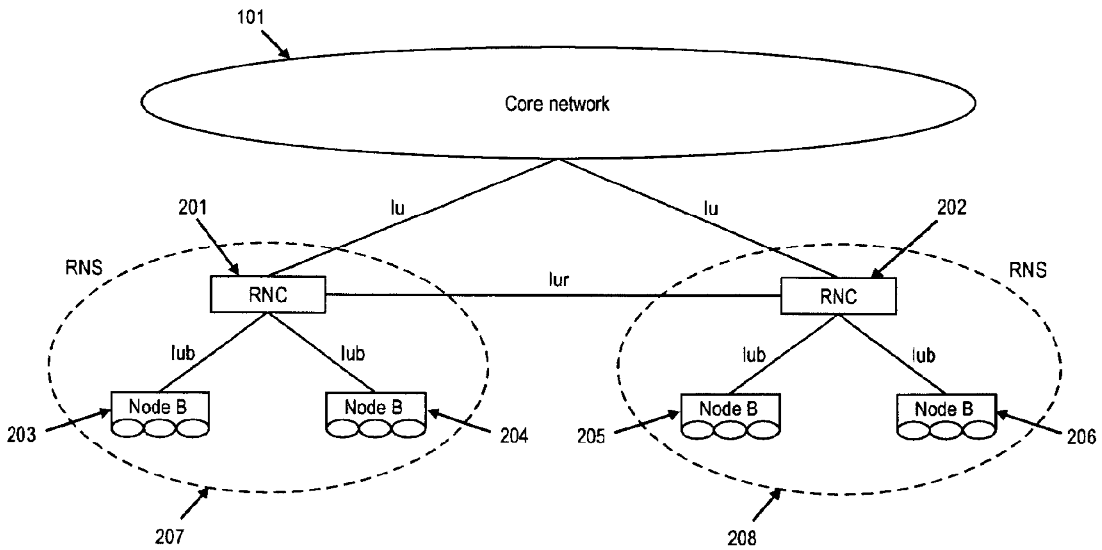
101
UE
Core Network
Iu
UTRAN
Uu
103

Fig. 1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201
Iu
Iu
202
RNS
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Iur
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Node B
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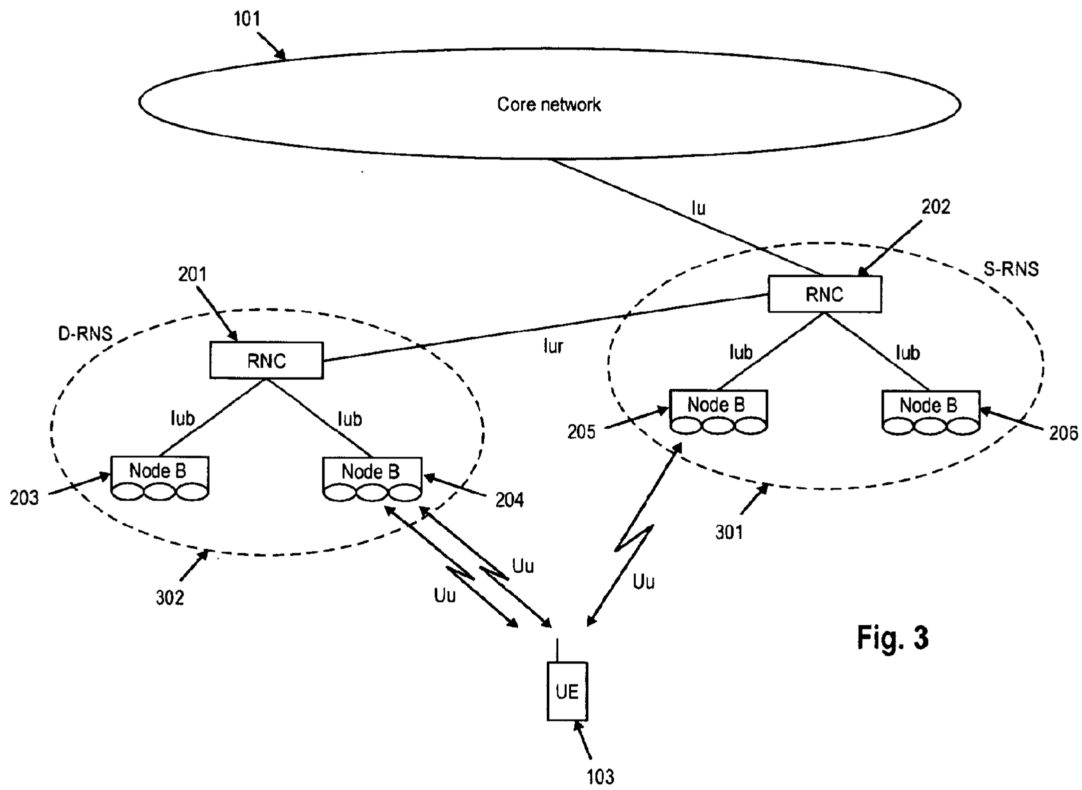
Node B
Node B
203
204
205
206
207
208

Fig. 2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204
301
Uu
Uu
Uu
302
UE
103

Fig. 3

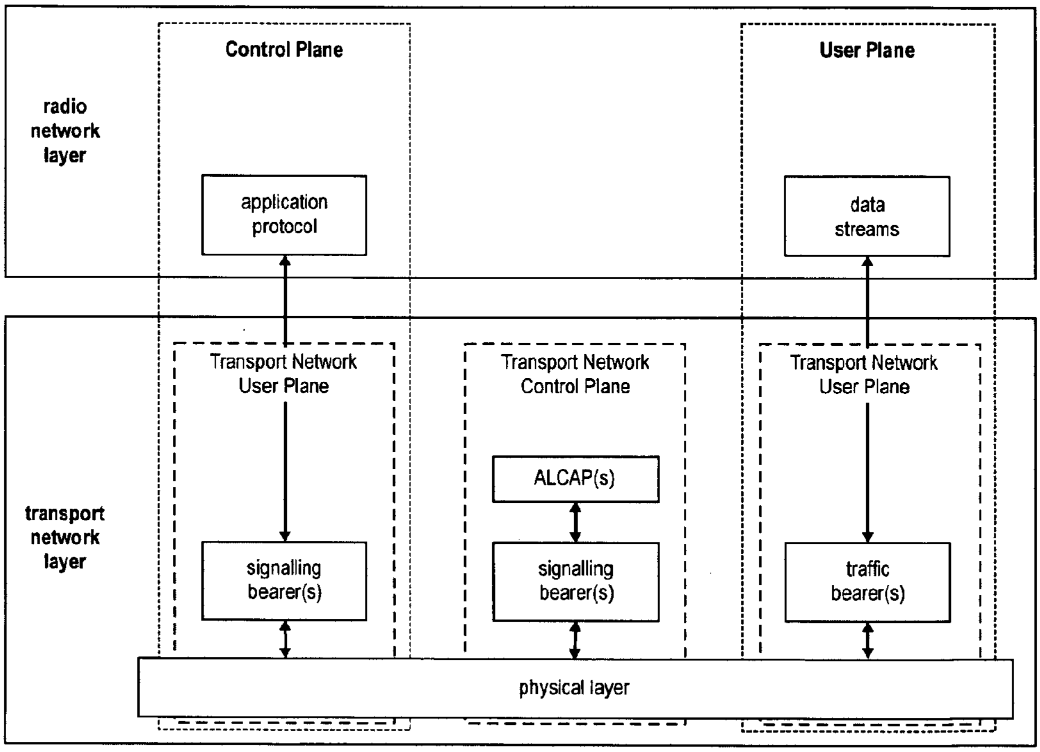

Control Plane
User Plane
radio network layer
application protocol
data streams
transport network layer
Transport Network User Plane
Transport Network Control Plane
Transport Network User Plane
ALCAP(s)
signalling bearer(s)
signalling bearer(s)
traffic bearer(s)
physical layer

Fig. 4

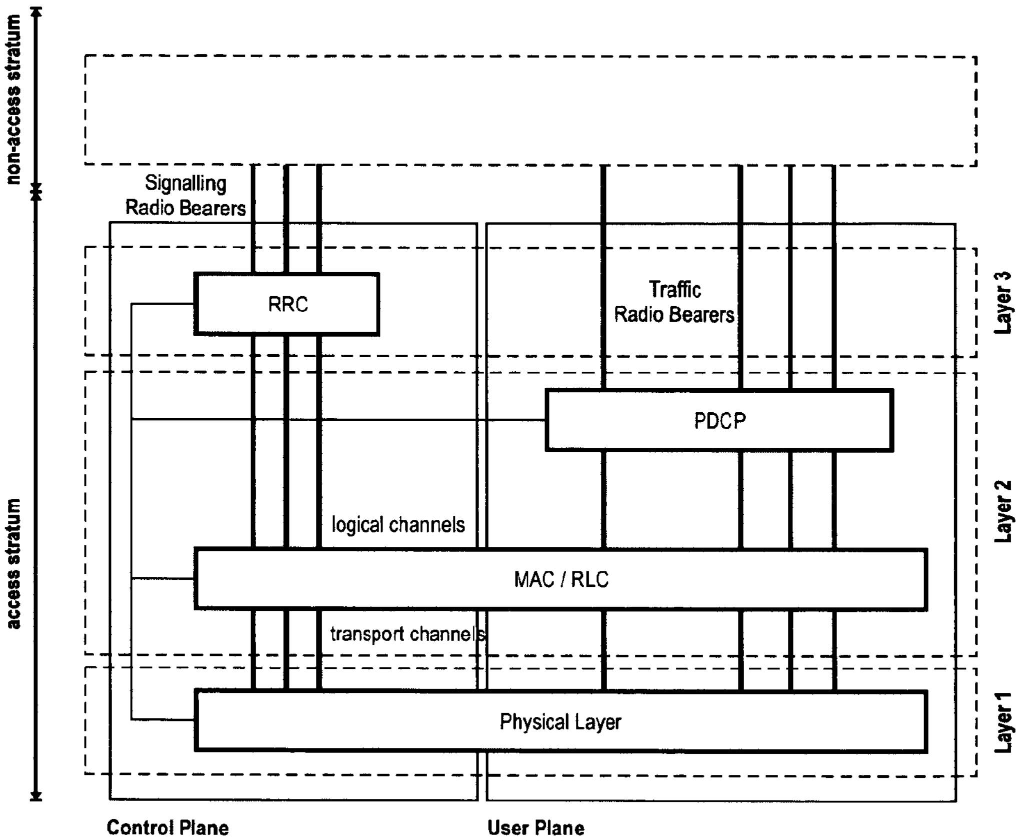

non-access stratum
access stratum
Signalling
Radio Bearers
RRC
Traffic
Radio Bearers
Layer 3
PDCP
logical channels
Layer 2
MAC / RLC
transport channels
Layer 1
Physical Layer
Control Plane
User Plane

Fig. 5

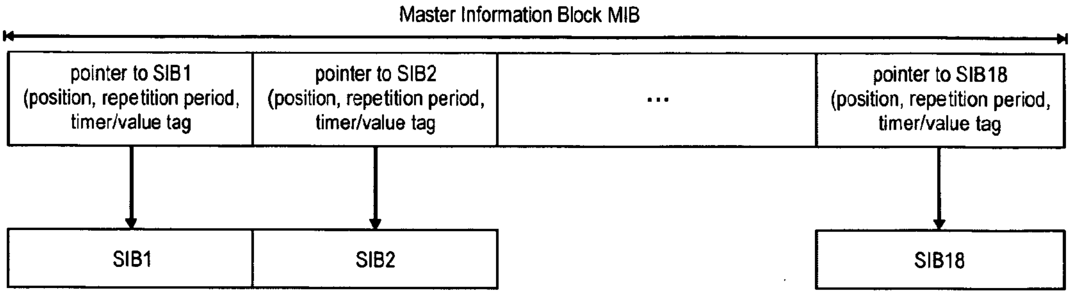


Fig. 6

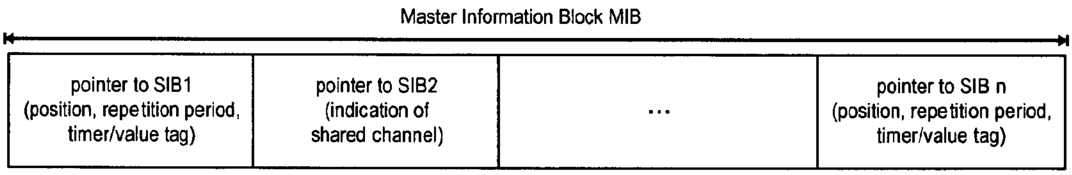


Fig. 11

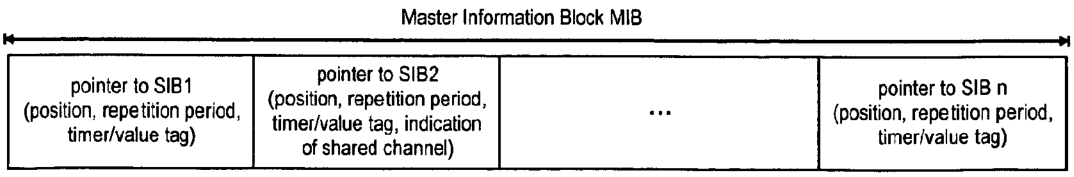


Fig. 13

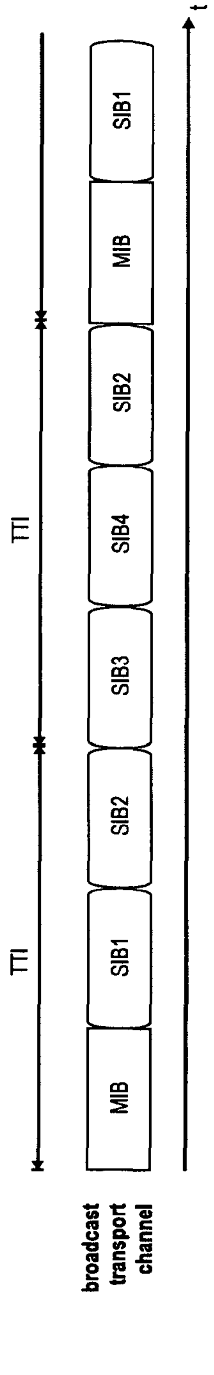


Fig. 7

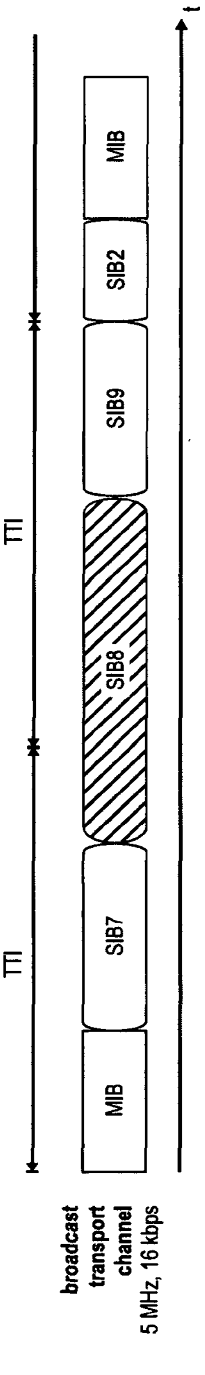


Fig. 8

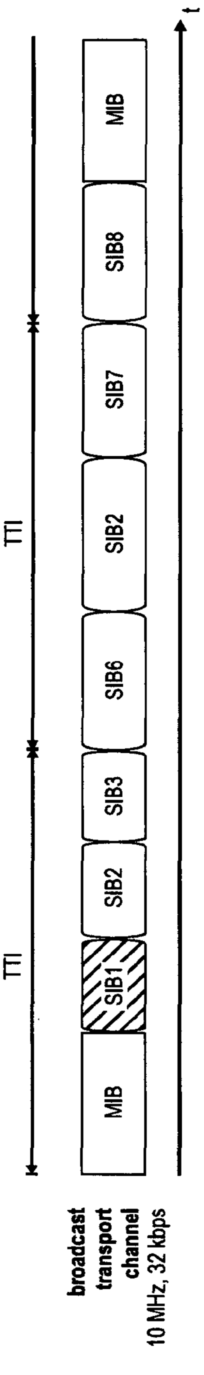
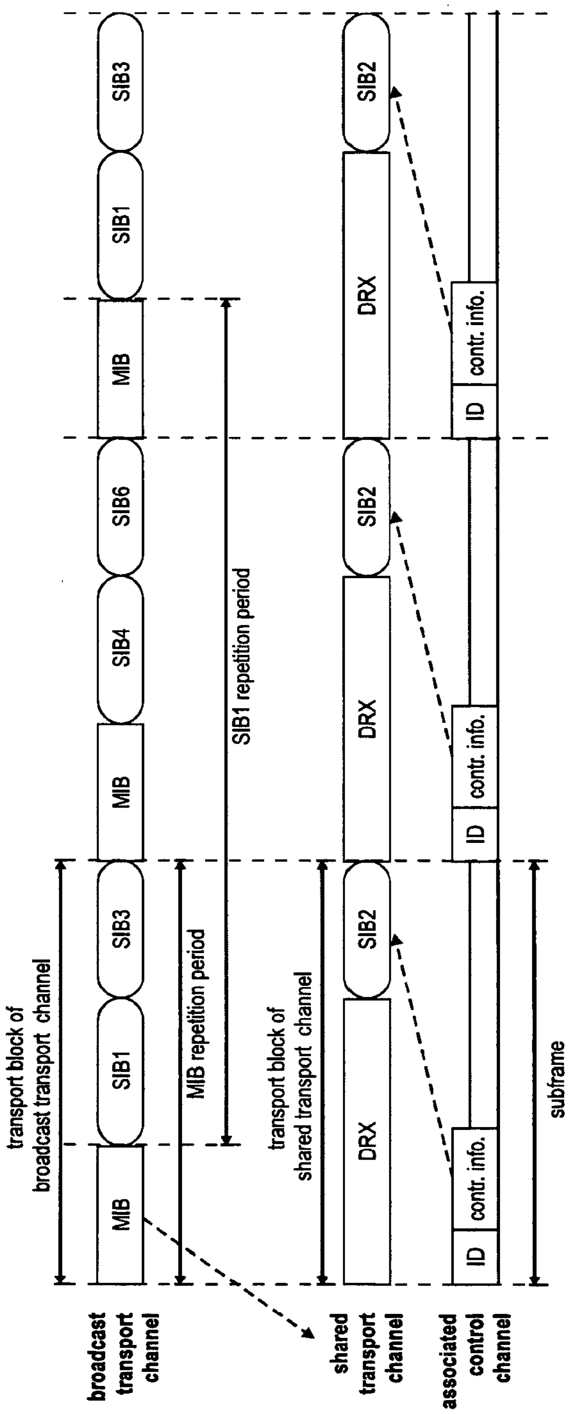


Fig. 9



broadcast transport channel
shared transport channel
associated control channel
transport block of broadcast transport channel
MIB repetition period
SIB1 repetition period
transport block of shared transport channel
subframe
MIB
SIB1
SIB3
MIB
SIB4
SIB6
MIB
SIB1
SIB3
DRX
SIB2
DRX
SIB2
DRX
SIB2
ID
contr. info.
ID
contr. info.
ID
contr. info.

Fig. 10

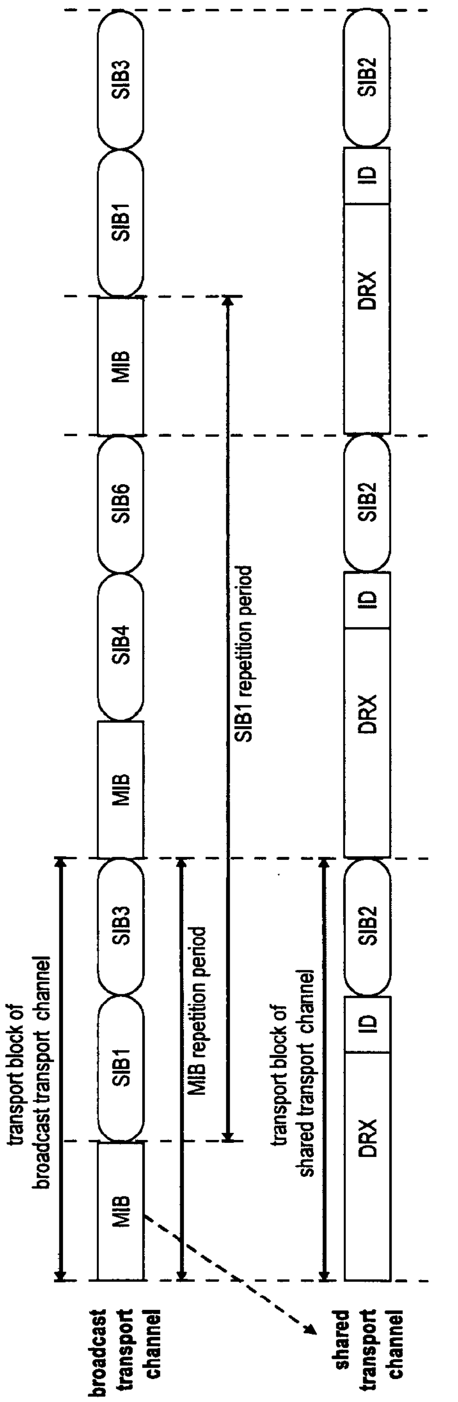

broadcast transport channel
shared transport channel
transport block of broadcast transport channel
MIB repetition period
SIB1 repetition period
transport block of shared transport channel
MIB
SIB1
SIB3
SIB4
SIB6
DRX
ID
SIB2

Fig. 12

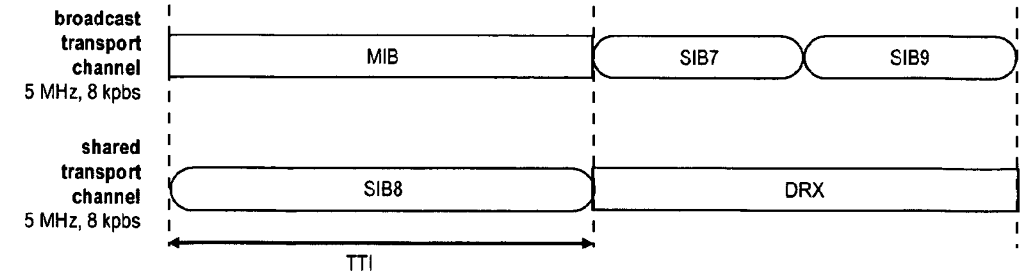


Fig. 14

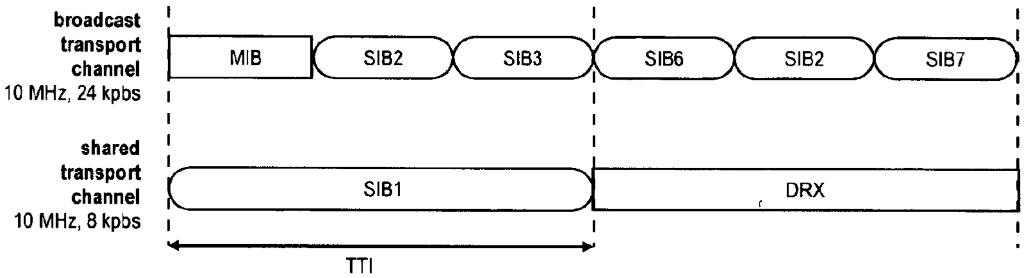


Fig. 15

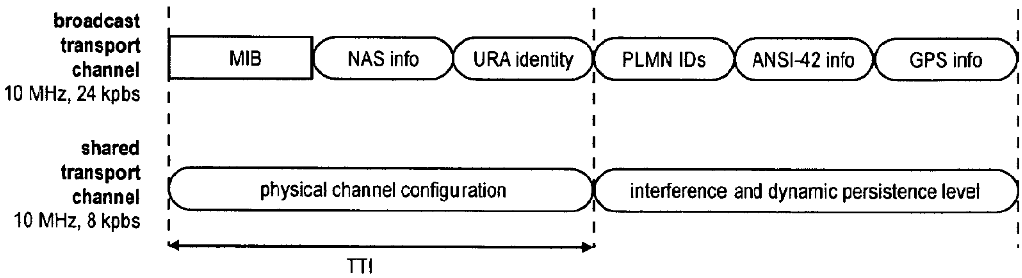


Fig. 16

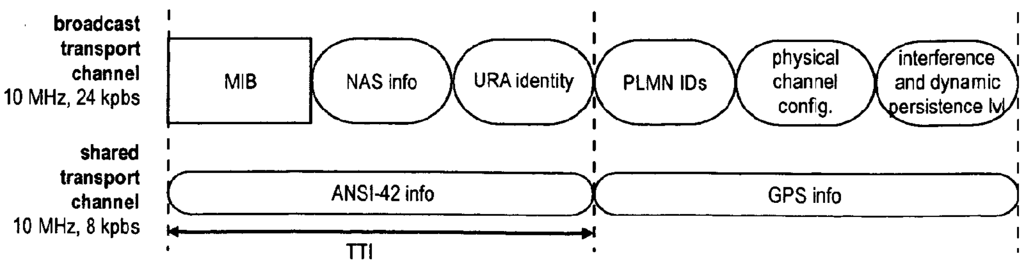


Fig. 17

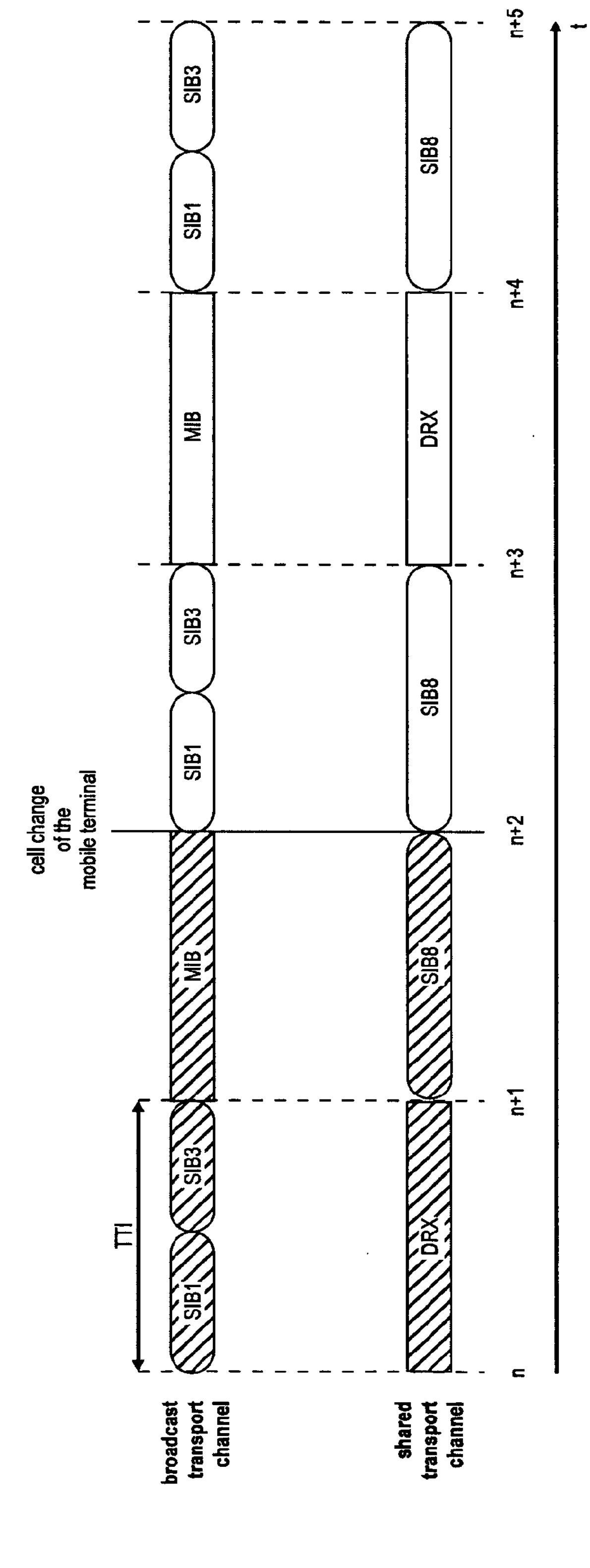

broadcast transport channel
shared transport channel
cell change of the mobile terminal
TTI
SIB1
SIB3
MIB
DRX
SIB8
SIB1
SIB3
SIB8
MIB
DRX
SIB1
SIB3
SIB8
n
n+1
n+2
n+3
n+4
n+5
t

Fig. 18

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 02 7214

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	US 2003/088695 A1 (KWAK YONG-JUN ET AL) 8 May 2003 (2003-05-08) * paragraphs [0029] - [0046] * * figures 1,4 * -----	1,17,21 2-12, 14-16, 18,20, 22,24	INV. H04Q7/38
A	WO 03/096717 A (INTERDIGITAL TECHNOLOGY CORPORATION) 20 November 2003 (2003-11-20) * paragraphs [0028] - [0042] * * figures 3-5 * -----	1-24	
A	WO 00/52943 A (NORTEL NETWORKS CORPORATION; BARANY, PETER, A; KULARATNA, SHAVANTHA; R) 8 September 2000 (2000-09-08) * page 11, line 14 - page 12, line 25 * * figure 7 * -----	1-24	
A	US 2005/041681 A1 (LEE YOUNG DAE ET AL) 24 February 2005 (2005-02-24) * paragraphs [0038] - [0053] * -----	1-24	TECHNICAL FIELDS SEARCHED (IPC) H04Q

The present search report has been drawn up for all claims

1

Place of search	Date of completion of the search	Examiner
Munich	15 May 2006	Goedhart, A

CATEGORY OF CITED DOCUMENTS

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The members are as contained in the European Patent Office EDP file on
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15-05-2006

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PCT

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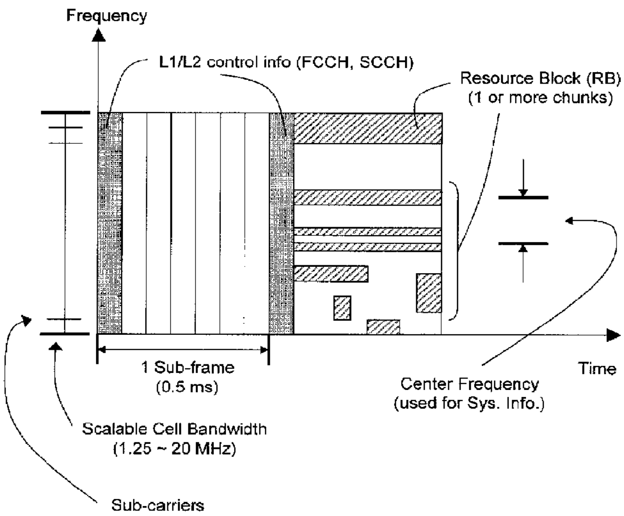
(54) Title: METHOD FOR PROCESSING PAGING INFORMATION IN A WIRELESS MOBILE COMMUNICATION SYSTEM



(57) Abstract: In a wireless mobile communications system, a method for processing paging information allows the operations of a mobile terminal to be simplified and permits efficient use of resources for the mobile terminal. The network instructs in advance, the transmission of control information, such as a particular paging message, a notification message, system information and the like, via a single indicator channel. The mobile terminal receives this single indicator channel and uses the indicator information that was transmitted via the indicator channel in order to receive the control information.

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Description

METHOD FOR PROCESSING PAGING INFORMATION IN A WIRELESS MOBILE COMMUNICATION SYSTEM

Technical Field

[1] The present invention relates to wireless (radio) mobile communication systems, and in particular, relates to a method for processing paging information allows the operations of a mobile terminal to be simplified and permits efficient use of resources for the mobile terminal

Background Art

[2] To support broadband wireless (e.g., WiMAX) access, there are different types of broadband wireless air interfaces, such as cellular 3G technologies (e.g., UMTS, WCDMA, etc.), and multi-carrier based multiple access techniques (e.g., OFDMA, OFDM-TDMA, OFDM-CDMA, etc.). Frequency division multiplexing involves sub-channelization, of which at least four types (OFDM, Flash OFDM, sOFDMA and OFDMA) exist.

[3] Orthogonal Frequency Division Multiplexing (OFDM) involves the splitting of a radio signal into multiple smaller sub-signals that are then transmitted simultaneously at different frequencies to a receiver. OFDM refers to a form of multi-carrier transmission where all the sub-carriers are orthogonal to each other. Certain IEEE standards and 3GPP standards are related to various aspects of OFDM.

[4] Figures 1 and 2 show a typical frame that is used in OFDM. One frame has a time duration of 10 ms (milliseconds) and consists of 20 sub-frames, each having a time duration of 0.5 ms. Each sub-frame may consist of a resource block (RB) that contains data or information, and a cyclic prefix (CP) that is a guard interval needed for conventional OFDM modulation (but not needed for OFDM with pulse shaping, i.e., OFDM/OQAM). The sub-frame duration corresponds to the minimum downlink TTI (Transmission Time Interval).

[5] Figure 3 shows a basic downlink reference-signal structure consisting of known reference symbols. Namely, a mapping of physical channel symbols in frequency domain is shown. In other words, channel-coded, interleaved, and data-modulated information (i.e., Layer 3 information) is mapped onto OFDM time/frequency symbols. The OFDM symbols can be organized into a number (M) of consecutive sub-carriers for a number (N) of consecutive OFDM symbols.

[6] Here, it is assumed that 7 OFDM symbols exist per sub-frame (when the CP length is short). In case of a long CP or a different frame structure, this basic downlink reference-signal structure would be slightly different.

[7] Reference symbols (i.e., first reference symbols) are located in the first OFDM symbol of every sub-frame assigned for downlink transmission. This is valid for both FDD and TDD, as well as for both long and short CP. Additional reference symbols (i.e., second reference symbols) are located in the third last OFDM symbol of every sub-frame assigned for downlink transmission. This is the baseline for both FDD and TDD, as well as for both long and short CP. However, for FDD, an evaluation of whether the second reference symbols are need should be made.

[8] Figure 4 shows an exemplary structure of an Evolved Universal Mobile Telecommunications System (E-UMTS). The E-UMTS system is a system that has evolved from the UMTS system, and its standardization work is currently being performed by the 3GPP standards organization.

[9] The E-UMTS network generally comprises at least one mobile terminal (i.e., user equipment: UE), base stations (i.e., Node Bs), a control plane server (CPS) that performs radio (wireless) control functions, a radio resource management (RRM) entity that performs radio resource management functions, a mobility management entity (MME) that performs mobility management functions for a mobile terminal, and an access gateway (AG) that is located at an end of the E-UMTS network and connects with one or more external networks. Here, it can be understood that the particular names of the various network entities are not limited to those mentioned above.

[10] The various layers of the radio interface protocol between the mobile terminal and the network may be divided into L1 (Layer 1), L2 (Layer 2), and L3 (Layer 3) based upon the lower three layers of the Open System Interconnection (OSI) standard model that is known the field of communication systems. Among these layers, a physical layer that is part of Layer 1 provides an information transfer service using a physical channel, while a Radio Resource Control (RRC) layer located in Layer 3 performs the function of controlling radio resources between the mobile terminal and the network. To do so, the RRC layer exchanges RRC messages between the mobile terminal and the network. The functions of the RRC layer may be distributed among and performed within the Node B, the CPS/RRM and/or the MME.

[11] Figures 5 and 6 show an exemplary architecture of the radio interface protocol between the mobile terminal and the UTRAN (UMTS Terrestrial Radio Access Network). The radio interface protocol of Figures 5 and 6 is horizontally comprised of a physical layer, a data link layer, and a network layer, and vertically comprised of a user plane for transmitting user data and a control plane for transferring control signaling. The radio interface protocol layer of Figures 5 and 6 may be divided into L1 (Layer 1), L2 (Layer 2), and L3 (Layer 3) based upon the lower three layers of the Open System Interconnection (OSI) standards model that is known the field of communication systems.

[12] Particular layers of the radio protocol control plane of Figure 5 and of the radio protocol user plane of Figure 6 will be described below. The physical layer (i.e., Layer 1) uses a physical channel to provide an information transfer service to a higher layer. The physical layer is connected with a medium access control (MAC) layer located thereabove via a transport channel, and data is transferred between the physical layer and the MAC layer via the transport channel. Also, between respectively different physical layers, namely, between the respective physical layers of the transmitting side (transmitter) and the receiving side (receiver), data is transferred via a physical channel.

[13] The MAC layer of Layer 2 provides services to a radio link control (RLC) layer (which is a higher layer) via a logical channel. The RLC layer of Layer 2 supports the transmission of data with reliability. It should be noted that the RLC layer in Figures 5 and 6 is depicted in dotted lines, because if the RLC functions are implemented in and performed by the MAC layer, the RLC layer itself may not need to exist. The PDCP layer of Layer 2 performs a header compression function that reduces unnecessary control information such that data being transmitted by employing Internet protocol (IP) packets, such as IPv4 or IPv6, can be efficiently sent over a radio (wireless) interface that has a relatively small bandwidth.

[14] The radio resource control (RRC) layer located at the lowermost portion of Layer 3 is only defined in the control plane, and handles the control of logical channels, transport channels, and physical channels with respect to the configuration, re-configuration and release of radio bearers (RB). Here, the RB refers to a service that is provided by Layer 2 for data transfer between the mobile terminal and the UTRAN.

[15] As for channels used in downlink transmission for transmitting data from the network to the mobile terminal, there is a broadcast channel (BCH) used for transmitting system information, and a shared channel (SCH) used for transmitting user traffic or control messages. As for channels used in uplink transmission for transmitting data from the mobile terminal to the network, there is a random access channel (RACH) used for transmitting an initial control message, and a shared channel (SCH) used for transmitting user traffic or control messages.

[16] One function implemented in 3GPP systems is a paging procedure. The paging procedure is necessary for converting the UE from idle mode into active mode. This procedure is implemented via a paging control channel (PCCH), a paging channel (PCH), a secondary common control physical channel (S-CCPCH), and a paging indicator channel (PICH). The paging procedure utilizes two different types of data (or signals), namely, a paging indicator (PI) and substantive paging data. The PI is sent on a paging indicator channel (PICH) in advance of the substantive paging data. The substantive paging data is sent on a separate paging channel (PCH), which is

transported by a Secondary Common Control Physical Channel (SCCPCH).

Disclosure of Invention

Technical Problem

[17] Before sending data to a particular mobile terminal, the network transmits a paging message on the downlink in order to determine the particular cell that the UE is located in. In the related art paging message transmitting method, an indicator (which informs in advance that a paging message will be transmitted) is transmitted through a separate (distinct) channel, such as a paging indicator channel. Additionally, an indicator (which informs in advance that a notification message for a multicast and broadcast service will be transmitted) is also transmitted through a separate (distinct) channel. In addition to these channels, the mobile terminal must also receive other channels, such as a broadcast channel used to periodically transmit system information. As there are a large total number of channels that a mobile terminal should receive due to transmissions through separate (distinct) channels according to each type of purpose, problems related to more complicated mobile terminal operations and a waste of mobile terminal resources occur.

Technical Solution

[18] The present invention has been developed in order to solve the above described problems of the related art. As a result, the present invention provides a method for processing paging information such that the operations of a mobile terminal can be simplified and permits efficient use of resources for the mobile terminal.

[19]

Brief Description of the Drawings

[20] Figure 1 shows an exemplary structure of one frame used in OFDM.

[21] Figure 2 shows an exemplary structure of one sub-frame within the frame of Figure 1.

[22] Figure 3 shows an example of how data and reference symbols for OFDM may be expressed in the frequency domain and the time domain.

[23] Figure 4 shows an overview of a E-UMTS network architecture.

[24] Figures 5 and 6 show an exemplary structure (architecture) of a radio interface protocol between a mobile terminal and a UTRAN according to the 3GPP radio access network standard.

[25] Figure 7 is a diagram to explain the features of the present invention by showing where the control information and resource blocks may be located within each sub-frame with respect to frequency and time.

[26] Figure 8 is a diagram used to explain a control information transmission and reception method according to an exemplary embodiment of the present invention.

[27] Figure 9 is a diagram used to explain a control information transmission and reception method according to another exemplary embodiment of the present invention.

[28] Figure 10 is a diagram used to explain a control information transmission and reception method according to another exemplary embodiment of the present invention.

[29] Figure 11 is a diagram used to explain a control information transmission and reception method according to another exemplary embodiment of the present invention.

[30] Figure 12 is a diagram used to explain constituting information of an FCCH according to an exemplary embodiment of the present invention.

Mode for the Invention

[31] One aspect of the present invention is the recognition by the present inventors regarding the problems and drawbacks of the related art described above and explained in more detail hereafter. Based upon such recognition, the features of the present invention have been developed.

[32] In the related art, it can be said that the system information is always fixed or non-flexible. Such fixed format allows a mobile terminal to easily detect and properly read the system information transmitted from the network.

[33] In contrast, the features of the present invention allow at least some portions of the system information to be dynamically (or flexibly) changed. Appropriate indicators are included such that a mobile terminal can properly detect and read the dynamic (flexible) system information. As a result, further system information may be added as desired in order to support technical evolution and advancements, which thus allows for future enhancements or continued expansion of currently used system information.

[34] It should be noted that the features of the present invention are related to issues regarding the long-term evolution (LTE) of the 3GPP standard. As such, the 3GPP TS 25.813 (LTE TR) and its related sections or portions thereof, as well as various developing enhancements thereof pertain to the present invention. Such enhancements and evolution have resulted in the use of a particular prefix (the letter E) when labeling various network entities (e.g., eNode B), protocol layers, channels, and the like. However, it can be clearly understood that such labeling and other terminology are merely exemplary and thus may be altered (or later clarified) as a result of ongoing or future discussions.

[35] First, with respect to the features of the present invention, certain aspects regarding the paging procedure will be explained below.

[36] In idle mode, the UE needs to complete a periodical supervision procedure in order

to monitor the paging channel. Upon receiving paging information related to the UE itself, the UE then changes into active mode and receives paging from the network. The monitoring in the periodical supervision procedure is realized through the monitoring of a paging indicator (PI). The paging indicator is sent once via paging indicator channel (PICH) in every cycle.

[37] When the RRC layer of the UE and the RRC layer of the UTRAN are connected to transmit and receive an RRC message between one another, the UE is considered to be in an RRC connected state. When they are not connected, the UE is considered to be in an idle state.

[38] When in the RRC-connected state, the UE can be divided into a URA_PCH state, a CELL_PCH state, a CELL_FACH state, and/or a CELL_DCH state. In particular, when the UE is in idle state (in addition to the URA_PCH state and the CELL_PCH state), it wakes up only at each discontinuous reception (DRX) cycle to receive a PICH (Paging Indicator Channel) transmitting paging information, in order to reduce power consumption.

[39] When in URA_PCH state or CELL_PCH state, the UE receives and stores a UTRAN specific DRX cycle length, and discontinuously receives the PICH according to the UTRAN specific DRX cycle length.

[40] In addition, in idle state, the UE receives and stores a CN domain specific DRX cycle length, and discontinuously receives the PICH according to the CN domain specific DRX cycle length.

[41] The UE further obtains and uses a DRX cycle length corresponding to its state through system information broadcast by the RRC layer of the UTRAN.

[42] The PICH is a physical channel used for transmitting a Paging Indicator (PI), and has a fixed data rate of SF 256. The PICH is always used in association with an S-CCPCH (Secondary Common Control Physical Channel) to which the PCH (Paging Channel) is mapped.

[43] The UTRAN periodically transmits information including the PI through the PICH to the UE. The UE then periodically checks whether the PICH has a PI related to it. More specifically, the UE in idle state periodically wakes up to check the PICH. If a PI is received through the PICH, the UE receives the S-CCPCH to which the PCH is mapped, to thereby receive corresponding paging information.

[44] The UTRAN periodically transmits system information through a BCH (Broadcast Channel) to the UE. More specifically, the UTRAN transmits an SIB (System Information Block) which is a group of information for constituting a channel and a protocol, using the BCH and transmits information for updating each type of system information to the UE based on the radio environment, which may undergo constant changes.

[45] Figure 7 is a diagram to explain the features of the present invention by showing where the control information and resource blocks may be located within each sub-frame with respect to frequency and time.

[46] The structure (format) of a sub-frame in relation to the frequency domain and the time domain can be understood from Figure 7. Namely, a single sub-frame has a time duration of 0.5 ms with 7 OFDM symbols (portions) therein.

[47] In the first portion of the sub-frame, control information (i.e., L1/L2 control information, FCCH, SCCH, etc.) is included, while resource blocks (RBs) that may be in the form of one or more chunks may be located in the remaining portion of the sub-frame. Here, a resource block may occupy the entire time duration of the sub-frame (excluding the time duration for the control information) or some partial time duration thereof. Also, each resource block (RB) may use a particular frequency range (i.e., a particular number of sub-carriers).

[48] The frequency axis can be referred to as a scalable cell bandwidth, which typically has a frequency range of 1.25 ~ 20 MHz. A plurality of sub-carriers exists in the scalable cell bandwidth. Of this frequency range, a so-called center frequency (of approximately 10 MHz) is mainly used in transmitting system information.

[49] In the related art, such system information is considered to be fixed. Although this allows the terminal to easily read the system information, addition of new system information is not possible. In contrast, the present invention allows for at least part of the system information to be flexible (or dynamic).

[50] To do so, the present invention divides (or separates or distinguishes) the system information into primary system information (e.g., Master Information Block: MIB) and non-primary (or secondary) system information (e.g., System Information Block: SIB).

[51] The MIB is transmitted in a static manner (e.g., via a BCH for fixed manner transmission), while the SIB is transmitted in a dynamic manner (e.g., via a downlink SCH for dynamic manner transmission). Here, transmission in a dynamic manner means that different frequency ranges and time durations can be used.

[52] For each frame, the MIB contains information about where each SIB is located. Namely, the particular frequency range (i.e., sub-carriers) and particular time duration (i.e., symbols) for each SIB is specified to allow the terminal (UE) to properly read the appropriate SIBs. For example, the MIB may indicate that a particular UE (e.g., UE #11) should read a particular resource block (e.g., RB #3). Here, the RB #3 can also be expressed as the information located at certain sub-carriers and certain symbols (e.g., at sub-carriers #13~60 and symbols #3~5).

[53] In a similar manner, for each sub-frame within one frame, the control information (located in the first portion) contains information about where each resource block (RB) is located. Namely, the frequency range and particular time duration for each RB

is specified to allow the terminal (UE) to properly read the appropriate RBs.

[54] The above concepts generally depicted in Figure 7 will be explained in more detail in the following description with reference to Figures 8 through 12.

[55] Figure 8 is a diagram used to explain a control information transmission and reception method according to an exemplary embodiment of the present invention. The network transmits a frame control channel (FCCH) at every particular period (i.e., a first period). Hereafter, the particular period is referred to as a frame.

[56] It should be noted that the FCCH may also be described in different terms. Namely, the control information transmitted by the network may be called L1/L2 control information, FCCH, SCCH, or the like. Hereafter, such control information will mostly be referred to as FCCH, merely for the sake of explanation (although control information and SCCH are also described).

[57] As shown in Figure 8, a MIB (Master Information Block) is repetitively transmitted at every second period, which is different that the above-mentioned first period. The MIB includes scheduling information for a SIB (System Information Block) that transmits system information, a paging message, and a notification message. Namely, the MIB provides scheduling information related to which frequency and what time is used to transmit each type of control information, such as multiple SIBs, multiple paging messages, multiple notification messages, and the like. The second period may set to be greater than the first period. The MIB may be transmitted in the first frame of the period in which the MIB is to be transmitted.

[58] Here, the FCCH that is transmitted in each frame can inform about whether the data transmitted in the corresponding time duration (frame) is a common control message, a control message dedicated for a particular mobile terminal, common data, or data dedicated for a particular mobile terminal. Also, the FCCH informs about which frequency and what time within the frame that a control message or data of the control information is transmitted.

[59] The mobile terminal periodically receives the FCCH at every first period. If the FCCH of a particular frame indicates the transmission of a MIB, the mobile terminal receives the MIB at the corresponding frequency and time in accordance with the scheduling information included in the indicator information transmitted through the FCCH. By referring to the MIB, the mobile terminal can obtain scheduling information for particular paging messages, particular notification messages, particular indicator messages, and the like. Through such scheduling information, the mobile terminal can determine which frequency and what time was used to transmit a particular SIB, a particular paging message, a particular notification message or the like. According to such scheduling information, the mobile terminal can receive a notification message with respect to the SIB, the paging message, and the subscribed service that is should

receive.

[60] The MIB may include either a mobile terminal identifier or a service identifier, or may include an indicator that indicates such an identifier.

[61] Figure 9 is a diagram used to explain a control information transmission and reception method according to another exemplary embodiment of the present invention. Referring to Figure 9, the network periodically transmits a PN-MAP (i.e., a Paging and Notification MAP) that informs about indicator information for a paging message or a notification message, and about scheduling information. Here, the PN-MAP may be labeled differently. Namely, the PN-MAP is merely one type of L1/L2 control information that may be transmitted by the network. In fact, an MIB may be used instead of the PN-MAP in order to provide information about paging or notification messages and about scheduling.

[62] Also, it can be understood that paging is provided on a per UE (terminal) basis, while notification is provided on a per service basis. Thus, the concepts related to paging with respect to UEs, can be applied to notification with respect to services.

[63] The PN-MAP may be transmitted during the first frame of a paging period or of a notification period. Here, the paging period and the notification period may be the same or may be different. The FCCH that is transmitted in each frame indicates whether the data transmitted in the corresponding time duration (frame) is a paging message, a notification message, or a PN-MAP. Also, the FCCH informs about the scheduling information that indicates which frequency and what time within the frame that each message or data of the control information is transmitted.

[64] The mobile terminal receives the PN-MAP at every paging period or at every notification period. Here, the mobile terminal can determine whether or not a corresponding frame contains a PN-MAP upon receiving the FCCH. Accordingly, the mobile terminal obtains the PN-MAP via the corresponding frame only when the transmission of the PN-MAP is informed by the FCCH.

[65] By using the received PN-MAP, the mobile terminal obtains the scheduling information of a particular paging message or a particular notification message. The mobile terminal uses the scheduling information to determine which frequency and what time the particular paging message or the particular notification message was transmitted. The mobile terminal can receive its corresponding paging message according to the determined transmission information, and can receive a notification message with respect to the service it subscribed to. The PN-MAP may include either a mobile terminal identifier or a service identifier, or may include an indicator that indicates such an identifier.

[66] Figure 10 is a diagram used to explain a control information transmission and reception method according to another exemplary embodiment of the present

invention. Referring to Figure 10, the network transmits a paging message or a notification message of multiple mobile terminals at every paging period. A paging message (for a particular mobile terminal), which is transmitted during one paging period, is transmitted through a particular frame that is mapped to an identifier of the mobile terminal. Also, a notification message (for a particular service), which is transmitted during one notification period, may be transmitted through a particular frame that is mapped to an identifier of the service. Here, the paging period and the notification period may be the same or may be different. The FCCH that is transmitted in each frame indicates whether the data transmitted in the corresponding time duration (frame) is a paging message or a notification message. Also, the FCCH informs about which frequency and what time within the frame that each message or data is transmitted.

[67] The mobile terminal periodically receives (according to the paging period) a particular frame that is mapped to its identifier, in order to obtain a paging message for itself. Also, the mobile terminal periodically receives (according to the notification period) a particular frame that is mapped to an identifier of a service it wishes to receive, in order to obtain a notification message for the service. Here, before receiving the particular frame, the mobile terminal receives the FCCH of the corresponding frame, and only if the FCCH indicates the transmission of the paging message or the notification message, the paging message or the notification message is obtained via the frame.

[68] Accordingly, it can be said that the L1/L2 control information (i.e., system information, MIB, PN-MAP, etc.) serves the purpose of a PICH. Namely, a UE can monitor the L1/L2 control information to determine the location of a particular resource block (RB) with respect to the time and frequency domains in order to obtain the necessary paging message.

[69] Figure 11 is a diagram used to explain a control information transmission and reception method according to another exemplary embodiment of the present invention. A cell that supports broadband frequencies with a bandwidth of 10 or 20 MHz, can provide a system bandwidth of narrowband frequencies for a mobile terminal operating in narrowband frequencies such as 1.25 MHz, 2.5 MHz, or the like. In this case, as shown in Figure 11, a central bandwidth of the broadband frequencies is typically used for the system bandwidth. Here, the MIB or PN-MAP, the paging messages, the notification messages, the SIBs, and the like should all be transmitted in the system bandwidth. However, SIBs that transmit particular system information may be transmitted outside of the system bandwidth.

[70] The FCCH (or other type of system information like L1/L2 control information, SCCH, etc.) transmitted in each frame indicates whether the data transmitted in the

corresponding time duration (frame) is a MIB or PN-MAP, a paging message, a notification message, an SIB, or the like. Also, the FCCH informs about which frequency and what time within the frame that each message or data is transmitted. The FCCH may be transmitted upon being divided into an FCCH for system bandwidth and an FCCH for non-system bandwidth. Accordingly, a mobile terminal that only receives the system bandwidth may receive the FCCH for system bandwidth to obtain information of each data or message that is transmitted via the system bandwidth. Also, a mobile terminal that receives the non-system bandwidth may receive the FCCH for non-system bandwidth to obtain information of each data or message that is transmitted via the non-system bandwidth.

[71] In other words, the concepts shown in Figure 11 are for handling the situation for mobile terminals in idle mode.

[72] The network (system) supports the cell bandwidth of 20 MHz, while a mobile terminal typically can only support a 10 MHz bandwidth range. Thus, the L1/L2 control information needs to be transmitted in certain units (a frequency range) such as, a range of 10 MHz, 5 MHz, or the like. As a result, there may be three scenarios for the frequency ranges used by the mobile terminal for reading data. Namely, of the 20 MHz scalable cell bandwidth, the mobile terminal may read one of three frequency ranges, i.e., the lower 10 MHz, the upper 10 MHz, or a middle (intermediate) 10 MHz thereof.

[73] For mobile terminals in RRC connected mode, because the particular cell in which the connected mode mobile terminal is located is known, any one of the three 10 MHz ranges and appropriate switching among these three 10 MHz ranges is possible. However, for a mobile terminal in idle mode, because the particular cell in which the terminal is located cannot be known, only one of these three 10 MHz ranges can be used (typically, the intermediate 10 MHz range is used). Meanwhile, the bandwidth outside the intermediate 10 MHz range can be used for transmitting and receiving resource blocks for mobile terminals in connected mode.

[74] Here, although the above exemplary embodiment with reference to Figure 11 is described for 10 MHz ranges, it is contemplated that the 20MHz scalable cell bandwidth could also be divided up into 5 MHz units.

[75] Figure 12 is a diagram used to explain constituting information of control information (i.e., an FCCH) according to an exemplary embodiment of the present invention. The FCCH provides to the mobile terminal, various types of control information related to data and control messages transmitted during the corresponding period (i.e., during the corresponding frame). Here, the FCCH is shown to be comprised of five different FCCH portions. However, this is merely exemplary, and the number of FCCH portions may vary accordingly.

[76] Referring to Figure 12, the first FCCH portion is a FCCH MAP that informs about

the frequency and time of the FCCH transmission, a length of the FCCH information, radio resource parameters needed for receiving the FCCH information, and the like. Such FCCH MAP may be always included in each frame. In the present invention, each frame may include all types of FCCH or may include only portions thereof. The FCCH MAP may inform about whether or not the remaining four types of FCCH portions (excluding the FCCH MAP) are transmitted in the corresponding frame.

[77] The second FCCH portion is a FCCH Idle Mode (DL) that includes control information needed on order to receive downlink control information when the mobile terminal is in idle mode. This second FCCH portion may be included in a corresponding frame when control information to be transmitted on the downlink exists in the frame. The control information related to common control messages such as the MIB, SIB, paging message, notification message, PN-MAP, etc. may be included in this second FCCH portion. Also, the MIB, SIB, paging message, notification message, PN-MAP, etc. may be included in this second FCCH portion.

[78] The third FCCH portion is a FCCH Idle Mode (UL) that includes control information needed in order to transmit uplink control information when the mobile terminal is in idle mode. This third FCCH portion may include information that is needed for uplink random access transmissions. When the mobile terminal transmits a random access message, the network may transmit a response to the ransom access message via this third FCCH portion. Also, the third FCCH portion can be used to inform that a response to the random access message is being transmitted in the frame that is used to transmit the third FCCH portion, and to do so, the third FCCH portion includes control information related to such response to the random access message.

[79] The fourth FCCH portion includes control information needed in order to receive downlink control information when the mobile terminal is in active mode. This fourth FCCH portion may include control information of an downlink shared channel (SCH) that is transmitted in a corresponding frame.

[80] The fifth FCCH portion includes control information needed in order to transmit uplink control information when the mobile terminal is in active mode. This fifth FCCH portion may include control information of an uplink shared channel (SCH) that is transmitted in a corresponding frame.

[81] The mobile terminal periodically receives the FCCH MAP and may check to see whether the corresponding frame contains any data or information that is wishes to receive. After receiving the FCCH MAP, when the mobile terminal is in idle mode, only the second and third FCCH portions are received. When the mobile terminal is in active mode, only the fourth and fifth FCCH portions are received.

[82] In order to inform about the control information that is needed for multicast and broadcast transmissions, the network may add and transmit other FCCH portions as

needed.

[83] It should be noted that Figures 1 through 12 show exemplary embodiments for a 10 ms frame having twenty 0.5 ms sub-frames. However, the features of the present invention are clearly applicable to other techniques that employ other frame sizes. For example, a frame size of 5 ms may be used, and to support LTE (Long Term Evolution) techniques, a frame size of 0.5 ms may be used.

[84] Regarding the effects of the present invention, the wireless network can, in advance, inform (through a single indicator channel) about the transmission of common control information (such as particular paging messages, notification messages, system infor mation, or the like). A radio mobile terminal can periodically receive the single indicator channel to thus receive the common control information by using the control information of the indicator channel. By using such procedures, the operations of the mobile terminal may be simplified and the mobile terminal resources can be more efficiently used.

[85] Additionally, as the present invention provides information about where each resource block (RB) is located with respect to the frequency and time domains, system information, control information, and the like can be processed in a dynamic and flexible manner, to thus support various enhanced capabilities. Also, when frequency selective scheduling is performed, improved adaptation to channel changes can be achieved.

[86] The present disclosure provides a method of reception of paging information for a mobile terminal in a mobile communications system, the method comprising: receiving control information in a periodic manner; if the received control information is relevant to the mobile terminal, receiving paging information using scheduling information that indicates time and frequency information of the paging information.

[87] The control information includes either a mobile terminal identifier or a service identifier, or an indicator that indicates a mobile terminal identifier or service identifier. The received control information and paging information are in the same sub-frame. The method further comprising: receiving primary system information in a static manner, the primary system information containing the scheduling information that is used for receiving the paging information; and receiving non-primary system information in a dynamic manner, the non-primary information containing the control information. The scheduling information indicates at least one of a time characteristic and a frequency characteristic of the non-primary system information. The time characteristic and the frequency characteristic indicate a location of the non-primary system information to be read by the particular terminal. The primary system information further comprises an indicator for indicating a particular terminal. The indicator comprises: at least one of a terminal identifier, a service identifier, and a

logical channel identifier. The time characteristic relates to symbols and the frequency characteristic relates to sub-carriers. The paging information is in the form of at least one resource block. The control information related to paging and notification, and other resource blocks are received via a center frequency among broadband frequencies used for a system bandwidth. The control information is for a mobile terminal in idle mode.

[88] Also, the present disclosure provides a method of downlink transmission of paging information for a mobile terminal in a mobile communications system, the method comprising: transmitting control information in a dynamic manner to a group of cells, wherein the control information comprises scheduling information that indicates time and frequency information; and transmitting paging information according to the control information.

[89] The control information includes either a mobile terminal identifier or a service identifier, or an indicator that indicates a mobile terminal identifier or service identifier. The transmitted control information and paging information are in the same sub-frame. The group of cells is related to a tracking area. The method further comprising: receiving primary system information in a static manner, the primary system information containing the scheduling information that is used for receiving the paging information; and receiving non-primary system information in a dynamic manner, the non-primary information containing the control information. The scheduling information indicates at least one of a time characteristic and a frequency characteristic of the non-primary system information. The time characteristic and the frequency characteristic indicate a location of the non-primary system information to be read by the particular terminal. The primary system information further comprises an indicator for indicating a particular terminal. The indicator comprises: at least one of a terminal identifier, a service identifier, and a logical channel identifier. The time characteristic relates to symbols and the frequency characteristic relates to sub-carriers. The paging information is in the form of at least one resource block. The control information related to paging and notification, and other resource blocks are received via a center frequency among broadband frequencies used for a system bandwidth. The control information is for a mobile terminal in idle mode.

[90] Additionally, the present disclosure provides a method for processing system information for a mobile terminal, the method comprising: receiving primary system information in a static manner; receiving non-primary system information in a dynamic manner based on the primary system information, the non-primary system information comprising control information that includes separate information for idle mode and active mode; and reading actual data by using the received control information according to whether the mobile terminal is operating in idle mode or active mode. The

static primary system information includes scheduling information that indicates time and frequency information of the non-primary system information.

[91] Furthermore, the present disclosure provides a method for processing system information for a network, the method comprising: transmitting primary system information in a static manner; transmitting non-primary system information in a dynamic manner based on the primary system information, the non-primary system information comprising control information that includes separate information for idle mode and active mode; and transmitting actual data to be read by a mobile terminal that uses the control information according to its operation in idle mode or active mode. The static primary system information includes scheduling information that indicates time and frequency information of the non-primary system information.

[92] This specification describes various illustrative embodiments of the present invention. The scope of the claims is intended to cover various modifications and equivalent arrangements of the illustrative embodiments disclosed in the specification. Therefore, the following claims should be accorded the reasonably broadest interpretation to cover modifications, equivalent structures, and features that are consistent with the spirit and scope of the invention disclosed herein.

Claims

[1] A method of reception of paging information for a mobile terminal in a mobile communications system, the method comprising:
receiving control information in a periodic manner;
if the received control information is relevant to the mobile terminal, receiving paging information using scheduling information that indicates time and frequency information of the paging information.

[2] The method of claim 1, wherein the control information includes either a mobile terminal identifier or a service identifier, or an indicator that indicates a mobile terminal identifier or service identifier.

[3] The method of claim 1, wherein the received control information and paging information are in the same sub-frame.

[4] The method of claim 1, further comprising:
receiving primary system information in a static manner, the primary system information containing the scheduling information that is used for receiving the paging information; and
receiving non-primary system information in a dynamic manner, the non-primary information containing the control information.

[5] The method of claim 4, wherein the scheduling information indicates at least one of a time characteristic and a frequency characteristic of the non-primary system information.

[6] The method of claim 5, wherein the time characteristic and the frequency characteristic indicate a location of the non-primary system information to be read by the particular terminal.

[7] The method of claim 6, wherein the primary system information further comprises an indicator for indicating a particular terminal.

[8] The method of claim 7, wherein the indicator comprises: at least one of a terminal identifier, a service identifier, and a logical channel identifier.

[9] The method of claim 5, wherein the time characteristic relates to symbols and the frequency characteristic relates to sub-carriers.

[10] The method of claim 1, wherein the paging information is in the form of at least one resource block.

[11] The method of claim 1, wherein the control information related to paging and notification, and other resource blocks are received via a center frequency among broadband frequencies used for a system bandwidth.

[12] The method of claim 11, wherein the control information is for a mobile terminal in idle mode.

[13] A method of downlink transmission of paging information for a mobile terminal in a mobile communications system, the method comprising:
transmitting control information in a dynamic manner to a group of cells, wherein the control information comprises scheduling information that indicates time and frequency information; and
transmitting paging information according to the control information.

[14] The method of claim 13, wherein the control information includes either a mobile terminal identifier or a service identifier, or an indicator that indicates a mobile terminal identifier or service identifier.

[15] The method of claim 14, wherein the transmitted control information and paging information are in the same sub-frame.

[16] The method of claim 13, wherein the group of cells is related to a tracking area.

[17] The method of claim 13, further comprising:
receiving primary system information in a static manner, the primary system information containing the scheduling information that is used for receiving the paging information; and
receiving non-primary system information in a dynamic manner, the non-primary information containing the control information.

[18] The method of claim 17, wherein the scheduling information indicates at least one of a time characteristic and a frequency characteristic of the non-primary system information.

[19] The method of claim 18, wherein the time characteristic and the frequency characteristic indicate a location of the non-primary system information to be read by the particular terminal.

[20] The method of claim 19, wherein the primary system information further comprises an indicator for indicating a particular terminal.

[21] The method of claim 20, wherein the indicator comprises: at least one of a terminal identifier, a service identifier, and a logical channel identifier.

[22] The method of claim 18, wherein the time characteristic relates to symbols and the frequency characteristic relates to sub-carriers.

[23] The method of claim 13, wherein the paging information is in the form of at least one resource block.

[24] The method of claim 13, wherein the control information related to paging and notification, and other resource blocks are received via a center frequency among broadband frequencies used for a system bandwidth.

[25] The method of claim 24, wherein the control information is for a mobile terminal in idle mode.

[26] A method for processing system information for a mobile terminal, the method

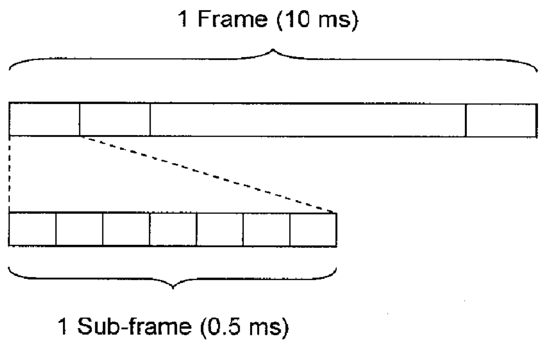
comprising:
receiving primary system information in a static manner;
receiving non-primary system information in a dynamic manner based on the primary system information, the non-primary system information comprising control information that includes separate information for idle mode and active mode; and
reading actual data by using the received control information according to whether the mobile terminal is operating in idle mode or active mode.

[27] The method of claim 26, wherein the static primary system information includes scheduling information that indicates time and frequency information of the non-primary system information.

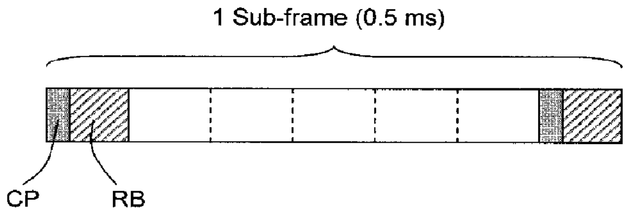
[28] A method for processing system information for a network, the method comprising:
transmitting primary system information in a static manner;
transmitting non-primary system information in a dynamic manner based on the primary system information, the non-primary system information comprising control information that includes separate information for idle mode and active mode; and
transmitting actual data to be read by a mobile terminal that uses the control information according to its operation in idle mode or active mode.

[29] The method of claim 28, wherein the static primary system information includes scheduling information that indicates time and frequency information of the non-primary system information.

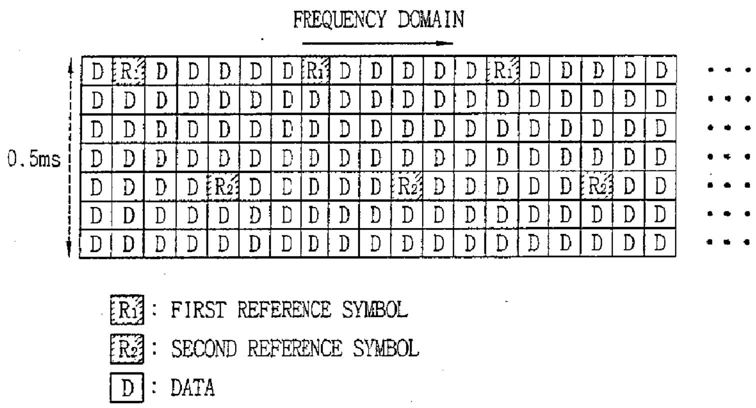
[Fig. 1]



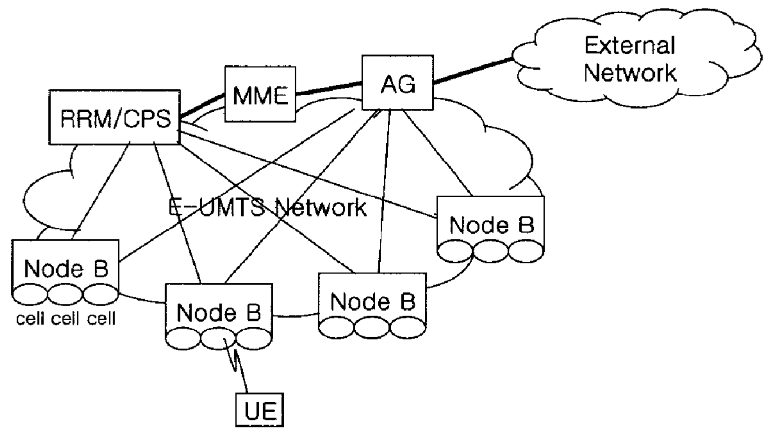
[Fig. 2]



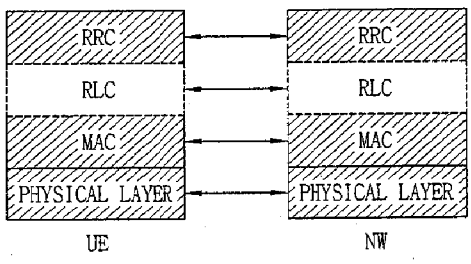
[Fig. 3]



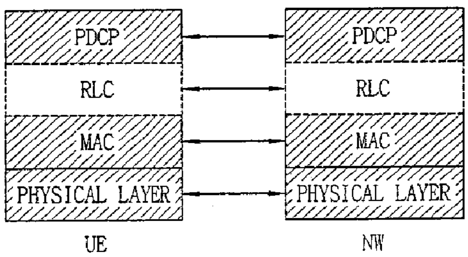
[Fig. 4]



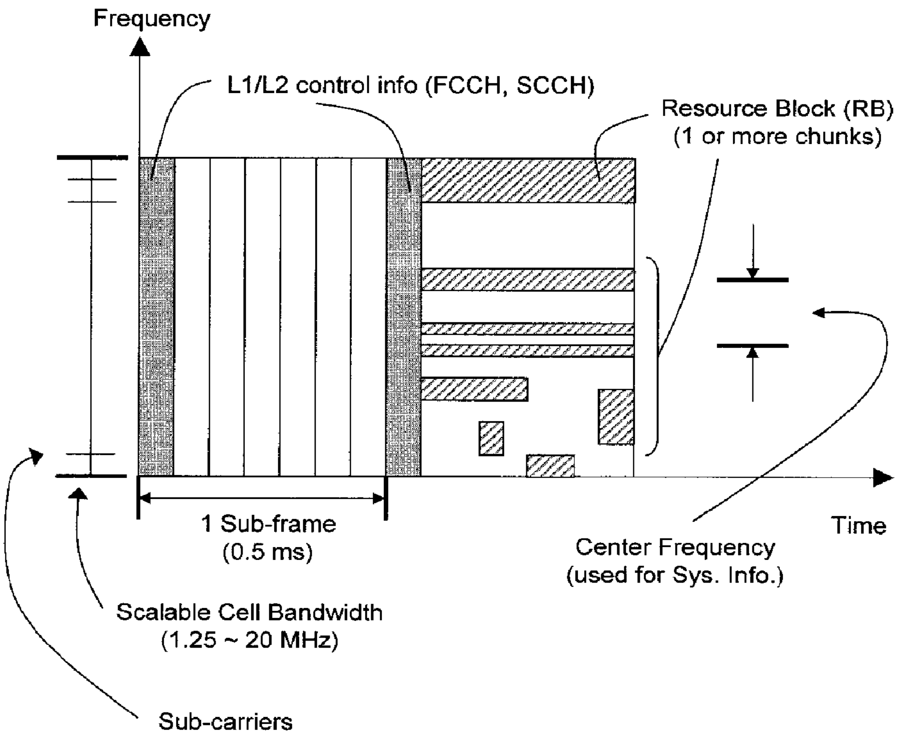
[Fig. 5]



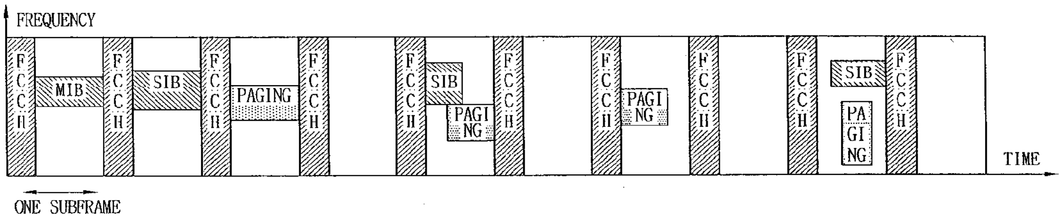
[Fig. 6]



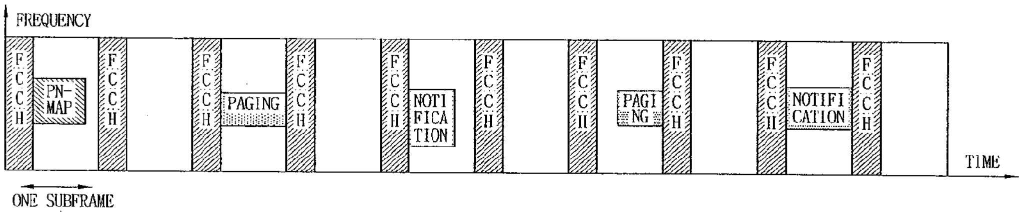
[Fig. 7]



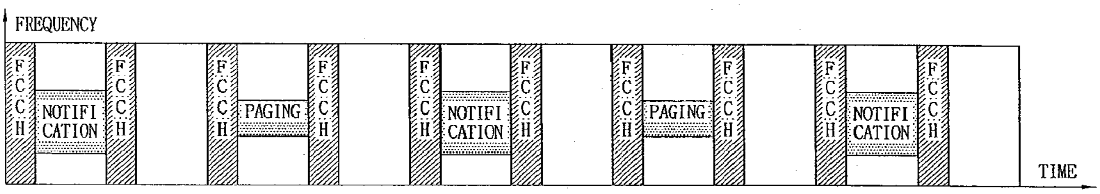
[Fig. 8]



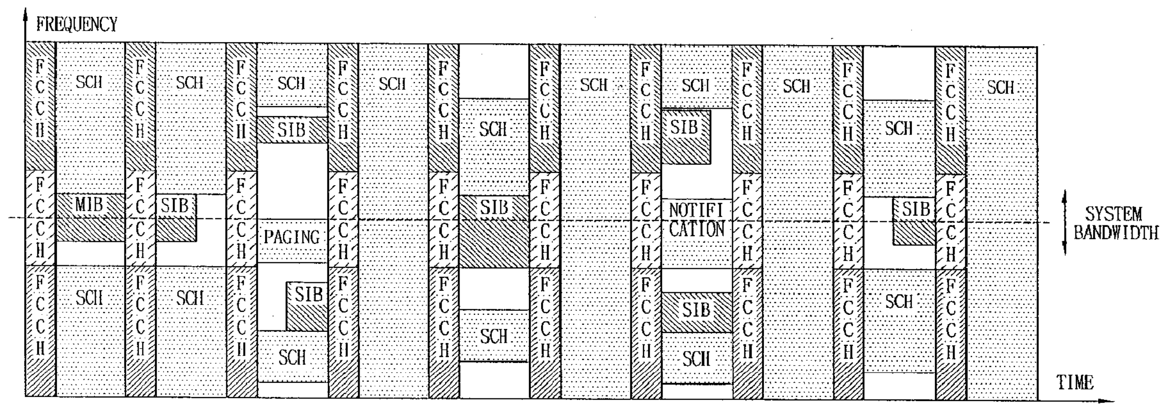
[Fig. 9]



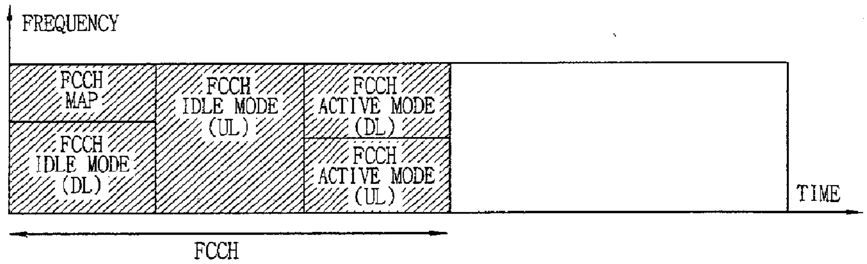
[Fig. 10]



[Fig. 11]



[Fig. 12]


FREQUENCY
FCCH MAP
FCCH IDLE MODE (DL)
FCCH IDLE MODE (UL)
FCCH ACTIVE MODE (DL)
FCCH ACTIVE MODE (UL)
TIME
FCCH

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference PALGIC06673	**FOR FURTHER ACTION** see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. **PCT/KR2006/004371**	International filing date *(day/month/year)* **25 OCTOBER 2006 (25.10.2006)**	(Earliest) Priority Date *(day/month/year)* 31 OCTOBER 2005 (31.10.2005)
Applicant **LG ELECTRONICS INC. et al**		

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language**, the international search was carried out on the basis of :
      ☒ the international application in the language in which it was filed
      ☐ a translation of the international application into ______________, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
   b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.
2. ☐ **Certain claims were found unsearchable** (See Box No. II)
3. ☐ **Unity of invention is lacking** (See Box No. III)
4. With regard to the **title,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established by this Authority to read as follows:
5. With regard to the **abstract,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. With regard to the drawings,
   a. the figure of the **drawings** to be published with the abstract is Figure No. 7
      ☒ as suggested by the applicant.
      ☐ because the applicant failed to suggest a figure.
      ☐ because this figure better characterizes the invention.
   b. ☐ none of the figure is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2006/004371

A. CLASSIFICATION OF SUBJECT MATTER

H04L 12/28(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)
IPC8: G06F, H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Patents and applications for inventions since 1975
Korean Utility models and applications for Utility models since 1975
Japanese Utility models and application for Utility models since 1975

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search terms used)

EKIPASS (KIPO internal), IEEE xplore

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6628946 B1 (Ericsson, Sep. 30, 2003) See the abstract, lines 5-22 in col. 3, lines 26-40 in col.11	1-3, 10-12
A	US 2005/0177623 A1 (M-Stack Limited, Aug. 11, 2005) See the abstract, figs. 1-5, and claims 1, 6	1 - 29
A	'Control channel structure for TDMA mobile radio systems', Onoe, S.; Tajima, J.; Utano, T.; Umeda, N.; Vehicular Technology Conference, 1990 IEEE 40th, 6-9 May 1990 Page(s):270 - 275	1 - 29

☐ 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 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
13 FEBRUARY 2007 (13.02.2007)	**13 FEBRUARY 2007 (13.02.2007)**

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	JUN, Young Sang Telephone No. 82-42-481-5653

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/KR2006/004371

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US6628946B1	30.09.2003	AU200051192A1	12.12.2000
		AU200051192B2	12.12.2000
		AU200051192A5	12.12.2000
		AU770705B2	26.02.2004
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		CA2374429AA	30.11.2000
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		CN1371576	25.09.2002
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		JP15500950	07.01.2003
		JP2003500950T2	07.01.2003
		KR1020020000649	05.01.2002
		US6628946B1	30.09.2003
		US6628946BA	30.09.2003
		WO0072609A1	30.11.2000
US2005/0177623A1	11.08.2005	US7079840BB	18.07.2006
		US2005177623AA	11.08.2005
		US2006281456AA	14.12.2006

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	Transmission of System Information on a Downlink Shared Channel
First Named Inventor/Applicant Name:	Erik Dahlman
Filer:	Michael Murphy/Laura Wade
Attorney Docket Number:	4015-6727 / P24241-US2

Filed as Large Entity

U.S. National Stage under 35 USC 371 Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
National Stage Fee	1631	1	330	330
Natl Stage Search Fee - Report provided	1642	1	430	430
National Stage Exam - all other cases	1633	1	220	220
Pages:				
Claims:				
Claims in excess of 20	1615	5	52	260
Independent claims in excess of 3	1614	2	220	440
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1680**

Electronic Acknowledgement Receipt

EFS ID:	6623076
Application Number:	12664347
International Application Number:	PCT/SE08/50407
Confirmation Number:	1464
Title of Invention:	Transmission of System Information on a Downlink Shared Channel
First Named Inventor/Applicant Name:	Erik Dahlman
Customer Number:	24112
Filer:	Michael Murphy/Laura Wade
Filer Authorized By:	Michael Murphy
Attorney Docket Number:	4015-6727 / P24241-US2
Receipt Date:	11-DEC-2009
Filing Date:	
Time Stamp:	17:51:39
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	$1680
RAM confirmation Number	4107
Deposit Account	
Authorized User	

File Listing:

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

1	Application Data Sheet	AppData.pdf	967595 a7ac0891fc8a78cf164d559853b1b14d5581 5a7b	no	5
Warnings:					
Information:					
2		WO2008156412.pdf	742563 75437f0fae0f12944c07ff5d1d4aa6b6c7dbb 63c	yes	19

Multipart Description/PDF files in .zip description

Document Description	Start	End
Abstract	1	2
Specification	3	9
Claims	10	13
Drawings-only black and white line drawings	14	19

Warnings:					
Information:					
3	Documents submitted with 371 Applications	IPRP.pdf	334208 56b2617f257bdb581f170125ed7f8bac5dc 73c68	no	8
Warnings:					
Information:					
4	Oath or Declaration filed	Declaration.pdf	64791 52fd2784058eb41847416070f2fc61be811f 3172	no	1
Warnings:					
Information:					
5	Preliminary Amendment	PrelimAmendment.pdf	440853 e431066003c438c76b7b5a19718a1be8ff9f 5ac0	no	6
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6	Information Disclosure Statement (IDS) Filed (SB/08)	IDS.pdf	608383 d48a4b42d91554b24c182d672b7f74abad b969ae	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.

7	Foreign Reference	EP1799003.pdf	1555234 a88839e2daee8f0627605fd7a8682946b1f249ed	no	31
Warnings:					
Information:					
8	Foreign Reference	WO2007052917.pdf	1438740 f978845e038dba3b3d507e6071c274e553f127bd	no	27
Warnings:					
Information:					
9	NPL Documents	R2-071912.pdf	66539 e20bfd7ac47c7d69e527936a971e4f0cc44bd301	no	6
Warnings:					
Information:					
10	NPL Documents	R2-072205.pdf	129403 03fabb4320b182ea775f4d37a5af89f5e801a3d3	no	8
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11	NPL Documents	R2-072543.pdf	69705 016d83f7e06e95a0e927dc9de20514111736a35d	no	4
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12	NPL Documents	R2-075559.pdf	58304 d66ec6774c8c59e056eba22a7200a9aac6038448	no	4
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13	Fee Worksheet (PTO-875)	fee-info.pdf	37872 87913caade32e00c63c00a2ef456aef49d851c33	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	6514190		

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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.

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.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4015-6727 / P24241-US2
	Application Number	

Title of Invention	Transmission of System Information on a Downlink Shared Channel

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	Application Number	
Title of Invention	Transmission of System Information on a Downlink Shared Channel	

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Title of the Invention	Transmission of System Information on a Downlink Shared Channel		
Attorney Docket Number	4015-6727 / P24241-US2	**Small Entity Status Claimed**	☐
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First Name	Michael	Last Name	Murphy	Registration Number	44958

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4015-6727 / P24241-US2
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(54) **Title:** TRANSMISSION OF SYSTEM INFORMATION

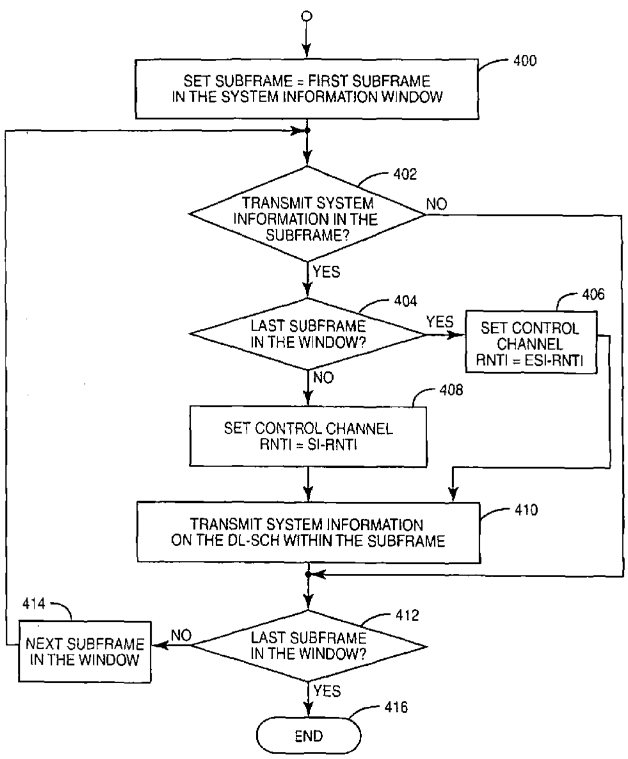

FIG. 4

(57) **Abstract:** In one embodiment, a method of transmitting system information on a down link shared channel structured as successive subframes includes transmitting (400 - 416) system information in regularly occurring time windows, each time window spanning some number of successive subframes. The method further includes indicating (406 / 408) to receiving user equipment (120) which subframes within a given time window carry system information. The method and variations of it are applied, for example, to the transmission of dynamic system information on the down link shared channel or other down link channel in a 3GPP E-UTRA wireless communication network (100).

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TRANSMISSION OF SYSTEM INFORMATION

BACKGROUND

Technical Field

The present invention generally relates to wireless communication networks, and particularly relates to the transmission of system information to user equipment (UE) operating in such networks, such as the transmission of system information by radio base stations in a wireless communication network configured according to 3GPP E-UTRA (evolved Universal Terrestrial Radio Access) standards, also referred to as 3GPP LTE (Long Term Evolution).

Background

In the 3GPP LTE, downlink user-data transmission is carried out on the Downlink Shared Channel (DL-SCH) transport channel. In LTE, the time dimension is divided into radio frames of length 10 ms, where each radio frame consists of 10 subframes, each of length 1 ms corresponding to 14 OFDM (orthogonal frequency-division multiplexing) symbols. Each subframe consists of two slots, each of length 0.5 ms or seven OFDM symbols. Note that, in case of Time Division Duplex (TDD), only a subset of the subframes of one frame is available for downlink transmission. On the other hand, in case of Frequency Division Duplex (FDD), all subframes on a downlink carrier are available for downlink transmission.

In LTE, the overall time/frequency-domain physical resource is divided into resource blocks, where each resource block consists of twelve OFDM subcarriers during one slot. DL-SCH transmission to a UE is carried out using a set of such resource blocks during one subframe. Layer 1 / Layer 2 (L1/L2) control signaling, also known as the Physical Downlink Control Channel (PDCCH), is transmitted at the beginning of each subframe. The L1/L2 control channel is typically used to inform a UE about various items. For example, the L1/L2 control channel may identify whether the DL-SCH carries data to the UE in the given subframe. More specifically, the L1/L2 control channel then includes the RNTI (Radio Network Temporary Identifier) associated with the UE for which the DL-SCH carries data in the given subframe. The L1/L2 control channel then also identifies the physical resource, more specifically the specific set of resource blocks that is used for the DL-SCH transmission to the specific UE in the given subframe. Moreover, the L1/L2 control channel then identifies the transport format (e.g. the modulation scheme and coding rate) used for DL-SCH transmission to the specific UE in the given subframe. Separate DL-SCH transmissions, using different physical resources (different resource blocks), can be carried out to different UEs during the same subframe. In this case there are multiple L1/L2 control channels, one for each UE that is to receive DL-SCH transmission in the given subframe.

In addition to user data, system information is also transmitted on the downlink within each cell. The system information may, e.g., include: public Land Mobile Network (PLMN) identity/identities, identifying the operator(s) to which the cell "belongs"; Neighbor-cell list, i.e. a list of the cells that are neighbors to the current cell; and different parameters used by the user terminal when accessing the system, e.g. random-access parameters and cell-access restrictions. The system information can be divided into two parts, one part being fixed and the other part being dynamic. The fixed part of the system information is transmitted on a pre-determined physical resource, i.e. a specific set of OFDM subcarriers during a specific time interval, using a pre-determined transport format. There is thus no flexibility in the amount of information in the fixed part of the system information. There is also no flexibility in the transmission structure (the physical resource and the transport format) used for the fixed part of the system information. In LTE, the fixed part of the system information is transmitted using the BCH (broadcast control channel) transport channel. Furthermore, for LTE it is currently assumed that the BCH is transmitted in the six centre resource blocks in subframe #0 of each frame.

The dynamic part of the system information is assumed to be transmitted using the DL-SCH, or at least a DL-SCH-like transport channel, similar to normal data transmission as described above. New UEs continuously "enter" the cell, either entering from a neighbor cell, due to power-on, or upon return from out-out-service, and the UEs must quickly acquire the system information. Thus the system information (both the fixed part on the BCH and the dynamic part on the DL-SCH or a DL-SCH-like channel) should be repeated regularly.

As an example, in LTE the fixed part of the system information (transmitted using the BCH) is assumed to be repeated every 40 ms. Also the dynamic part of the system information should be repeated more or less regularly. However, different portions of the dynamic part of the system information are more or less time critical, in the sense of how quickly the UE must acquire it, and thus need to be repeated more or less often. This can be described so that the dynamic part of the system information is divided into different so-called scheduling units, also referred to as System Information Messages. In general, information corresponding to scheduling unit number n should be repeated more often than information corresponding to scheduling unit number n+1. As an example, scheduling unit #1 (SU-1) may be repeated (approximately) once every 80 ms, scheduling unit #2 (SU-2) may be repeated (approximately) once every 160 ms, scheduling unit #3 (SU-3) may be repeated (approximately) once every 320 ms, etc.

SUMMARY

The invention described below allows for transmission of the dynamic part of the system information fulfilling these requirements and desirable properties while, at the same time, allowing for low UE complexity. One aspect of the teachings presented herein is to transmit system information in regularly occurring (system information) windows, with specific RNTIs indicating the presence of system information in a subframe, and with another specific RNTI indicating the end of system information transmission. This enables UEs to stop receiving, demodulating and decoding subframes when no more system information is expected during the current window.

In one embodiment, a method of transmitting system information on a downlink shared channel structured as successive subframes includes transmitting system information in regularly occurring time windows, each time window spanning some number of successive subframes. The method further includes indicating to receiving user equipment which subframes within a given time window carry system information.

Of course, the present invention is not limited to the above features and advantages. Indeed, those skilled in the art will recognize additional features and advantages upon reading the following detailed description, and upon viewing the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram of an embodiment of a wireless network that overlays or otherwise defines a recurring sequence of time windows for the transmission of dynamic system information using subframes falling within the defined time windows.

Figure 2 is a diagram of an embodiment of different system-information time windows having different repetition periods.

Figure 3 is a diagram of an embodiment of overlaying or otherwise defining a recurring sequence of time windows for the transmission of dynamic system information using subframes falling within the defined time windows.

Figure 4 is a flow diagram of an embodiment of program logic for overlaying or otherwise defining a recurring sequence of time windows for the transmission of dynamic system information using subframes falling within the defined time windows.

Figure 5 is a flow diagram of an embodiment of program logic for processing recurring system-information time windows containing dynamic system information included in subframes falling within the defined time windows.

Figure 6 is a diagram of an embodiment of variably sized recurring system-information time windows for the transmission of system information.

Figure 7 is a diagram of an embodiment of different system-information time windows.

DETAILED DESCRIPTION

Figure 1 illustrates an embodiment of a wireless network 100 including one or more network transmitters 110 such as a radio base station which services one or more UEs 120. The network transmitter 110 includes a baseband processor 130 for generating one or more scheduling units 132 (also referred to as System Information Messages) including dynamic parts of the system information. The network transmitter 110 sends the scheduling units 132 to the UE 120 using different system-information windows. In one embodiment, the system-information windows occur with a period corresponding to the repetition period of the most frequently occurring scheduling unit 132 as shown in Figure 2 where "SU-n" refers to the nth scheduling unit 132. System information corresponding to the most frequently occurring scheduling unit 132 is transmitted within each system-information window while less frequently-occurring scheduling units 132 are transmitted only within a sub-set of the system-information windows, where system information is shown as a shaded area in Figure 2. For illustrative purposes only, system information corresponding to a second one of the scheduling units 132 could be transmitted within every second window, system information corresponding to a third one of the scheduling units 132 could be transmitted within every fourth window, and so on.

In one embodiment, the transmission timing corresponding to each scheduling unit 132 can be pre-specified when a limited amount of transmission periods are employed by the network 100. In another embodiment, the window transmission timing can be signaled to the UE 120, e.g. when more specific values for transmitted scheduling units 132 are specified. Either way, a variable window size can be used if the amount of system information is not the same in each window. In one embodiment, the window size is increased when system information from additional scheduling units 132 is transmitted.

Figure 3 illustrates one embodiment of transmitting the dynamic (possibly changing) system information within regularly occurring windows with well-defined starting points (specific subframes) and of a certain size in number of (consecutive) subframes. In the illustration, the system-information windows, more generally regarded as recurring time windows defined for the transmission of system information, start at subframe #5 of the frame with frame number 8*k and have a size of 13 subframes. The network transmitter 110 only transmits the dynamic part of the system information within these windows. Moreover, the window occurs (is repeated) often enough to fulfill the repetition rate of the most often repeated system information (in LTE terminology, system information corresponding to the first scheduling unit 132, as described above).

In one or more embodiments, within each recurring time window, the transmission of system information is carried out similar to the transmission of user data on DL-SCH (dynamic resource and transport format with signaling on L1/L2 control channel), with some exceptions. Instead of using an RNTI of a specific UE 120, a specific System-Information RNTI (SI-RNTI), indicating that system information to be read by all UEs 120 is being transmitted, is included in the corresponding L1/L2 control signaling. Also, for the last piece of system information to be transmitted within the window, the SI-RNTI is replaced with an End-of-System-Information RNTI (ESI-RNTI). The reception of an ESI-RNTI informs the UE 120 that no more system information is transmitted within the window. The UE 120 can stop demodulating and decoding the L1/L2 control channel when there is no more system information to be transmitted in the window, thus improving UE power-saving performance.

Moreover, the system information does not have to be transmitted in consecutive subframes. This way, the network transmitter 110 can dynamically avoid transmitting system information in certain subframes when a more pressing need for subframes arises, e.g., when a subframe is needed for high priority downlink data transmission or for uplink transmission in case of TDD. In addition, the set of subframes in which system information is actually transmitted does not have to be the same between consecutive windows. Furthermore, the network transmitter 110 can dynamically vary the number of subframes used to carry system information without prior knowledge of the UE 120 (i.e., prior to the UE 120 reading the L1/L2 control channel).

As non-limiting examples, the teachings presented herein for transmitting system information yields several desirable properties. For example, there are several requirements and desired properties for the transmission of the dynamic part of the system information. From a UE power-consumption point of-view, it is desirable to transmit the different parts of the system information as close in time as possible to each other, in the ideal case in a set of consecutive subframes. This enables the UE 120 to receive the maximum amount of system information during a minimum reception time, reducing UE reception time and UE power consumption.

The teachings herein also allow system information to be transmitted in recurring time windows, where the particular subframes within each window used for carrying system information are selectable. If current conditions, e.g., competing transmission priorities permit, the system information can be transmitted in a contiguous set of subframes within the time window.

It is also desirable to have flexibility in terms of exactly where the system information is transmitted, i.e., exactly which set of subframes within a given time window carries the system information. Some subframes, depending on the situation, may not be available for transmitting system information. For example, some TDD subframes may not be available for downlink transmission. In another example, for latency reasons there may, in some situations, be a benefit to not having too many consecutive subframes used for transmission of system information, thus making them unavailable for downlink user data transmission. As such, it is also desirable to dynamically (with low delay) decide in exactly what subframes the system information is to be transmitted.

Further, it is desirable to have flexibility in the rate by which different parts of the system information is repeated. In this way, a higher repetition rate (shorter repetition period) can be used, e.g. in the case of wider overall transmission bandwidth, when the overhead of the system-information transmission is less of a concern. It is desirable to have flexibility in the number of subframes used to transmit the system information. As an example, in case of smaller overall bandwidth or larger cells, more subframes may be needed to transmit a given set of system information. Moreover, the amount of system information, e.g. neighbor lists and PLMN lists may be of different sizes for different cells.

The teachings presented herein provide for methods and apparatuses where system information is transmitted within recurring time windows, but with flexible selection of which subframes within those windows are used to carry system information. Figure 4 illustrates one embodiment of program logic for transmitting system information from the network transmitter 110 to the UE 120. According to this embodiment, the baseband processor 130 included in the network transmitter 110 initializes the first subframe in the system-information window (Step 400). The baseband processor 130 then determines whether the current subframe is to be used for transmission of system information (Step 402). If so, the baseband processor 130 determines whether the current subframe is the last subframe in the window (Step 404). If the current subframe is the last subframe, the RNTI of the L1/L2 control channel is set to ESI-RNTI for indicating to the UE 120 that the subframe is the last subframe in the window containing system information. (Step 406). Otherwise, the control channel RNTI is set to SI-RNTI for indicating to the UE 120 that the subframe contains system information, but is not the last subframe. (Step 408). The corresponding system information is transmitted on the DL-SCH within the current subframe (Step 410). The baseband processor 130 determines whether the last window subframe has been transmitted (Step 412). If not, Steps 402 – 412 are repeated for the next subframe within the window. The system information transmission process ends when the last subframe is transmitted (Step 416).

Figure 5 illustrates one embodiment of program logic carried out by the UE 120 for processing the system information transmitted by the network transmitter 110. According to this embodiment, the UE 120 includes a baseband processor 140 for demodulating and decoding received subframes. A window detection and evaluation unit 150 included in or associated with the baseband processor 140 begins the window reception process by initializing the first subframe received within the window (Step 500). The baseband processor 150 then demodulates and decodes the L1/L2 control channel of the current subframe (Step 502). The window detection and evaluation unit 150 determines whether either SI-RNTI or ESI-RNTI is detected for the current subframe (Step 504). If so, the baseband processor 140 demodulates and decodes the corresponding DL-SCH transport block to retrieve the system information provided therewith (Step 506). The window detection and evaluation unit 150 then determines whether the current subframe is the last subframe in the window or the last subframe containing system information, e.g., whether the RNTI of the control channel is ESI-RNTI (Step 508). If neither condition exists, Steps 502 – 508 are repeated for the next subframe within the window (Step 510). The baseband processor 140 stops demodulating and decoding DL-SCH transport blocks when either the last subframe or ESI-RNTI is detected, indicating no more system information is forthcoming (Step 512). Thus, the UE 120 demodulates and decodes the control channel starting with the first subframe in the system information window and checks for specific system information RNTIs until either the ESI-RNTI is detected or the last window subframe is received.

As discussed above, some parts of the system information (corresponding to the scheduling units 132) may not need to be repeated as often as some other parts of the system information, implying that certain windows will include more data (more scheduling units 132) than other windows. Thus, the window size may be of varying length, with a longer window at the time instances where more system information (more scheduling units 132) is to be transmitted. Figure 6 provides an illustration of a variable-length window embodiment.

Note that the window size can be specified in either the radio-access specification or be configurable. In case of a configurable window size, the UE 120 can use a default (large) window size before it is informed (via the system information) about the actual window size. Moreover, the RNTI may indicate more than just system information such as more details about the system information. In one embodiment, several different SI-RNTIs could be used, e.g., SI-RNTI1, SI-RNTI2, SI-RNTI3, ..., with corresponding multiple ESI-RNTIs, e.g., ESI-RNTI1, ESI-RNTI2, ESI-RNTI3, etc.

In one embodiment, the scheduling units 132 transmitted at the same time use the same system-information window as shown in the upper part of Figure 7. Alternatively, the scheduling units 132 are transmitted using different system-information windows as shown in the lower part of Figure 7. In either embodiment, system information is transmitted in regularly occurring system-information windows, with specific RNTIs indicating the presence of system information in a subframe, and with another specific RNTI indicating the end of system information transmission.

Of course, other variations are contemplated. Thus, the foregoing description and the accompanying drawings represent non-limiting examples of the methods and apparatus taught herein for the transmission of system information. As such, the present invention is not limited by the foregoing description and accompanying drawings. Instead, the present invention is limited only by the following claims and their legal equivalents.

CLAIMS

What is claimed is:

1. A method of transmitting system information on the downlink of a wireless communication network comprising:

    transmitting (410) system information in recurring time windows overlaid on a sequence of transmit channel subframes;

    dynamically selecting (402) which subframes within a given time window are to be used for carrying the system information; and

    including (406 / 408) an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

2. The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a contiguous set of subframes within the given time window.

3. The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a non-contiguous set of subframes within the given time window.

4. The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting which subframes to use for transmitting system information in view of competing transmission priorities associated with other control or data signaling.

5. The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information comprises using an RNTI (Radio Network Temporary Identifier) to denote that the subframe carries system information.

6. The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using an end-of-system-information indicator in a last subframe of the given time window that carries system information.

7. The method of claim 1, further comprising varying window sizes of the recurring time windows.

8. The method of claim 1, further comprising dynamically configuring a window size for the recurring time windows.

9. The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using different indicators corresponding to different types of system information, such that the indicator used for a particular subframe indicates the type of system information carried in that subframe.

10. A network transmitter (110) comprising a baseband processor (130) configured to:
generate system information in recurring time windows overlaid on a sequence of transmit channel subframes;
dynamically select which subframes within a given time window are to be used for carrying system information; and
include an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

11. The network transmitter of claim 10, wherein the network transmitter comprises a radio base station configured for operation in accordance with 3GPP E-UTRA standards.

12. A method of transmitting system information on a downlink shared channel structured as successive subframes, the method comprising:
transmitting (400 – 416) system information in regularly occurring time windows, each time window spanning some number of successive subframes; and
indicating (406 / 408) to receiving user equipment which subframes within a given time window carry system information.

13. The method of claim 12, wherein indicating to receiving user equipment which subframes within a given time window carry system information includes indicating the last subframe within the given time window that carries system information, thereby allowing the receiving user equipment to cease monitoring for system information within the given time window.

14. The method of claim 12, further comprising dynamically selecting which subframes within a given time window are to be used for carrying system information.

15. A method for a mobile station to receive system information from a supporting wireless communication network, the method comprising:

beginning monitoring (500 and 502) for the receipt of system information at the start of each time window in a succession of recurring time windows used for the transmission of system information, each said time window spanning a number of signal subframes;

within each time window, monitoring (504 – 510) each signal subframe for an indication of system information and reading system information from the signal subframe if such information is present; and

terminating monitoring (512) at least at the end of the time window.

16. The method of claim 15, further comprising recognizing an end-of-system-information indicator in a signal subframe received within the time window and terminating monitoring for the time window in response.

17. The method of claim 15, further comprising adapting to changing or configurable window sizes used for the time window.

18. The method of claim 15, further comprising storing a default window size for monitoring for system information transmissions.

19. The method of claim 18, further comprising monitoring for system information transmissions based on a specified window size indicated in received information rather than the default window size.

20. The method of claim 15, further comprising recognizing different types of system information based on recognizing different system information indicators in different signal subframes.

21. A mobile station (120) comprising a baseband processor (140) operable to:

begin monitoring for the receipt of system information at the start of each time window in a succession of recurring time windows used for the transmission of system information, each said time window spanning a number of signal subframes;

within each time window, monitor each signal subframe for an indication of system information and reading system information from the signal subframe if such information is present; and

terminate monitoring at least at the end of the time window.

22. The mobile station of claim 21, wherein the baseband processor is operable to recognize an end-of-system-information indicator in a signal subframe received within the time window and terminate monitoring for the time window in response.

23. The mobile station of claim 21, wherein the baseband processor is operable to adapt to changing or configurable window sizes used for the time window.

24. The mobile station of claim 21, wherein the baseband processor is operable to monitor for system information transmissions based on a specified window size indicated in received information rather than a default window size.

25. The mobile station of claim 21, wherein the baseband processor is operable to recognize different types of system information based on different system information indicators detected in different signal subframes.

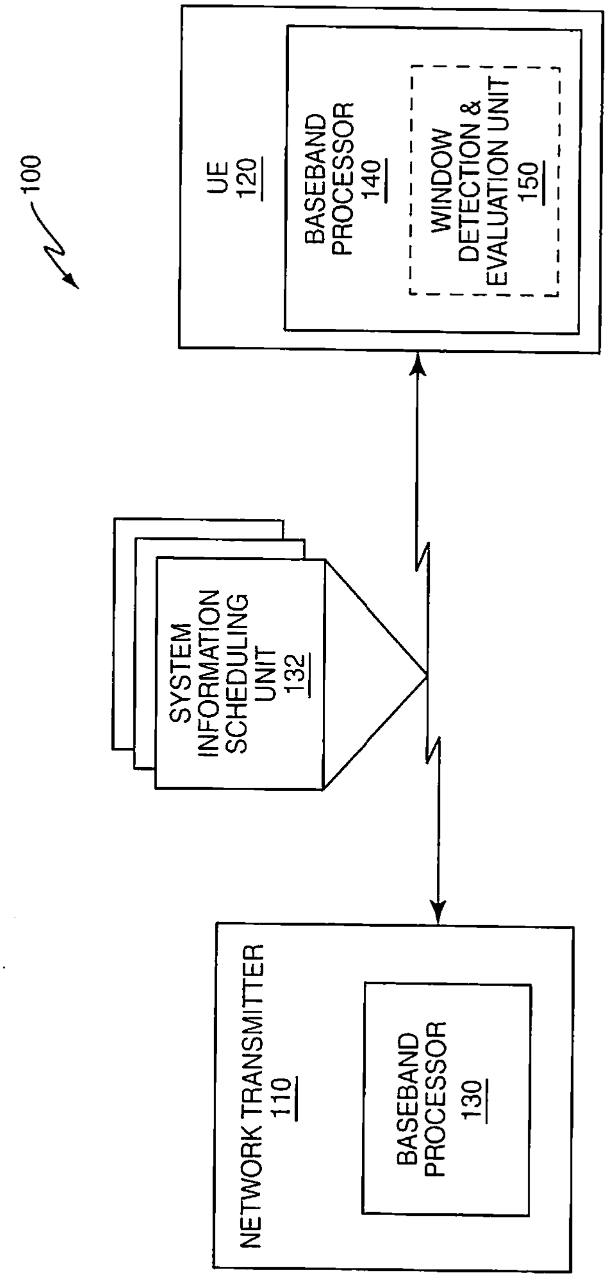
100
UE
120
BASEBAND
PROCESSOR
140
WINDOW
DETECTION &
EVALUATION UNIT
150
SYSTEM
INFORMATION
SCHEDULING
UNIT
132
NETWORK TRANSMITTER
110
BASEBAND
PROCESSOR
130

FIG. 1

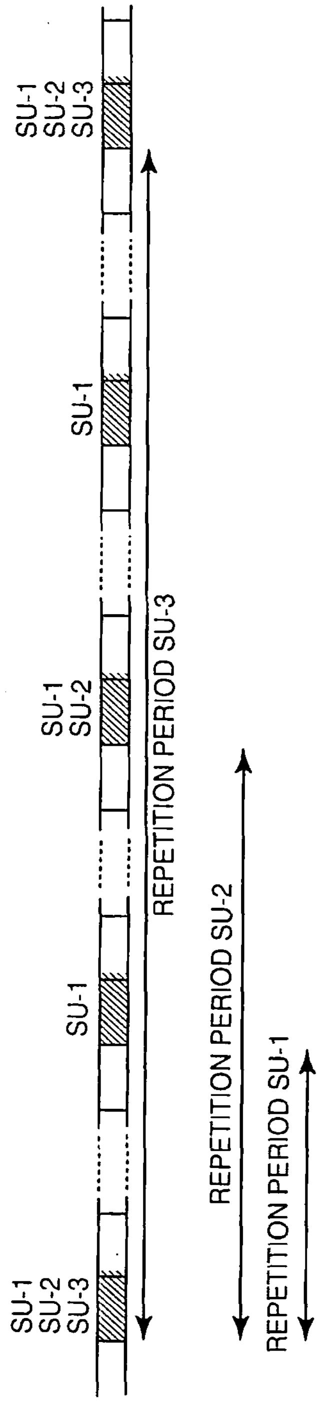
SU-1
SU-2
SU-3
SU-1
SU-1
SU-2
SU-1
SU-1
SU-2
SU-3
REPETITION PERIOD SU-3
REPETITION PERIOD SU-2
REPETITION PERIOD SU-1

FIG. 2


FRAME 0
FRAME 1
FRAME 2
FRAME 3
FRAME 4
FRAME 5
FRAME 6
FRAME 7
FRAME 8
FRAME 9
FRAME 10
SYSTEM INFORMATION WINDOW (L SUBFRAMES)
SYSTEM INFORMATION WINDOW

FIG. 3

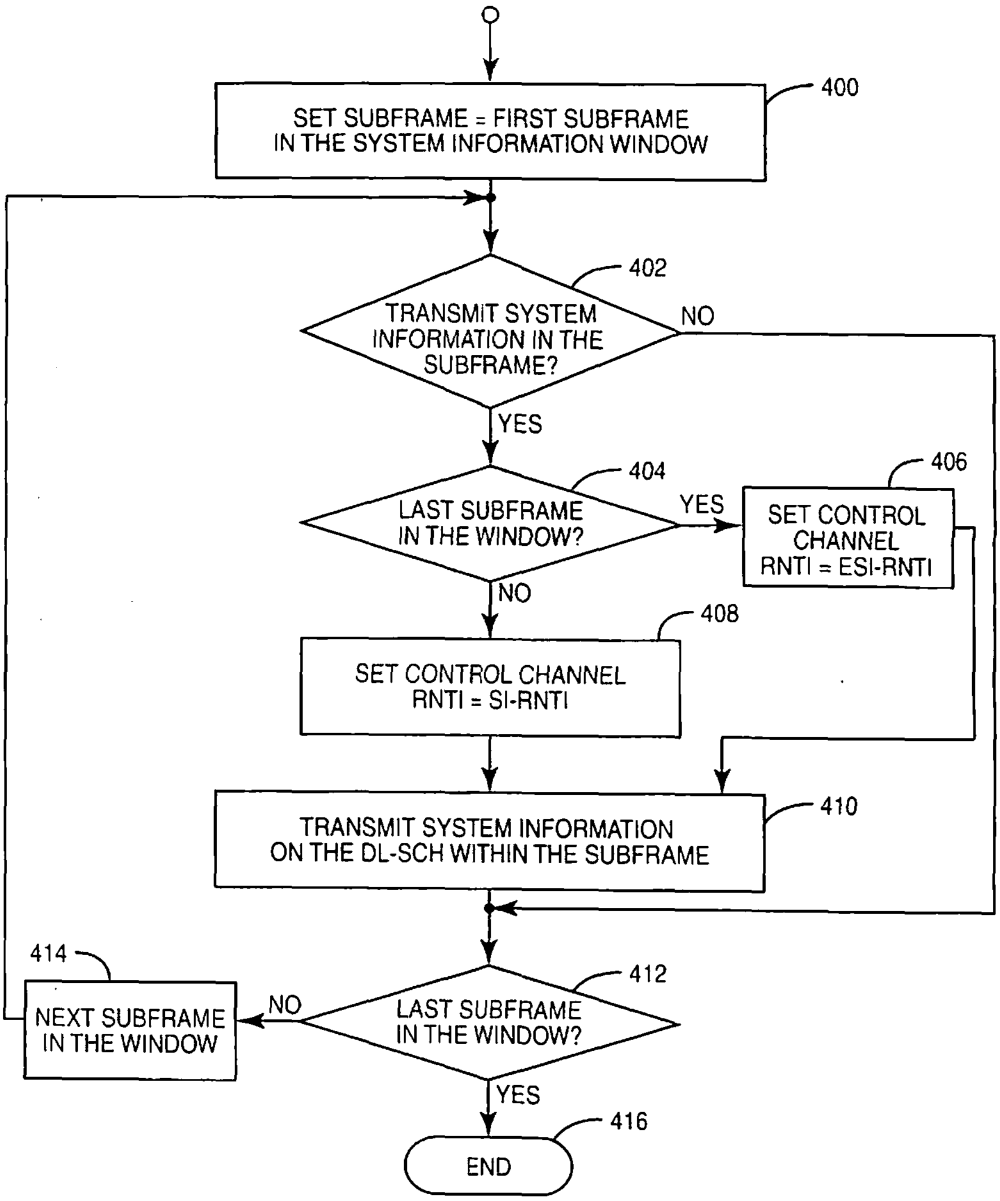
400
SET SUBFRAME = FIRST SUBFRAME IN THE SYSTEM INFORMATION WINDOW
402
TRANSMIT SYSTEM INFORMATION IN THE SUBFRAME?
NO
YES
404
LAST SUBFRAME IN THE WINDOW?
YES
406
SET CONTROL CHANNEL RNTI = ESI-RNTI
NO
408
SET CONTROL CHANNEL RNTI = SI-RNTI
410
TRANSMIT SYSTEM INFORMATION ON THE DL-SCH WITHIN THE SUBFRAME
414
NEXT SUBFRAME IN THE WINDOW
NO
412
LAST SUBFRAME IN THE WINDOW?
YES
416
END

FIG. 4

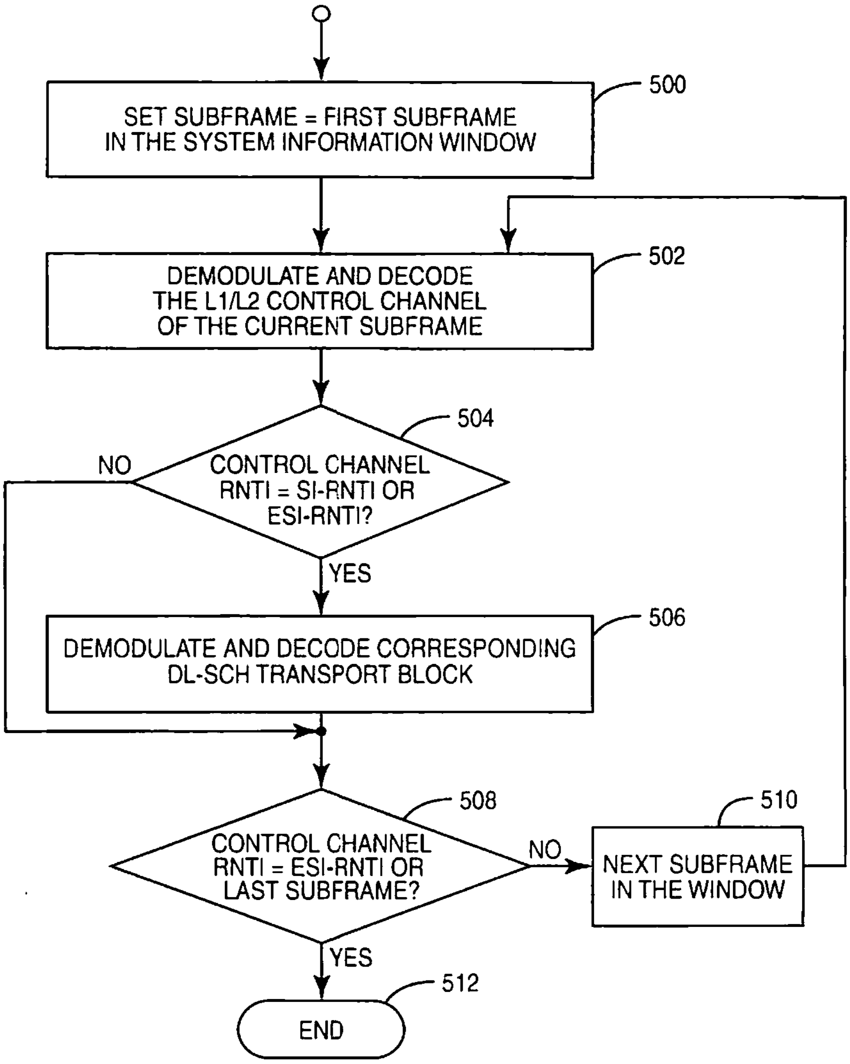
500
SET SUBFRAME = FIRST SUBFRAME IN THE SYSTEM INFORMATION WINDOW
502
DEMODULATE AND DECODE THE L1/L2 CONTROL CHANNEL OF THE CURRENT SUBFRAME
504
CONTROL CHANNEL RNTI = SI-RNTI OR ESI-RNTI?
NO
YES
506
DEMODULATE AND DECODE CORRESPONDING DL-SCH TRANSPORT BLOCK
508
CONTROL CHANNEL RNTI = ESI-RNTI OR LAST SUBFRAME?
NO
510
NEXT SUBFRAME IN THE WINDOW
YES
512
END

FIG. 5

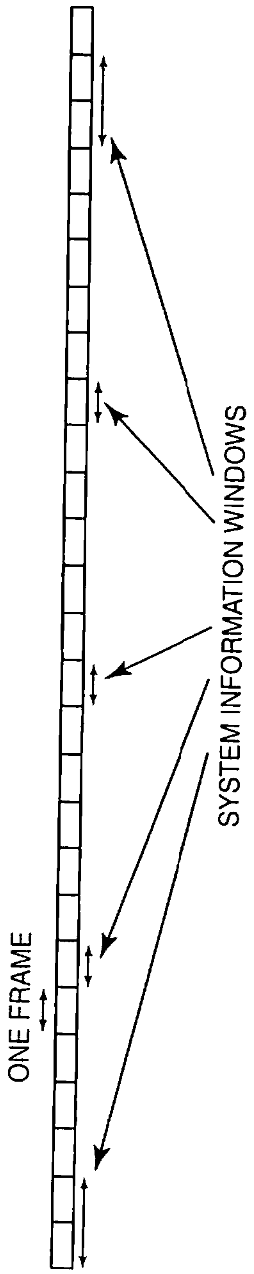

FIG. 6

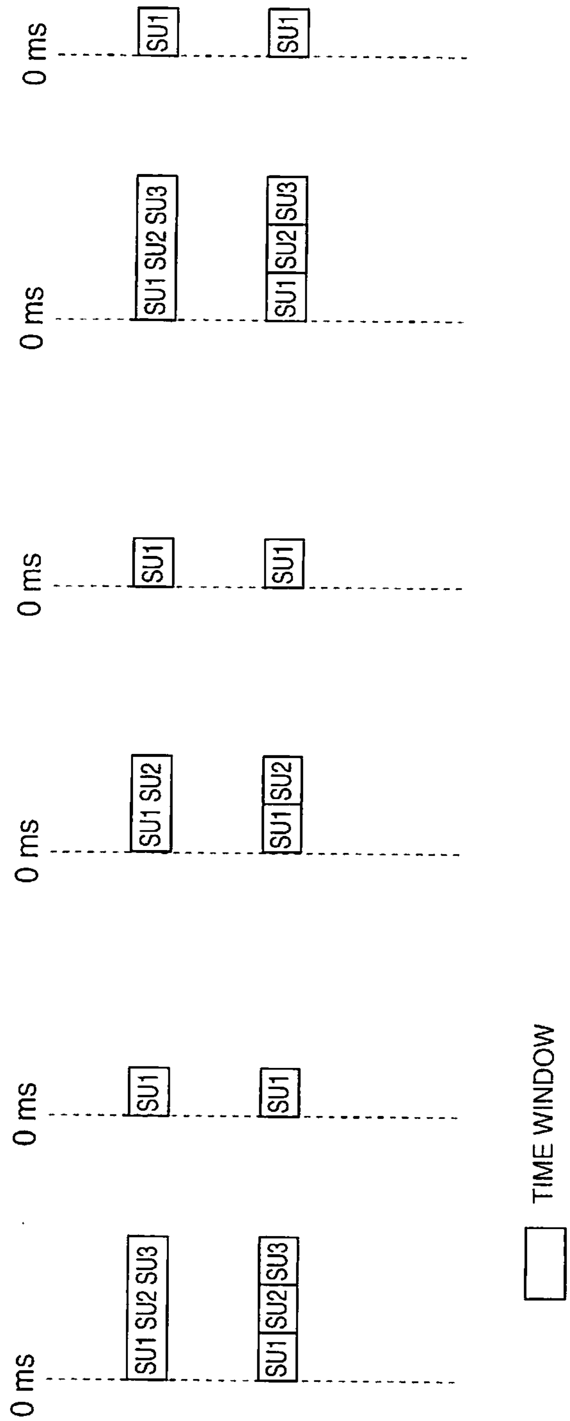

FIG. 7

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2009-10-06

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P24241WO1	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/SE2008/050407	International filing date *(day/month/year)* 10-04-2008	Priority date *(day/month/year)* 18-06-2007
International Patent Classification (IPC) or national classification and IPC See Supplemental Box		
Applicant TELEFONAKTIEBOLAGET LM ERICSSON (PUBL) et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 8 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☐ *(sent to the applicant and to the International Bureau)* a total of ______ sheets, as follows:
      - ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) ______, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☒ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
16-04-2009	22-09-2009
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Anders Ackeberg / EÖ Telephone No. +46 8 782 25 00

Form PCT/IPEA/409 (cover sheet) (January 2009)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/SE2008/050407

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Cover sheet

International patent classification (IPC)
H04J 3/00 (2006.01)
H04B 7/26 (2006.01)
H04W 68/00 (2009.01)
H04W 74/04 (2009.01)

Form PCT/IPEA/409 (Supplemental Box) (January 2009)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/SE2008/050407

Box No. I **Basis of the report**

1. With regard to the **language**, this report is based on:
   - [x] the international application in the language in which it was filed.
   - [ ] a translation of the international application into ______ which is the language of a translation furnished for the purposes of:
     - [ ] international search (Rules 12.3(a) and 23.1(b)).
     - [ ] publication of the international application (Rule 12.4(a)).
     - [ ] international preliminary examination (Rules 55.2(a) and/or 55.3(a)).

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
   - [x] the international application as originally filed/furnished.
   - [ ] the description:

     pages ______ as originally filed/furnished.
     pages* ______ received by this Authority on ______
     pages* ______ received by this Authority on ______
   - [ ] the claims:

     pages ______ as originally filed/furnished.
     pages* ______ as amended (together with any statement) under Article 19
     pages* ______ received by this Authority on ______
     pages* ______ received by this Authority on ______
   - [ ] the drawings:

     pages ______ as originally filed/furnished.
     pages* ______ received by this Authority on ______
     pages* ______ received by this Authority on ______
   - [ ] a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. [ ] The amendments have resulted in the cancellation of:
   - [ ] the description, pages ______
   - [ ] the claims, Nos. ______
   - [ ] the drawings, sheets/figs ______
   - [ ] the sequence listing *(specify)*: ______
   - [ ] any table(s) related to the sequence listing *(specify)*: ______

4. [ ] This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - [ ] the description, pages ______
   - [ ] the claims, Nos. ______
   - [ ] the drawings, sheets/figs ______
   - [ ] the sequence listing *(specify)*: ______
   - [ ] any table(s) related to the sequence listing *(specify)*: ______

5. [ ] This report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 70.2(e)).

6. [ ] Supplementary international search report(s) from Authority(ies) ______ have been received and taken into account in drawing up this report (Rule 45*bis*.8(b) and (c)).

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-25	YES
	Claims	----	NO
Inventive step (IS)	Claims	1-11, 13-25	YES
	Claims	12	NO
Industrial applicability (IA)	Claims	1-25	YES
	Claims	----	NO

2. Citations and explanations (Rule 70.7)

The claimed invention

The claimed invention concerns a method for transmitting system information.
In LTE, system information can be divided in two parts, a fixed part sent on BCH and a dynamic part sent on the DL-SCH. Different portions of the dynamic part of the system information need to be repeated more or less often.

The claimed invention solves this problem by transmitting control information in recurring time windows and indicating to the receiving UE which subframes that are dynamically selected to carry control information.

Cited documents:

D1: "Draft text proposal capturing agreements on system Information"
R2-072205
3GPP TSG-RAN2 Meeting #58
Kobe, Japan, 7th-11th May 2007

D2: "System information scheduling and change notification"
R2-071912
3GPP TSG-RAN2 Meeting #58
Kobe, Japan, 7th-11th May 2007

D3: 3GPP TS36.300 V8.0.0 (2007-03)

D4: WO 2007052917 A1
D5: EP 1799003 A1

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box V

D1, which is considered to represent the most relevant prior art, describes transmission of system information in LTE. See the whole document.

D2, which is also considered to be a relevant document, describes system information scheduling. See the whole document.

D3, which is a background art document, is the 3Gpp specification for E-UTRA and E-UTRAN, overall description. See pages 36 and 72-74.

D4 is a background art document. According to D4, in the related art, it can be said that the system information is always fixed or non- flexible. Such fixed format allows a mobile terminal to easily detect and properly read the system information transmitted from the network. In contrast, the features of the invention in D4 allow at least some portions of the system information to be dynamically (or flexibly) changed. Appropriate indicators are included such that a mobile terminal can properly detect and read the dynamic (flexible) system information. See abstract, sections [3]-[4], [15], [32]-[34] and [44]-[59] and figures 2-3 and 7-8.

D5, which is a background art document, describes mapping of broadcast system information to a shared transport channel. See abstract, sections [0025]-[0026] and [0032]-[0048] and figures 6 and 10-12.

Claim 12

In D1, a group of system information blocks (SIBs) that have the same scheduling requirements are referred to as a Scheduling Unit (SU). The most frequently repeated SU (SU-1) carries scheduling information of the other SUs and indication in which the SU the SIB is included. An SU may furthermore be segmented, in which case segments are scheduled in subsequent consecutive subframes.

To indicate in which the SU the SIB is included is considered to be comparable to indicate which subframes that carries system information.

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box V

Hence, the claimed invention differs from D1 in that each subframe includes an indicator to indicate which subframe that carries system information. However, to include an indicator in each subframe, instead of an indicator in SU-1 that indicates which subframes that carries system information, is not considered to go beyond what can be expected from a person skilled in the art. Consequently, claim 12 is considered to fail to involve an inventive step.

Claims 1-11 and 13-25

The invention defined in claims 1-11 and 13-25 is not disclosed by any of these documents.
The cited prior art does not give any indication that would lead a person skilled in the art to the claimed invention of transmitting the system information in recurring time windows, each said time window spanning a
number of signal subframes, and dynamically selecting which sub-frames within a given time window are to be used and including an indicator in each of the selected sub-frames to indicate to receiving User Equipment that the sub-frame carries system information. Therefore, the claimed invention is not obvious to a person skilled in the art.

Accordingly, the invention defined in claims 1-11 and 13-25 is novel and is considered to involve an inventive step. The invention is industrially applicable.

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claims 1, 10, 12, 15 and 21 are not supported by the description as required by Article 6 PCT, as their scope is broader than justified by the description and drawings. The technical feature "downlink shared channel", included in claim 12, is missing in claims 1, 10, 15 and 21. Furthermore, the feature "dynamically selecting which subframes to be used for carrying the system information", included in claims 1 and 10, is missing in claim 12.
Since independent claims 1, 10, 12, 15 and 21 do not contain the same technical features, they do not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

Furthermore, claims 1, 10, 15 and 21 do not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. In claims 1 and 10 the expression "recurring time windows overlaid on a sequence of transmit channel subframes" is used. However, in claims 15 and 21 it is stated "recurring time window **used for transmission of system information**". Since different wordings are used, it is unclear if the matter for which protection is sought is equal for claims 1 and 10 as for claims 15 and 21.

The applicant has stated that the feature "downlink shared channel", included in claim 12, not is a technical feature essential to the definition of the invention, since it follows that "in LTE, the **fixed part** of the system information is transmitted using the BCH (broadcast control channel) transport channel" (see page 2). What should also be noted is found on page 2, lines 12-14, where it is stated **"The dynamic part** of the system information is assumed to be transmitted using the DL-SCH, or at least DL-SCH-like transport channel, similar to normal data transmission as described above". The applicant thus claims that transmitting system information on the DL-SCH is merely an alternative.

However, from the description it is obvious that the mentioned system information that is transmitted is **the dynamic part** of the system information (see page 2: lines 20-25 and 31).

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box VIII

The claimed invention is said to solve the problem that different portions of **the dynamic part** of the system information are more or less time critical, and thus need to be repeated more or less often. Furthermore, line 31 on page 2 states that "The invention described below allows for transmission of **the dynamic part** of the system information fulfilling these requirements and desirable properties while, at the same time, allowing for low UE complexity.

Hence, since the dynamic part is transmitted using the DL-SCH, the technical feature "downlink shared channel", missing in claims 1, 10, 15 and 21, is considered to be a technical features essential to the definition of the invention.

Furthermore, the applicant has referred to page 5, lines 24-26, in order to show the support in the description for claims 1 and 10. In the same section on that page (on lines 22-24) it is stated that "for latency reasons there may in some situations, be a benefit to not having too many consecutive subframes used for transmission of system information, thus making them unavailable for downlink user data transmission", i.e. the system information and downlink user data **shares** the same resources. This clearly shows that the system information, in claims 1 and 10, is sent on the DL-SCH.

Box No. VIII (iv) DECLARATION: INVENTORSHIP (only for the purposes of the designation of the United States of America)
The declaration must conform to the following standardized wording provided for in Section 214; see Notes to Boxes Nos. VIII, VIII (i) to (v) (in general) and the specific Notes to Box No. VIII (iv). If this Box is not used, this sheet should not be included in the request.

Declaration of inventorship (Rules 4.17(iv) and 51*bis*.1(a)(iv)) for the purposes of the designation of the United States of America:

I hereby declare that I believe I am the original, first and sole (if only one inventor is listed below) or joint (if more than one inventor is listed below) inventor of the subject matter which is claimed and for which a patent is sought.

This declaration is directed to the international application of which it forms a part (if filing declaration with application).

This declaration is directed to international application No. PCT/ SE2008/050407 (if furnishing declaration pursuant to Rule 26*ter*).

I hereby declare that my residence, mailing address, and citizenship are as stated next to my name.

I hereby state that I have reviewed and understand the contents of the above-identified international application, including the claims of said application. I have identified in the request of said application, in compliance with PCT Rule 4.10, any claim to foreign priority, and I have identified below, under the heading "Prior Applications," by application number, country or Member of the World Trade Organization, day, month and year of filing, any application for a patent or inventor's certificate filed in a country other than the United States of America, including any PCT international application designating at least one country other than the United States of America, having a filing date before that of the application on which foreign priority is claimed.

Prior Applications: US 60/944,628

I hereby acknowledge the duty to disclose information that is known by me to be material to patentability as defined by 37 C.F.R. § 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the PCT international filing date of the continuation-in-part application.

I hereby declare that all statements made herein of my own 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 Section 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.

Name: DAHLMAN, Erik

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Citizenship: Sweden

Inventor's Signature: [signature] Date: 2008-04-13
(The signature must be that of the inventor, not that of the agent)

Name: VUKAJLOVIC, Vera

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Mailing Address:

Citizenship: Sweden

Inventor's Signature: [signature] Date: 20 May 08
(The signature must be that of the inventor, not that of the agent)

☐ This declaration is continued on the following sheet, "Continuation of Box No. VIII (iv)".

Electronic Acknowledgement Receipt	
EFS ID:	6623170
Application Number:	12664347
International Application Number:	
Confirmation Number:	1464
Title of Invention:	Transmission of System Information on a Downlink Shared Channel
First Named Inventor/Applicant Name:	Erik Dahlman
Customer Number:	24112
Filer:	Michael Murphy/Laura Wade
Filer Authorized By:	Michael Murphy
Attorney Docket Number:	4015-6727 / P24241-US2
Receipt Date:	11-DEC-2009
Filing Date:	
Time Stamp:	18:00:25
Application Type:	U.S. National Stage under 35 USC 371

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	NPL Documents	3GPP-TS-36-300.pdf	792229 4f6e3fbeca4f2e4fca68ba6d945cc3d9d41b2b3e	no	82

Warnings:

Information:

Total Files Size (in bytes):	792229

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.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
24 December 2008 (24.12.2008)

PCT

(10) International Publication Number
WO 2008/156412 A2

(51) International Patent Classification:
H04L 1/00 (2006.01) *H04J 3/00* (2006.01)

(21) International Application Number: PCT/SE2008/050407

(22) International Filing Date: 10 April 2008 (10.04.2008)

(25) Filing Language: English

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[Continued on next page]

(54) Title: TRANSMISSION OF SYSTEM INFORMATION

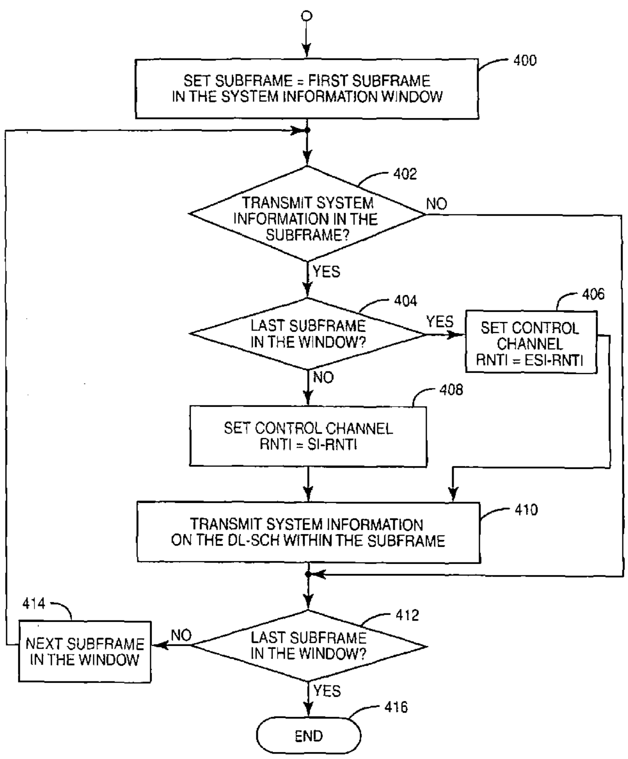

FIG. 4

(57) Abstract: In one embodiment, a method of transmitting system information on a down link shared channel structured as successive subframes includes transmitting (400 - 416) system information in regularly occurring time windows, each time window spanning some number of successive subframes. The method further includes indicating (406 / 408) to receiving user equipment (120) which subframes within a given time window carry system information. The method and variations of it are applied, for example, to the transmission of dynamic system information on the down link shared channel or other down link channel in a 3GPP E-UTRA wireless communication network (100).

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TRANSMISSION OF SYSTEM INFORMATION

BACKGROUND

Technical Field

The present invention generally relates to wireless communication networks, and particularly relates to the transmission of system information to user equipment (UE) operating in such networks, such as the transmission of system information by radio base stations in a wireless communication network configured according to 3GPP E-UTRA (evolved Universal Terrestrial Radio Access) standards, also referred to as 3GPP LTE (Long Term Evolution).

Background

In the 3GPP LTE, downlink user-data transmission is carried out on the Downlink Shared Channel (DL-SCH) transport channel. In LTE, the time dimension is divided into radio frames of length 10 ms, where each radio frame consists of 10 subframes, each of length 1 ms corresponding to 14 OFDM (orthogonal frequency-division multiplexing) symbols. Each subframe consists of two slots, each of length 0.5 ms or seven OFDM symbols. Note that, in case of Time Division Duplex (TDD), only a subset of the subframes of one frame is available for downlink transmission. On the other hand, in case of Frequency Division Duplex (FDD), all subframes on a downlink carrier are available for downlink transmission.

In LTE, the overall time/frequency-domain physical resource is divided into resource blocks, where each resource block consists of twelve OFDM subcarriers during one slot. DL-SCH transmission to a UE is carried out using a set of such resource blocks during one subframe. Layer 1 / Layer 2 (L1/L2) control signaling, also known as the Physical Downlink Control Channel (PDCCH), is transmitted at the beginning of each subframe. The L1/L2 control channel is typically used to inform a UE about various items. For example, the L1/L2 control channel may identify whether the DL-SCH carries data to the UE in the given subframe. More specifically, the L1/L2 control channel then includes the RNTI (Radio Network Temporary Identifier) associated with the UE for which the DL-SCH carries data in the given subframe. The L1/L2 control channel then also identifies the physical resource, more specifically the specific set of resource blocks that is used for the DL-SCH transmission to the specific UE in the given subframe. Moreover, the L1/L2 control channel then identifies the transport format (e.g. the modulation scheme and coding rate) used for DL-SCH transmission to the specific UE in the given subframe. Separate DL-SCH transmissions, using different physical resources (different resource blocks), can be carried out to different UEs during the same subframe. In this case there are multiple L1/L2 control channels, one for each UE that is to receive DL-SCH transmission in the given subframe.

In addition to user data, system information is also transmitted on the downlink within each cell. The system information may, e.g., include: public Land Mobile Network (PLMN) identity/identities, identifying the operator(s) to which the cell "belongs"; Neighbor-cell list, i.e. a list of the cells that are neighbors to the current cell; and different parameters used by the user terminal when accessing the system, e.g. random-access parameters and cell-access restrictions. The system information can be divided into two parts, one part being fixed and the other part being dynamic. The fixed part of the system information is transmitted on a pre-determined physical resource, i.e. a specific set of OFDM subcarriers during a specific time interval, using a pre-determined transport format. There is thus no flexibility in the amount of information in the fixed part of the system information. There is also no flexibility in the transmission structure (the physical resource and the transport format) used for the fixed part of the system information. In LTE, the fixed part of the system information is transmitted using the BCH (broadcast control channel) transport channel. Furthermore, for LTE it is currently assumed that the BCH is transmitted in the six centre resource blocks in subframe #0 of each frame.

The dynamic part of the system information is assumed to be transmitted using the DL-SCH, or at least a DL-SCH-like transport channel, similar to normal data transmission as described above. New UEs continuously "enter" the cell, either entering from a neighbor cell, due to power-on, or upon return from out-out-service, and the UEs must quickly acquire the system information. Thus the system information (both the fixed part on the BCH and the dynamic part on the DL-SCH or a DL-SCH-like channel) should be repeated regularly.

As an example, in LTE the fixed part of the system information (transmitted using the BCH) is assumed to be repeated every 40 ms. Also the dynamic part of the system information should be repeated more or less regularly. However, different portions of the dynamic part of the system information are more or less time critical, in the sense of how quickly the UE must acquire it, and thus need to be repeated more or less often. This can be described so that the dynamic part of the system information is divided into different so-called scheduling units, also referred to as System Information Messages. In general, information corresponding to scheduling unit number n should be repeated more often than information corresponding to scheduling unit number n+1. As an example, scheduling unit #1 (SU-1) may be repeated (approximately) once every 80 ms, scheduling unit #2 (SU-2) may be repeated (approximately) once every 160 ms, scheduling unit #3 (SU-3) may be repeated (approximately) once every 320 ms, etc.

SUMMARY

The invention described below allows for transmission of the dynamic part of the system information fulfilling these requirements and desirable properties while, at the same time, allowing for low UE complexity. One aspect of the teachings presented herein is to transmit system information in regularly occurring (system information) windows, with specific RNTIs indicating the presence of system information in a subframe, and with another specific RNTI indicating the end of system information transmission. This enables UEs to stop receiving, demodulating and decoding subframes when no more system information is expected during the current window.

In one embodiment, a method of transmitting system information on a downlink shared channel structured as successive subframes includes transmitting system information in regularly occurring time windows, each time window spanning some number of successive subframes. The method further includes indicating to receiving user equipment which subframes within a given time window carry system information.

Of course, the present invention is not limited to the above features and advantages. Indeed, those skilled in the art will recognize additional features and advantages upon reading the following detailed description, and upon viewing the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram of an embodiment of a wireless network that overlays or otherwise defines a recurring sequence of time windows for the transmission of dynamic system information using subframes falling within the defined time windows.

Figure 2 is a diagram of an embodiment of different system-information time windows having different repetition periods.

Figure 3 is a diagram of an embodiment of overlaying or otherwise defining a recurring sequence of time windows for the transmission of dynamic system information using subframes falling within the defined time windows.

Figure 4 is a flow diagram of an embodiment of program logic for overlaying or otherwise defining a recurring sequence of time windows for the transmission of dynamic system information using subframes falling within the defined time windows.

Figure 5 is a flow diagram of an embodiment of program logic for processing recurring system-information time windows containing dynamic system information included in subframes falling within the defined time windows.

Figure 6 is a diagram of an embodiment of variably sized recurring system-information time windows for the transmission of system information.

Figure 7 is a diagram of an embodiment of different system-information time windows.

DETAILED DESCRIPTION

Figure 1 illustrates an embodiment of a wireless network 100 including one or more network transmitters 110 such as a radio base station which services one or more UEs 120. The network transmitter 110 includes a baseband processor 130 for generating one or more scheduling units 132 (also referred to as System Information Messages) including dynamic parts of the system information. The network transmitter 110 sends the scheduling units 132 to the UE 120 using different system-information windows. In one embodiment, the system-information windows occur with a period corresponding to the repetition period of the most frequently occurring scheduling unit 132 as shown in Figure 2 where "SU-n" refers to the nth scheduling unit 132. System information corresponding to the most frequently occurring scheduling unit 132 is transmitted within each system-information window while less frequently-occurring scheduling units 132 are transmitted only within a sub-set of the system-information windows, where system information is shown as a shaded area in Figure 2. For illustrative purposes only, system information corresponding to a second one of the scheduling units 132 could be transmitted within every second window, system information corresponding to a third one of the scheduling units 132 could be transmitted within every fourth window, and so on.

In one embodiment, the transmission timing corresponding to each scheduling unit 132 can be pre-specified when a limited amount of transmission periods are employed by the network 100. In another embodiment, the window transmission timing can be signaled to the UE 120, e.g. when more specific values for transmitted scheduling units 132 are specified. Either way, a variable window size can be used if the amount of system information is not the same in each window. In one embodiment, the window size is increased when system information from additional scheduling units 132 is transmitted.

Figure 3 illustrates one embodiment of transmitting the dynamic (possibly changing) system information within regularly occurring windows with well-defined starting points (specific subframes) and of a certain size in number of (consecutive) subframes. In the illustration, the system-information windows, more generally regarded as recurring time windows defined for the transmission of system information, start at subframe #5 of the frame with frame number 8*k and have a size of 13 subframes. The network transmitter 110 only transmits the dynamic part of the system information within these windows. Moreover, the window occurs (is repeated) often enough to fulfill the repetition rate of the most often repeated system information (in LTE terminology, system information corresponding to the first scheduling unit 132, as described above).

In one or more embodiments, within each recurring time window, the transmission of system information is carried out similar to the transmission of user data on DL-SCH (dynamic resource and transport format with signaling on L1/L2 control channel), with some exceptions. Instead of using an RNTI of a specific UE 120, a specific System-Information RNTI (SI-RNTI), indicating that system information to be read by all UEs 120 is being transmitted, is included in the corresponding L1/L2 control signaling. Also, for the last piece of system information to be transmitted within the window, the SI-RNTI is replaced with an End-of-System-Information RNTI (ESI-RNTI). The reception of an ESI-RNTI informs the UE 120 that no more system information is transmitted within the window. The UE 120 can stop demodulating and decoding the L1/L2 control channel when there is no more system information to be transmitted in the window, thus improving UE power-saving performance.

Moreover, the system information does not have to be transmitted in consecutive subframes. This way, the network transmitter 110 can dynamically avoid transmitting system information in certain subframes when a more pressing need for subframes arises, e.g., when a subframe is needed for high priority downlink data transmission or for uplink transmission in case of TDD. In addition, the set of subframes in which system information is actually transmitted does not have to be the same between consecutive windows. Furthermore, the network transmitter 110 can dynamically vary the number of subframes used to carry system information without prior knowledge of the UE 120 (i.e., prior to the UE 120 reading the L1/L2 control channel).

As non-limiting examples, the teachings presented herein for transmitting system information yields several desirable properties. For example, there are several requirements and desired properties for the transmission of the dynamic part of the system information. From a UE power-consumption point of-view, it is desirable to transmit the different parts of the system information as close in time as possible to each other, in the ideal case in a set of consecutive subframes. This enables the UE 120 to receive the maximum amount of system information during a minimum reception time, reducing UE reception time and UE power consumption.

The teachings herein also allow system information to be transmitted in recurring time windows, where the particular subframes within each window used for carrying system information are selectable. If current conditions, e.g., competing transmission priorities permit, the system information can be transmitted in a contiguous set of subframes within the time window.

It is also desirable to have flexibility in terms of exactly where the system information is transmitted, i.e., exactly which set of subframes within a given time window carries the system information. Some subframes, depending on the situation, may not be available for transmitting system information. For example, some TDD subframes may not be available for downlink transmission. In another example, for latency reasons there may, in some situations, be a benefit to not having too many consecutive subframes used for transmission of system information, thus making them unavailable for downlink user data transmission. As such, it is also desirable to dynamically (with low delay) decide in exactly what subframes the system information is to be transmitted.

Further, it is desirable to have flexibility in the rate by which different parts of the system information is repeated. In this way, a higher repetition rate (shorter repetition period) can be used, e.g. in the case of wider overall transmission bandwidth, when the overhead of the system-information transmission is less of a concern. It is desirable to have flexibility in the number of subframes used to transmit the system information. As an example, in case of smaller overall bandwidth or larger cells, more subframes may be needed to transmit a given set of system information. Moreover, the amount of system information, e.g. neighbor lists and PLMN lists may be of different sizes for different cells.

The teachings presented herein provide for methods and apparatuses where system information is transmitted within recurring time windows, but with flexible selection of which subframes within those windows are used to carry system information. Figure 4 illustrates one embodiment of program logic for transmitting system information from the network transmitter 110 to the UE 120. According to this embodiment, the baseband processor 130 included in the network transmitter 110 initializes the first subframe in the system-information window (Step 400). The baseband processor 130 then determines whether the current subframe is to be used for transmission of system information (Step 402). If so, the baseband processor 130 determines whether the current subframe is the last subframe in the window (Step 404). If the current subframe is the last subframe, the RNTI of the L1/L2 control channel is set to ESI-RNTI for indicating to the UE 120 that the subframe is the last subframe in the window containing system information. (Step 406). Otherwise, the control channel RNTI is set to SI-RNTI for indicating to the UE 120 that the subframe contains system information, but is not the last subframe. (Step 408). The corresponding system information is transmitted on the DL-SCH within the current subframe (Step 410). The baseband processor 130 determines whether the last window subframe has been transmitted (Step 412). If not, Steps 402 – 412 are repeated for the next subframe within the window. The system information transmission process ends when the last subframe is transmitted (Step 416).

Figure 5 illustrates one embodiment of program logic carried out by the UE 120 for processing the system information transmitted by the network transmitter 110. According to this embodiment, the UE 120 includes a baseband processor 140 for demodulating and decoding received subframes. A window detection and evaluation unit 150 included in or associated with the baseband processor 140 begins the window reception process by initializing the first subframe received within the window (Step 500). The baseband processor 150 then demodulates and decodes the L1/L2 control channel of the current subframe (Step 502). The window detection and evaluation unit 150 determines whether either SI-RNTI or ESI-RNTI is detected for the current subframe (Step 504). If so, the baseband processor 140 demodulates and decodes the corresponding DL-SCH transport block to retrieve the system information provided therewith (Step 506). The window detection and evaluation unit 150 then determines whether the current subframe is the last subframe in the window or the last subframe containing system information, e.g., whether the RNTI of the control channel is ESI-RNTI (Step 508). If neither condition exists, Steps 502 – 508 are repeated for the next subframe within the window (Step 510). The baseband processor 140 stops demodulating and decoding DL-SCH transport blocks when either the last subframe or ESI-RNTI is detected, indicating no more system information is forthcoming (Step 512). Thus, the UE 120 demodulates and decodes the control channel starting with the first subframe in the system information window and checks for specific system information RNTIs until either the ESI-RNTI is detected or the last window subframe is received.

As discussed above, some parts of the system information (corresponding to the scheduling units 132) may not need to be repeated as often as some other parts of the system information, implying that certain windows will include more data (more scheduling units 132) than other windows. Thus, the window size may be of varying length, with a longer window at the time instances where more system information (more scheduling units 132) is to be transmitted. Figure 6 provides an illustration of a variable-length window embodiment.

Note that the window size can be specified in either the radio-access specification or be configurable. In case of a configurable window size, the UE 120 can use a default (large) window size before it is informed (via the system information) about the actual window size. Moreover, the RNTI may indicate more than just system information such as more details about the system information. In one embodiment, several different SI-RNTIs could be used, e.g., SI-RNTI1, SI-RNTI2, SI-RNTI3, ..., with corresponding multiple ESI-RNTIs, e.g., ESI-RNTI1, ESI-RNTI2, ESI-RNTI3, etc.

In one embodiment, the scheduling units 132 transmitted at the same time use the same system-information window as shown in the upper part of Figure 7. Alternatively, the scheduling units 132 are transmitted using different system-information windows as shown in the lower part of Figure 7. In either embodiment, system information is transmitted in regularly occurring system-information windows, with specific RNTIs indicating the presence of system information in a subframe, and with another specific RNTI indicating the end of system information transmission.

Of course, other variations are contemplated. Thus, the foregoing description and the accompanying drawings represent non-limiting examples of the methods and apparatus taught herein for the transmission of system information. As such, the present invention is not limited by the foregoing description and accompanying drawings. Instead, the present invention is limited only by the following claims and their legal equivalents.

CLAIMS

What is claimed is:

1. A method of transmitting system information on the downlink of a wireless communication network comprising:

    transmitting (410) system information in recurring time windows overlaid on a sequence of transmit channel subframes;

    dynamically selecting (402) which subframes within a given time window are to be used for carrying the system information; and

    including (406 / 408) an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

2. The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a contiguous set of subframes within the given time window.

3. The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a non-contiguous set of subframes within the given time window.

4. The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting which subframes to use for transmitting system information in view of competing transmission priorities associated with other control or data signaling.

5. The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information comprises using an RNTI (Radio Network Temporary Identifier) to denote that the subframe carries system information.

6. The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using an end-of-system-information indicator in a last subframe of the given time window that carries system information.

7. The method of claim 1, further comprising varying window sizes of the recurring time windows.

8. The method of claim 1, further comprising dynamically configuring a window size for the recurring time windows.

9. The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using different indicators corresponding to different types of system information, such that the indicator used for a particular subframe indicates the type of system information carried in that subframe.

10. A network transmitter (110) comprising a baseband processor (130) configured to:

generate system information in recurring time windows overlaid on a sequence of transmit channel subframes;

dynamically select which subframes within a given time window are to be used for carrying system information; and

include an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

11. The network transmitter of claim 10, wherein the network transmitter comprises a radio base station configured for operation in accordance with 3GPP E-UTRA standards.

12. A method of transmitting system information on a downlink shared channel structured as successive subframes, the method comprising:

transmitting (400 – 416) system information in regularly occurring time windows, each time window spanning some number of successive subframes; and

indicating (406 / 408) to receiving user equipment which subframes within a given time window carry system information.

13. The method of claim 12, wherein indicating to receiving user equipment which subframes within a given time window carry system information includes indicating the last subframe within the given time window that carries system information, thereby allowing the receiving user equipment to cease monitoring for system information within the given time window.

14. The method of claim 12, further comprising dynamically selecting which subframes within a given time window are to be used for carrying system information.

15. A method for a mobile station to receive system information from a supporting wireless communication network, the method comprising:

beginning monitoring (500 and 502) for the receipt of system information at the start of each time window in a succession of recurring time windows used for the transmission of system information, each said time window spanning a number of signal subframes;

within each time window, monitoring (504 – 510) each signal subframe for an indication of system information and reading system information from the signal subframe if such information is present; and

terminating monitoring (512) at least at the end of the time window.

16. The method of claim 15, further comprising recognizing an end-of-system-information indicator in a signal subframe received within the time window and terminating monitoring for the time window in response.

17. The method of claim 15, further comprising adapting to changing or configurable window sizes used for the time window.

18. The method of claim 15, further comprising storing a default window size for monitoring for system information transmissions.

19. The method of claim 18, further comprising monitoring for system information transmissions based on a specified window size indicated in received information rather than the default window size.

20. The method of claim 15, further comprising recognizing different types of system information based on recognizing different system information indicators in different signal subframes.

21. A mobile station (120) comprising a baseband processor (140) operable to:

begin monitoring for the receipt of system information at the start of each time window in a succession of recurring time windows used for the transmission of system information, each said time window spanning a number of signal subframes;

within each time window, monitor each signal subframe for an indication of system information and reading system information from the signal subframe if such information is present; and

terminate monitoring at least at the end of the time window.

22. The mobile station of claim 21, wherein the baseband processor is operable to recognize an end-of-system-information indicator in a signal subframe received within the time window and terminate monitoring for the time window in response.

23. The mobile station of claim 21, wherein the baseband processor is operable to adapt to changing or configurable window sizes used for the time window.

24. The mobile station of claim 21, wherein the baseband processor is operable to monitor for system information transmissions based on a specified window size indicated in received information rather than a default window size.

25. The mobile station of claim 21, wherein the baseband processor is operable to recognize different types of system information based on different system information indicators detected in different signal subframes.

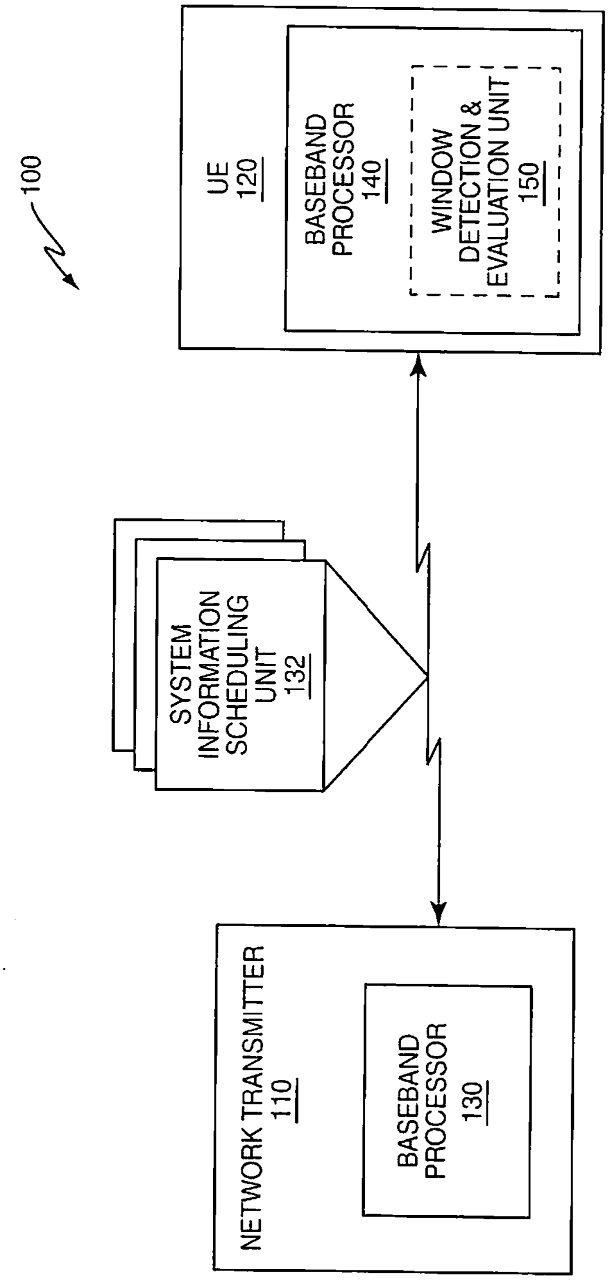
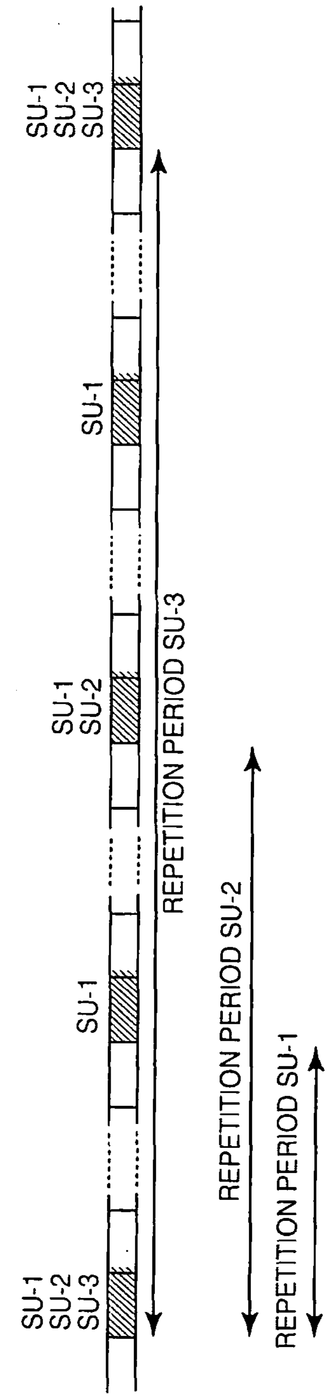

100
UE
120
BASEBAND
PROCESSOR
140
WINDOW
DETECTION &
EVALUATION UNIT
150
SYSTEM
INFORMATION
SCHEDULING
UNIT
132
NETWORK TRANSMITTER
110
BASEBAND
PROCESSOR
130

FIG. 1


SU-1
SU-2
SU-3
SU-1
SU-1
SU-2
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SU-2
SU-3
REPETITION PERIOD SU-3
REPETITION PERIOD SU-2
REPETITION PERIOD SU-1

FIG. 2

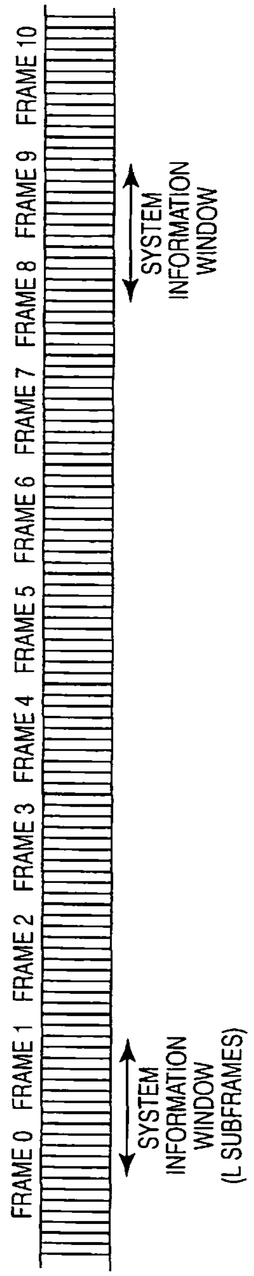

FRAME 0
FRAME 1
FRAME 2
FRAME 3
FRAME 4
FRAME 5
FRAME 6
FRAME 7
FRAME 8
FRAME 9
FRAME 10
SYSTEM INFORMATION WINDOW (L SUBFRAMES)
SYSTEM INFORMATION WINDOW

FIG. 3

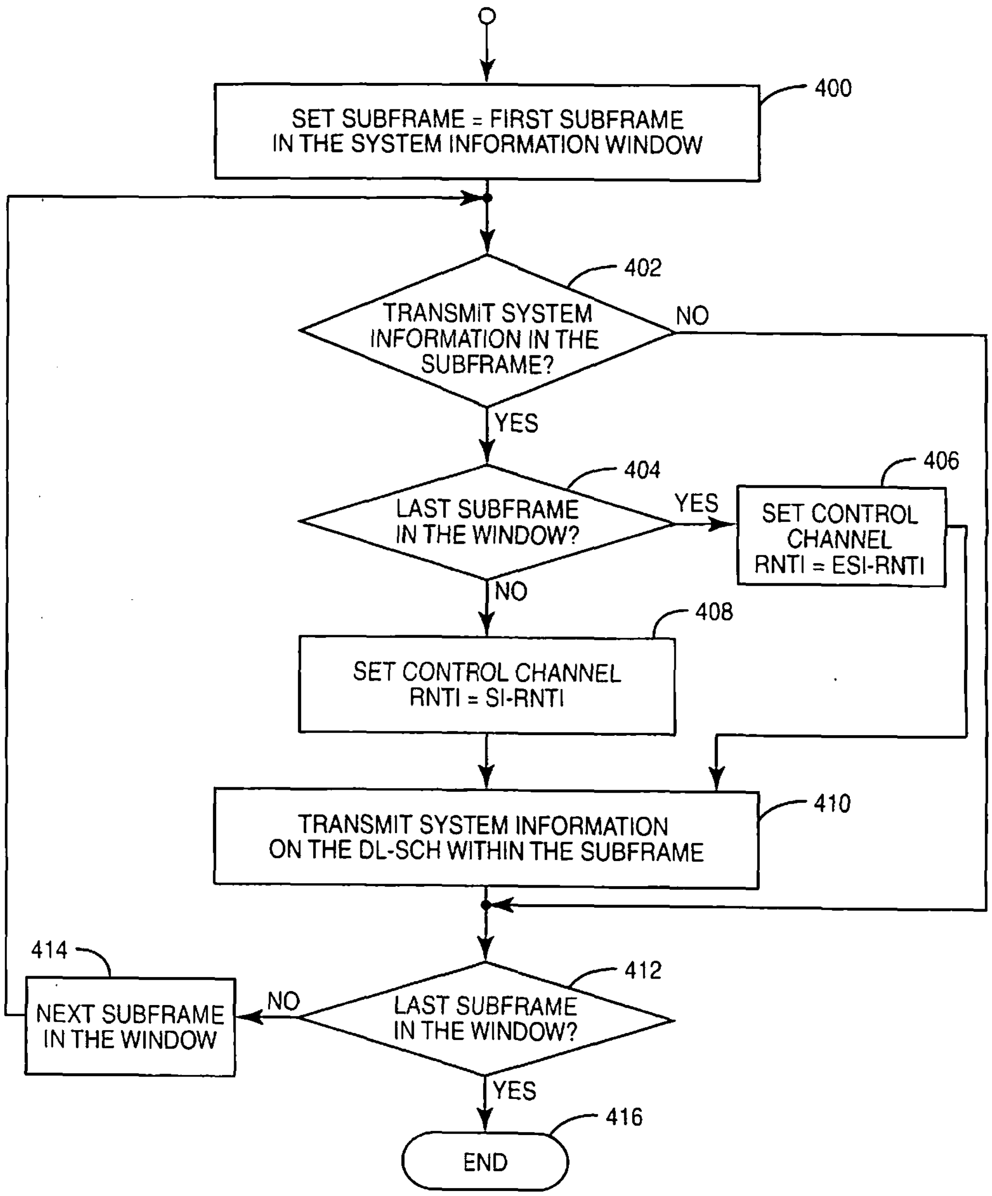

400
SET SUBFRAME = FIRST SUBFRAME IN THE SYSTEM INFORMATION WINDOW
402
TRANSMIT SYSTEM INFORMATION IN THE SUBFRAME?
NO
YES
404
LAST SUBFRAME IN THE WINDOW?
YES
406
SET CONTROL CHANNEL RNTI = ESI-RNTI
NO
408
SET CONTROL CHANNEL RNTI = SI-RNTI
410
TRANSMIT SYSTEM INFORMATION ON THE DL-SCH WITHIN THE SUBFRAME
414
NEXT SUBFRAME IN THE WINDOW
NO
412
LAST SUBFRAME IN THE WINDOW?
YES
416
END

FIG. 4

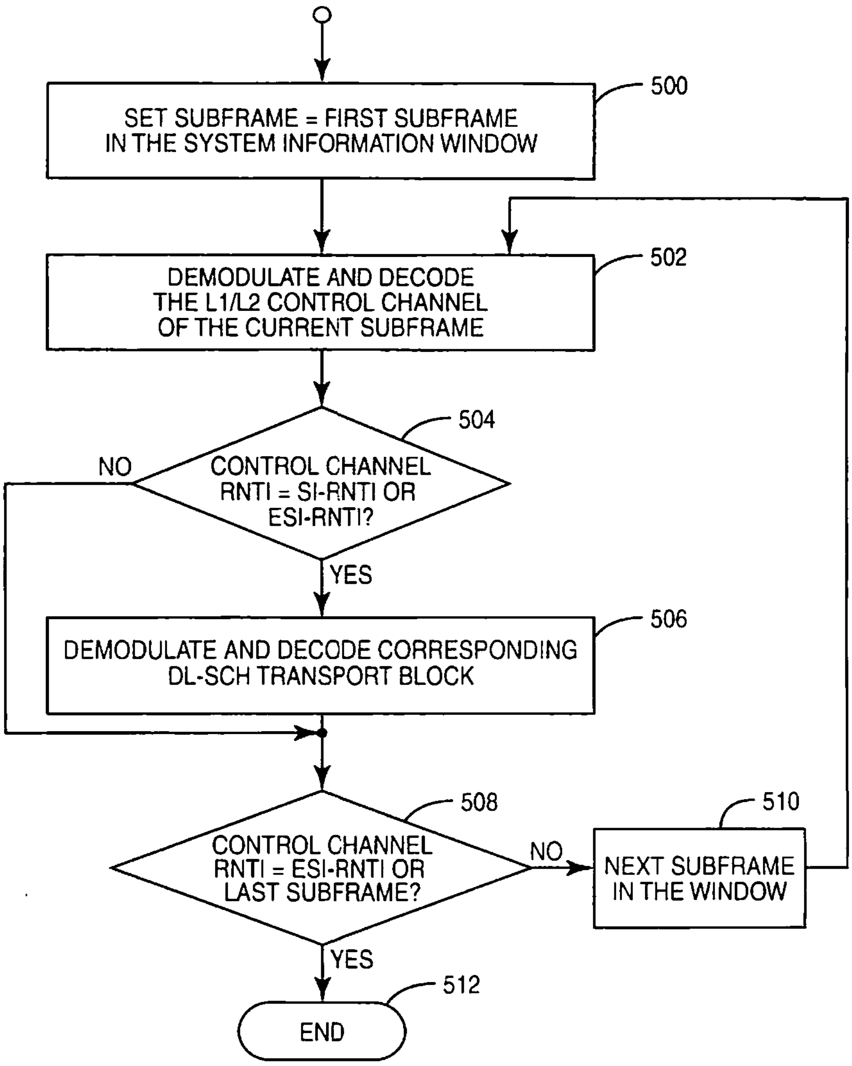

500
SET SUBFRAME = FIRST SUBFRAME IN THE SYSTEM INFORMATION WINDOW
502
DEMODULATE AND DECODE THE L1/L2 CONTROL CHANNEL OF THE CURRENT SUBFRAME
504
CONTROL CHANNEL RNTI = SI-RNTI OR ESI-RNTI?
NO
YES
506
DEMODULATE AND DECODE CORRESPONDING DL-SCH TRANSPORT BLOCK
508
CONTROL CHANNEL RNTI = ESI-RNTI OR LAST SUBFRAME?
NO
510
NEXT SUBFRAME IN THE WINDOW
YES
512
END

FIG. 5

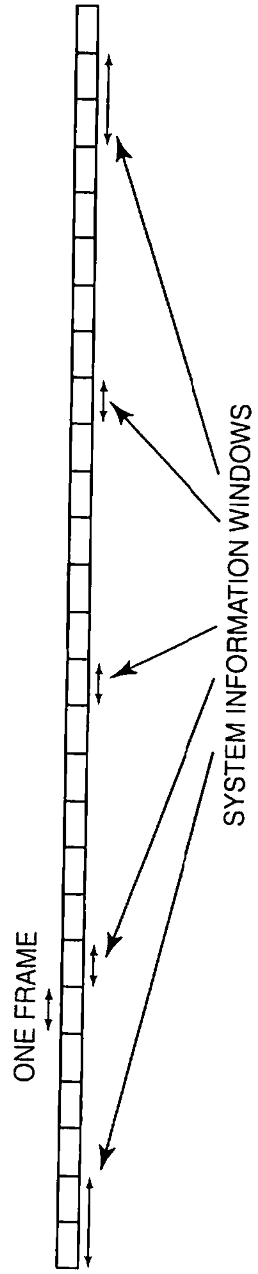
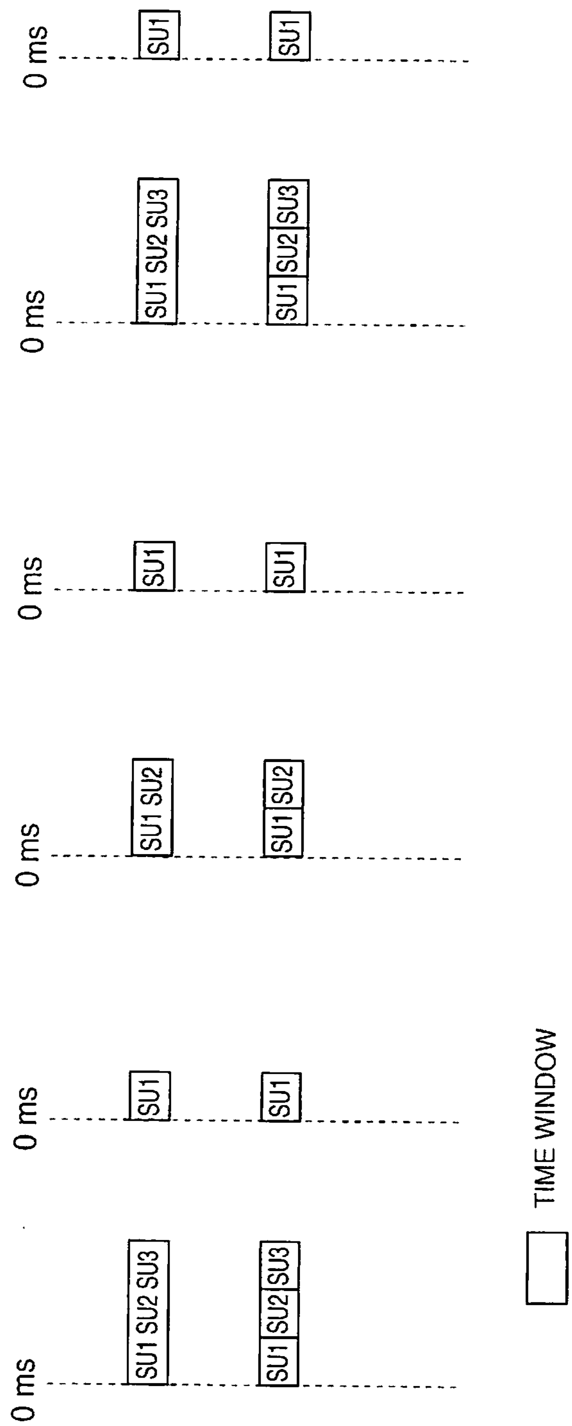


FIG. 6



0 ms
SU1
SU1
0 ms
SU1 SU2 SU3
SU1 SU2 SU3
0 ms
SU1
SU1
0 ms
SU1 SU2
SU1 SU2
0 ms
SU1
SU1
0 ms
SU1 SU2 SU3
SU1 SU2 SU3
TIME WINDOW

FIG. 7

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Declarations under Rule 4.17:
— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
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(54) Title: TRANSMISSION OF SYSTEM INFORMATION ON A DOWNLINK SHARED CHANNEL

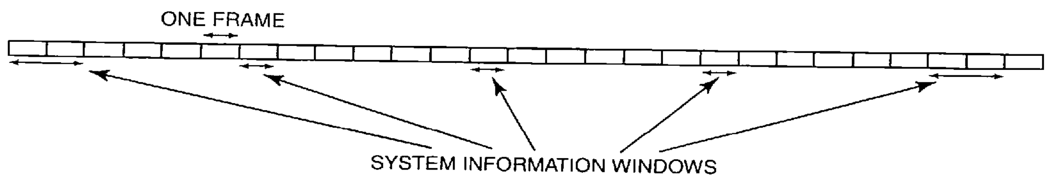

FIG. 6

(57) Abstract: In one embodiment, a method of transmitting system information on a down link shared channel structured as successive subframes includes transmitting (400 - 416) system information in regularly occurring time windows, each time window spanning some number of successive subframes. The method further includes indicating (406 / 408) to receiving user equipment (120) which subframes within a given time window carry system information. The method and variations of it are applied, for example, to the transmission of dynamic system information on the down link shared channel or other down link channel in a 3GPP E-UTRA wireless communication network (100).

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THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS CONVENTION, IS ***US60/944,628***

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1	Application Data Sheet	AppData.pdf	1517294	no	5
Warnings:					
Information:					
2		Application.pdf	1586828	yes	23
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Specification		1	8	
	Claims		9	14	
	Abstract		15	15	
	Appendix to the Specification		16	19	
	Drawings		20	23	
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4015-5854 / P24241-US1
	Application Number	

Title of Invention	Transmission of System Information

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4015-5854 / P24241-US1
	Application Number	
Title of Invention	Transmission of System Information	

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Application Information:

Title of the Invention	Transmission of System Information		
Attorney Docket Number	4015-5854 / P24241-US1	**Small Entity Status Claimed** ☐	
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Suggested Class (if any)		**Sub Class (if any)**	
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Publication Information:			
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4015-5854 / P24241-US1
	Application Number	
Title of Invention	Transmission of System Information	

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Signature	/Michael D. Murphy/			Date (YYYY-MM-DD)	2007-06-18
First Name	Michael	Last Name	Murphy	Registration Number	44958

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	4015-5854 / P24241-US1
	Application Number	
Title of Invention	Transmission of System Information	

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TRANSMISSION OF SYSTEM INFORMATION

BACKGROUND

Technical Field

[0001] The present invention generally relates to wireless communication networks, and particularly relates to the transmission of system information to user equipment operating in such networks, such as the transmission of system information by radio base stations in a wireless communication network configured according to 3GPP E-UTRA standards, also referred to as 3GPP LTE (Long Term Evolution).

Background

[0002] In the 3GPP Long-Term Evolution (LTE), downlink user-data transmission is carried out on the Downlink Shared Channel (DL-SCH). In LTE, the time dimension is divided into radio frames of length 10 ms, where each radio frame consists of 10 subframes, each of length 1 ms corresponding to14 OFDM symbols. See, e.g., Fig. 1. Note that, in case of Time Division Duplex (TDD), only a subset of the subframes of one frame is available for downlink transmission, with the remaining subframes used for uplink transmission. On the other hand, in case of Frequency Division Duplex (FDD), all subframes on a downlink carrier are available for downlink transmission.

[0003] In LTE, the overall time/frequency-domain physical resource is divided into resource blocks, where each resource block consists of twelve OFDM subcarriers during one subframe. DL-SCH transmission to a user is carried out using a set of such resource blocks during one subframe. Fig. 2 illustrates the described arrangement.

[0004] Layer 1 / Layer 2 (L1/L2) control signaling, also known as the Physical Downlink Control Channel (PDCCH), is transmitted at the beginning of each subframe. The L1/L2 control channel is, among other things, used to inform a User Equipment (UE) about the following: if the DL-SCH carries data to this UE in the given subframe, more specifically, if the DL-SCH carries data to a specific UE in the given subframe, the L1/L2 control signaling includes the RNTI

(Radio Network Temporary Identifier) of this specific UE; the physical resource, more specifically the specific set of resource blocks, that is used for the DL-SCH transmission to this specific UE in the given subframe; the transport format (modulation scheme and coding rate) that is used for DL-SCH transmission to this specific UE in the given subframe.

[0005] Separate DL-SCH transmission, using different physical resources (different resource blocks), can be carried out to different UEs during the same subframe. In this case there are multiple L1/L2 control channels, one for each DL-SCH transmission.

[0006] In addition to user data, system information needs to be transmitted on the downlink within each cell. Such system information may e.g. include: public Land Mobile Network (PLMN) identity/identities, identifying the operator(s) to which the cell "belongs"; Neighbor-cell list, i.e. a list of the cells that are neighbors to the current cell; and different parameters used by the user terminal when accessing the system, e.g. random-access parameters and cell-access restrictions. The system information can be divided into two parts, with one part being fixed and one part being dynamic. The fixed part of the system information is transmitted on a pre-determined physical resource using a pre-determined transport format. There is thus no flexibility in the amount of information in the fixed part of the system information. There is also no flexibility in the transmission structure (the physical resource and the transport format) used for the fixed part of the system information. In LTE, the fixed part of the system information corresponds to the BCH transport channel. It is currently assumed that the BCH is transmitted in the six centre resource blocks in subframe #0 of each frame.

[0007] The dynamic part of the system information is assumed to be transmitted using the DL-SCH, or at least on a DL-SCH-like channel, similar to normal data transmission as described above. New UEs continuously "enter" the cell, either entering from a neighbor cell, due to power-on, or upon return from out-out-service, and it must be possible for such UEs to quickly acquire the system information. Thus the system information (both the fixed part and the dynamic part) should be repeated regularly.

[0008] As an example, in LTE the fixed part of the system information (the BCH information) is assumed to be repeated every 40 ms. Also the dynamic part of the system information should be repeated more or less regularly. However, different parts of the dynamic part of the system information are more or less time critical and thus need to be repeated more or less often. This can be described so that the dynamic part of the system information is divided into different so-called scheduling units where, in general, information corresponding to scheduling unit number n should be repeated more often than information corresponding to scheduling unit number n+1. As an example, scheduling unit #1 (SU-1) may be repeated (approximately) once every 80 ms, scheduling unit #2 (SU-2) may be repeated (approximately) once every 160 ms, scheduling unit #3 (SU-3) may be repeated (approximately) once every 320 ms, etc.

SUMMARY

[0009] The invention described below allows for transmission of the dynamic part of the system information fulfilling these requirements and desirable properties while, at the same time, allowing for low UE complexity.

[0010] One aspect of the teachings presented herein is to transmit the system information in regularly occurring (system information) windows, with specific RNTIs indicating the presence of system information in a subframe, and with another specific RNTI indicating the end of system information transmission (thus allowing for the UE to stop receiving when no more system information is expected).

[0011] In one embodiment, a method of transmitting system information on a downlink shared channel structured as successive subframes includes transmitting system information in regularly occurring time windows, each time window spanning some number of successive subframes. The method further includes indicating to receiving user equipment which subframes within a given time window carry system information.

[0012] Of course, the present invention is not limited to the above features and advantages. Indeed, those skilled in the art will recognize additional features and advantages upon reading the following detailed description, and upon viewing the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] Fig. 1 is a diagram of a known frame/subframe signal structure, such as may be used on a downlink channel of a 3GPP E-UTRA network.

[0014] Fig. 2 is a diagram of a known transport channel configuration for the transmission of static system information.

[0015] Fig. 3 is a diagram of overlaying or otherwise defining a recurring sequence of time windows for the transmission of dynamic system information using subframes falling within the defined time windows.

[0016] Fig. 4 is a diagram of variably sized time windows for the transmission of system information.

DETAILED DESCRIPTION

[0017] Fig. 3 illustrates one embodiment of transmitting the dynamic (possibly changing) system information within regularly occurring windows with well-defined starting points (specific subframes) and of a certain size in number of (consecutive) subframes. In the illustration, these system-information windows, more generally regarded as recurring time windows defined for the transmission of system information, start at subframe #5 of the frame with frame number 8*k and have a size of 13 subframes. The network only transmits the dynamic part of the system information within these windows.

[0018] The window should thus occur (be repeated) sufficiently often to fulfill the repetition rate of the most often repeated system information (in LTE terminology, system information corresponding to scheduling unit #1). System information corresponding to other scheduling units with lower repetition rate should be transmitted within a subset of the windows. As an example, system information corresponding to scheduling unit # 2 could be transmitted within every second window, system information corresponding to scheduling unit #3 could be transmitted in every fourth window, etc. When (within what windows) system information corresponding to a certain scheduling unit is to be transmitted could either be specified or signaled.

[0019] In one or more embodiments, within each such system-information window, the transmission of system information is carried out similar to the transmission of user data on DL-SCH (dynamic resource and transport format with signaling on L1/L2 control channel), with the following exceptions: instead of an RNTI of a specific UE, a specific System-Information RNTI (SI-RNTI), indicating that system information to be read by all UEs is being transmitted, is included in the corresponding L1/L2 control signaling; for the last piece of system information to be transmitted within the window, the SI-RNTI is replaced by an End-of-System-Information RNTI (ESI-RNTI). The reception of an ESI-RNTI informs the UE that no more system information is transmitted within the window. Thus the UE does not need to receive further, despite the fact that the entire window has not yet been received, thus allowing for reduced UE power consumption.

[0020] It should be noted that the system information does not need to be transmitted in all subframes within the window. Furthermore, the system information does not need to be transmitted in consecutive subframes. Furthermore, the number of subframes used for system information can be dynamically varied without UE prior knowledge (prior to reading the L1/L2 control).

[0021] As non-limiting examples the teachings presented herein for transmitting system information fulfills to desirable properties of the previous section. For example, there are several requirements and desired properties of the transmission of the dynamic part of the system information. From a UE power-consumption point of-view, it is desirable to transmit the different parts of the system information as close in time as possible to each other, in the ideal case in a set of consecutive subframes. This will allow for a UE to receive the maximum amount of system information during a minimum reception time, thus reducing UE reception time and thus UE power consumption.

[0022] The teachings herein allow system information to be transmitted in recurring time windows, where the particular subframes within each window used for carrying system information are selectable. If current conditions, e.g., competing transmission priorities permit, the system information can be transmitted in a contiguous set of subframes within the time window.

[0023] At the same time, it is desirable to have flexibility in terms of exactly where (in exactly what set of subframes within given time windows) the system information is transmitted. This is because some subframes, depending on the situation, may not be available for transmission of system information. As an example, in case of TDD some subframes may not even be available for downlink transmission. As another example, for latency reasons there may, in some situations, be a strong need not to have too many consecutive subframes used for transmission of system information, thus making them unavailable for downlink user data transmission. Thus it is also desirable to be able to dynamically (with low delay) decide in exactly what subframes the system information is to be transmitted.

[0024] Further, it is desirable to have flexibility in the rate by which different parts of the system information is repeated. In this way, a higher repetition rate (shorter repetition period) can be used, e.g. in case of wider overall transmission bandwidth, when the overhead of the system-information transmission is less of an issue. It is desirable to have flexibility in the number of subframes used to transmit the system information. As an example, in case of smaller overall bandwidth or larger cells, more subframes may be needed to transmit a given set of system information. Another reason is that the amount of system information, e.g. neighbor lists and PLMN lists, may be of different sizes for different cells.

[0025] The teachings presented herein provide for methods and apparatuses where system information is transmitted within recurring time windows, but with flexible selection of which subframes within those windows are used to carry system information. Exemplary network behavior in one embodiment thus includes: 1) set subframe equal to first subframe in the window; 2) if this subframe is to be used for transmission of system information then (a) if this is the last piece of system information to be transmitted within the window, set RNTI of L1/L2 control channel to ESI-RNTI, otherwise, set RNTI of the L1/L2 control channel to SI-RNTI, (b) transmit system information on the DL-SCH within the subframe; 3) if all system information is not transmitted, increase subframe by one and repeat from 2); and 4) if all system information for the window is transmitted, then end.

[0026] Exemplary corresponding UE behavior in at least one embodiment includes: 1) set subframe equal to first subframe in the window; 2) demodulate and decode L1/L2 control channel of subframe; 3) if SI-RNTI or ESI-RNTI, demodulate and decode corresponding DL-SCH transport block; 4) if not ESI-RNTI and subframe not equal to last subframe in window, increase subframe by one and repeat from 2); and 5) if last subframe then end.

[0027] As discussed above, some parts of the system information may not need to be repeated as often as some other parts of the system information (different scheduling units), implying that certain windows will include more data (more scheduling units) than other windows. Thus, the window size may be of varying length, with a longer window at the time instances where more system information (more scheduling units) is to be transmitted. Fig. 4 provides an illustration of a variable-length window embodiment.

[0028] Note that the window size could either be specified in the radio-access specification or be configurable. In case of a configurable window size, the UE could use a default (large) window size before it is informed (via the system information) about the actual window size. There could be reasons to have the RNTI indicating not just system information but also somewhat more details about the system information. In practice this would imply the use of several different SI-RNTI, i.e. SI-RNTI1, SI-RNTI2, SI-RNTI3, ..., and corresponding multiple ESI-RNTI, i.e. ESI-RNTI1, ESI-RNTI2, ESI-RNTI3, ...

[0029] Of course, other variations are contemplated. For example, further information is presented herewith in the form of the included ATTACHMENT 1 following the claims presented. Thus, the foregoing description and the accompanying drawings represent non-limiting examples of the methods and apparatus taught herein for the transmission of system information. As such, the present invention is not limited by the foregoing description and accompanying drawings. Instead, the present invention is limited only by the following claims and their legal equivalents.

CLAIMS

What is claimed is:

1. A method of transmitting system information on the downlink of a wireless communication network comprising:

transmitting system information in recurring time windows overlaid on a sequence of transmit channel subframes;

dynamically selecting which subframes within a given time window are to be used for carrying system information; and

including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

2. The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a contiguous set of subframes within the given time window.

3. The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a non-contiguous set of subframes within the given time window.

4. The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting which subframes to use for transmitting system information in view of competing transmission priorities associated with other control or data signaling.

5. The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information comprises using an RNTI (Radio Network Temporary Identifier) to denote that the subframe carries system information.

6. The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using an end-of-system-information indicator in a last subframe of the given time window that carries system information.

7. The method of claim 1, further comprising varying window sizes of the recurring time windows.

8. The method of claim 1, further comprising dynamically configuring a window size for the recurring time windows.

9. The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using different indicators corresponding to different types of system information, such that the indicator used for a particular subframe indicates the type of system information carried in that subframe.

10. A network transmitter comprising one or more processing circuits configured to:

transmit system information in recurring time windows overlaid on a sequence of transmit channel subframes;

dynamically select which subframes within a given time window are to be used for carrying system information; and

include an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

11. The network transmitter of claim 10, wherein the network transmitter comprises a radio base station configured for operation in accordance with 3GPP E-UTRA standards.

12. A method of transmitting system information on a downlink shared channel structured as successive subframes, the method comprising:

transmitting system information in regularly occurring time windows, each time window spanning some number of successive subframes; and

indicating to receiving user equipment which subframes within a given time window carry system information.

13. The method of claim 12, wherein indicating to receiving user equipment which subframes within a given time window carry system information includes indicating the last subframe within the given time window that carries system information, thereby allowing the receiving user equipment to cease monitoring for system information within the given time window.

14. The method of claim 12, further comprising dynamically selecting which subframes within a given time window are to be used for carrying system information.

15. A method for a mobile station to receive system information from a supporting wireless communication network, the method comprising:

beginning monitoring for the receipt of system information at the start of each time window in a succession of recurring time windows used for the transmission of system information, each said time window spanning a number of signal subframes;

within each time window, monitoring each signal subframe for an indication of system information and reading system information from the signal subframe if such information is present; and

terminating monitoring at least at the end of the time window.

16. The method of claim 15, further comprising recognizing an end-of-system-information indicator in a signal subframe received within the time window and terminating monitoring for the time window in response.

17. The method of claim 15, further comprising adapting to changing or configurable window sizes used for the time window.

18. The method of claim 15, further comprising storing a default window size for monitoring for system information transmissions.

19. The method of claim 18, further comprising monitoring for system information transmissions based on a specified window size indicated in received information rather than the default window size.

20. The method of claim 15, further comprising recognizing different types of system information based on recognizing different system information indicators in different signal subframes.

ABSTRACT OF THE DISCLOSURE

In one embodiment, a method of transmitting system information on a downlink shared channel structured as successive subframes includes transmitting system information in regularly occurring time windows, each time window spanning some number of successive subframes. The method further includes indicating to receiving user equipment which subframes within a given time window carry system information. The method and variations of it are applied, for example, to the transmission of dynamic system information on the downlink shared channel or other downlink channel in a 3GPP E-UTRA wireless communication network.

Client Docket No. P24241-US1
Attorney Docket No. 4015-5854

ATTACHMENT 1

TSG-RAN WG1 #X R1-07xxxx

Source: Ericsson
Title:
Agenda Item:
Document for: Discussion and decision

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1. Discussion

1.1 Introduction

The LTE system information, corresponding to the BCCH logical channel, is divided into two parts

- System information in the Master Information Block (MIB), carried on the BCH transport channel
- The remaining system information (the remaining System Information Blocks, SIBs), carried on the DL-SCH or, at least, on a DL-SCH-like transport channel[1]. We will here refer to this information as the dynamic system information

Different parts of the dynamic system information may be transmitted with different *repetition periods* depending on the acceptable delay in the acquisition of each specific part of the system-information. SIBs that are transmitted with the same repetition period are part of the same *Scheduling Unit* (SU)

The number of subframes needed to transmit a certain SU may vary for at lest two reasons:

- The amount of system information within the SU may vary, e.g. SU-1 containing different number of PLMN identities or an optional neighbor list
- The number of subframes needed to transmit a given amount of system information may vary e.g. depending on the overall system bandwidth and the cell size, with smaller bandwidth and/or larger cell sizes potentially leading to a need for more subframes (more time) to transmit a given amount of system information.

Similar to "normal" DL-SCH transmission, transmission of the dynamic system information should allow for dynamic frequency-domain scheduling and transport-format selection, with the UE acquiring the instantaneous frequency-domain resource and transport format from the corresponding PDCCH.

The remaining key question regarding system-information scheduling concerns the system-information *time-domain* scheduling and the corresponding signaling.

- In what subframes the system information is or can be transmitted?
- How does the UE acquire knowledge about when the system information is actually transmitted?

---

[1] There may be certain specification-related benefits of defining a new "DL-SCH-like" transport channel for the dynamic system information, rather than assuming that the dynamic system information is mapped a DL-SCH. As an example, it would then be more straightforward to specify that a UE should be able to demodulate/decode the dynamic system information (of the current cell) in parallel to normal DL-SCH user-data reception (the *system-information* transport channel demodulated/decoded in parallel to DL-SCH). Alternatively one would need to specify that the UE should be able to demodulate/decode two DL-SCH in parallel, *assuming that one of the DL-SCH carries system information.*

1.1.2 Static scheduling

On the other extreme is a pre-specified (static) scheduling, i.e. it is *specified* in what subframes the different parts of the dynamic system information is transmitted. However, this is not an acceptable approach either, for several reasons:

- According to above, certain flexibility in the scheduling is needed simply due to the fact that the number of subframes needed for the system-information transmission may vary, e.g. depending on the system bandwidth and the cell size. Thus a fully static time-domain scheduling is not possible.
- Although from a UE power consumption point-of-view, it is preferred to transmit different scheduling units as close as possible to each other, i.e. in consecutive subframes, this may not always be possible. In case of TDD, some subframes are not even available for downlink transmission. Furthermore, for user-data-latency reasons, it may not always be acceptable to have a large number of consecutive subframes reserved for system-information transmission, thus being potentially unavailable for normal DL-SCH user-data transmission.

Instead there is a need for a system-information scheduling that allows for certain flexibility in the time-domain scheduling without leading to unacceptable negative impact on the possibility for power-efficient DRX operation when acquiring system information. Below we outline two alternatives:

- Semi-static scheduling, with SU-1 indicating the exact time-domain scheduling of the remaining scheduling units.
- Dynamic scheduling withing a *scheduling window, allowing for a more dynamic scheduling of the scheduling units*

1.2 Semi-static scheduling

With this approach, a *Scheduling Block* in SU-1, transmitted once every 80 ms, informs UEs about the time-domain scheduling (frame and subframe) of the remaining scheduling units.

Although a possible approach, there are some drawbacks with this approach:

- Additional scheduling information to be transmitted on SU-1, implying larger SU-1 payload
- The scheduling of the remaining scheduling units must be decided at the time of the transmission of SU-1 which is only transmitted once every 80 ms
- Not clear how to allow for a flexible size (in terms of number of subframes) for the scheduling units. One possibility would be that the scheduling block indicates the first subframe of the scheduling unit and that the UE then continuous to read PDCCH to find out if additional subframes are used for the transmission of the scheduling unit

1.3 Dynamic scheduling with scheduling window

This approach can be seen as dynamic scheduling, according to Section **Error! Reference source not found.**, with certain additional restrictions on the scheduling instants. Alternatively it can be seen as the semi-static scheduling, according to the previous section (Section 0), extending with a certain degree of dynamic flexibility in the scheduling. With this approach, the system information is transmitted within periodically occurring *system-information windows* with well-defined starting points and consisting of a well-defined number of consecutive subframes, see Figure 1.

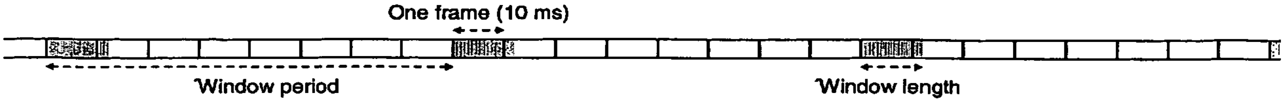

Figure 1 System-information windows. Each window consists of a number of subframes. In the figure, the scheduling window occurs once every 80 ms, corresponding to the repetition period of SU-1.

Within the window, system information is not necessarily transmitted within every subframe. Rather, the network can, in principle, transmit the system information in an arbitrary set of subframes of the window, as illustrated in Figure 2 and the set of subframes in which the system information is actually transmitted does not have to be the same between consecutive windows. On the receiver side, the UE demodulates and decodes the PDCCH, starting from the first subframe of the system-information window and check for specific *System-Information RNTIs*. These RNTIs do not just indicate the presence of system information but also the specific scheduling unit being transmitted (one specific RNTI for each scheduling unit) in order for the UE to read DL-SCH only for scheduling units not yet acquired or scheduling units that needs to be re-acquired.

In this way the network can dynamically avoid transmitting system information in certain subframes, should the need occur (TDD, subframe needed for other purposes, etc.). It should be noted that the UE would anyway, even with a fully pre-determined time-domain scheduling, need to demodulate and decode the PDCCH in order to acquire the frequency-domain scheduling as well as the transport format of the system-information transmission.

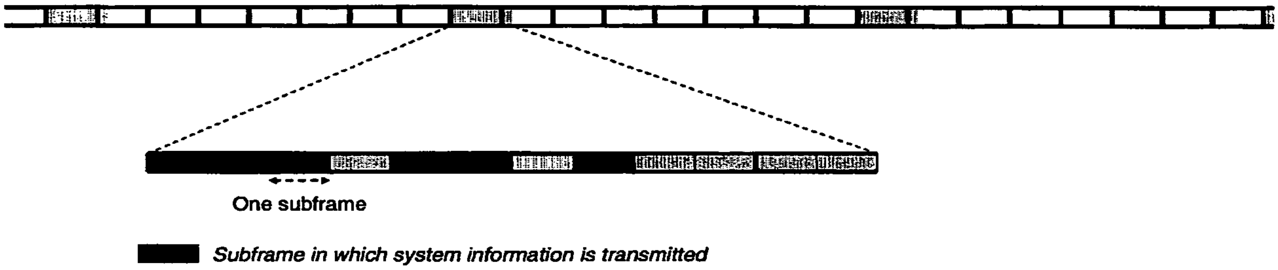

Figure 2 Transmission of system information within a window of size 12 subframes (Type 1 frame structure assumed)

In order for the UE to be able to stop demodulating the PDCCH when there is no additional system information within the window, the last system-information transmission within the window can be indicated by specific *End-of-System-Information RNTIs* (one for each scheduling unit). This would allow for the UE to stop demodulating/decoding the PDCCH when there is no more system-information to be transmitted within the window, thus improving UE power-saving performance.

In case the number of SUs and mapping of SIBs onto SUs is flexible in the standard, additional information on the number of SUs that UE could expect needs to be signaled to the UE.

The system-information windows should occur with a period corresponding to the required repetition period of the most frequently occurring scheduling unit (SU-1). System information corresponding to SU-1 would then be transmitted within each system-information window while less frequently occurring scheduling units would be transmitted only within a sub-set of the system-information windows. As an example, system information corresponding to SU-2 could be transmitted within every second window, system information corresponding to SU-3 could be transmitted within every fourth window, etc., see Figure 3. The transmission timing corresponding to each scheduling unit could either be pre-specified if RAN2 manages to agree to limited amount of transmission periods or signaled e.g. as part of SU-1 in case more specific values for transmitting SUs need to be specified. Taking into account that the amount of system information would not be the same in each window, one could thus also consider having a variable window size with a larger window size for windows in which system information corresponding to more scheduling units are to be transmitted.

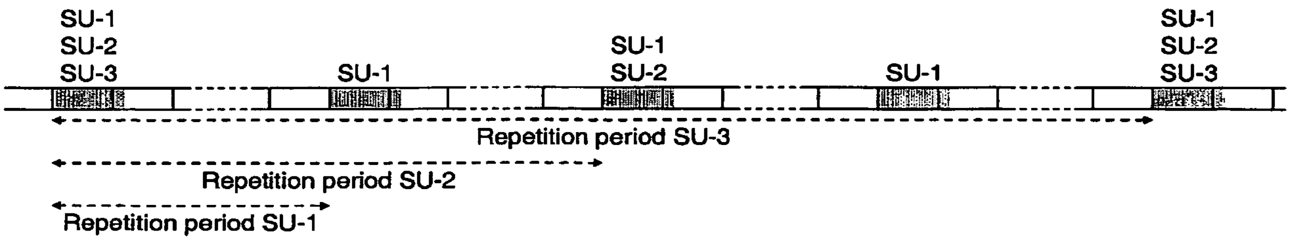

Figure 3 Scheduling of scheduling units to different system-information windows.

If it is possible to transmit all system information in consecutive subframes, the network will do so and the time needed to receive the corresponding system information can be minimized.

The scheme is applicable both for FDD and TDD (in case of TDD, the SU content will simply be scheduled in the next available DL subframe).

In case of small cells, with the flexibility allowed with the proposed scheme, there is always a possibility to schedule users together with system information by delaying content of SU by few subframes.

2. Summary and conclusions

In this paper we have outlined two alternative approaches to the time-domain scheduling of the dynamic part of the system information:

- Semi-static scheduling with SU-1 indicating the scheduling of the remaining scheduling units.
- Dynamic scheduling with scheduling window

Of these two approaches we prefer and propose the window-based approach as this allows for the dynamic scheduling of the system information without compromising the possibility for "optimal" DRX for the system-information reception.

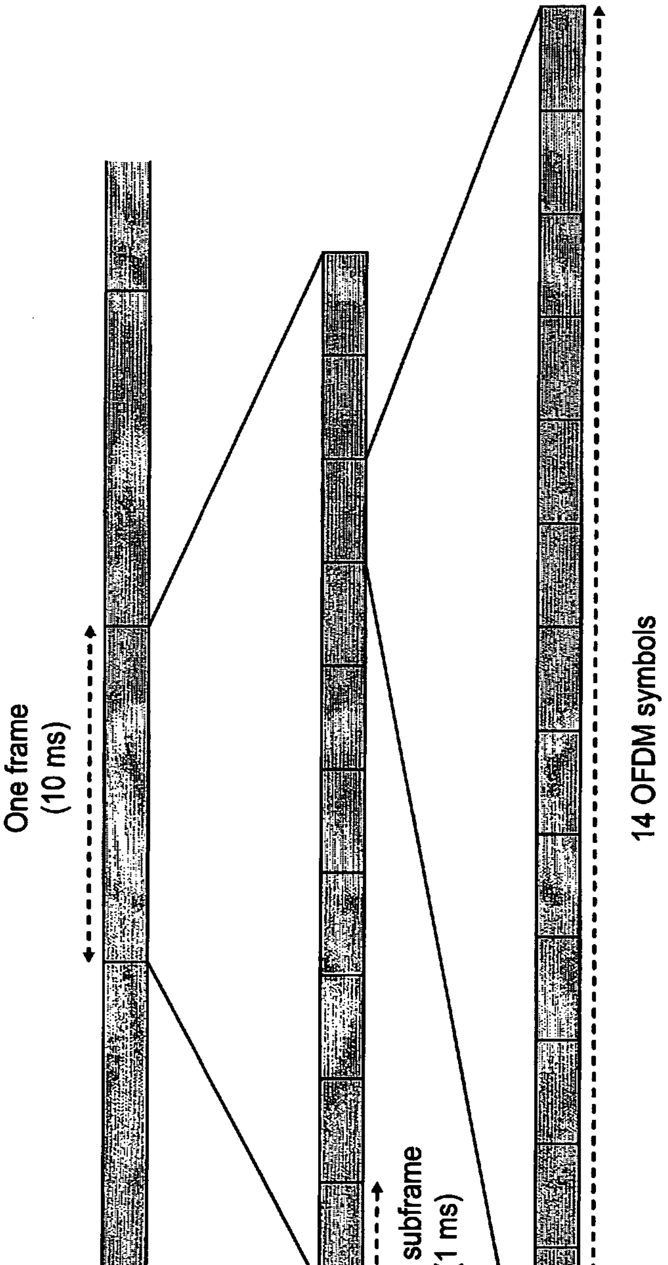

FIG. 1
(PRIOR ART)

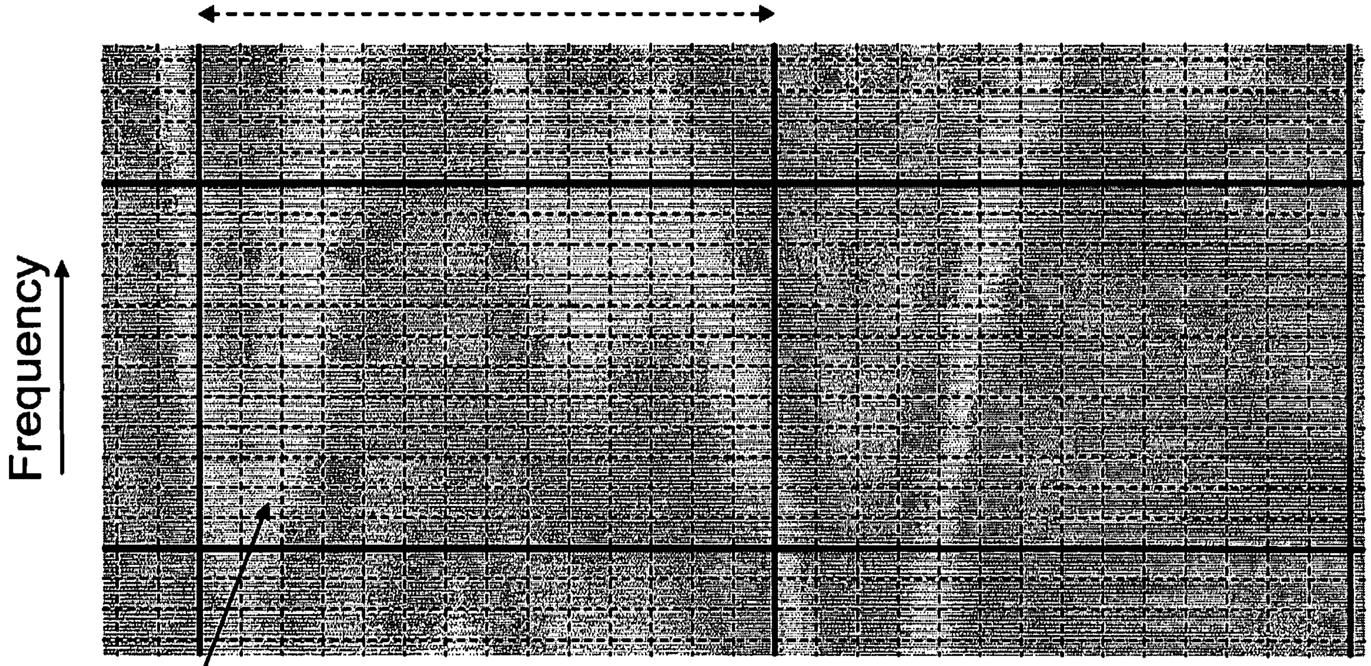

FIG. 2
(PRIOR ART)

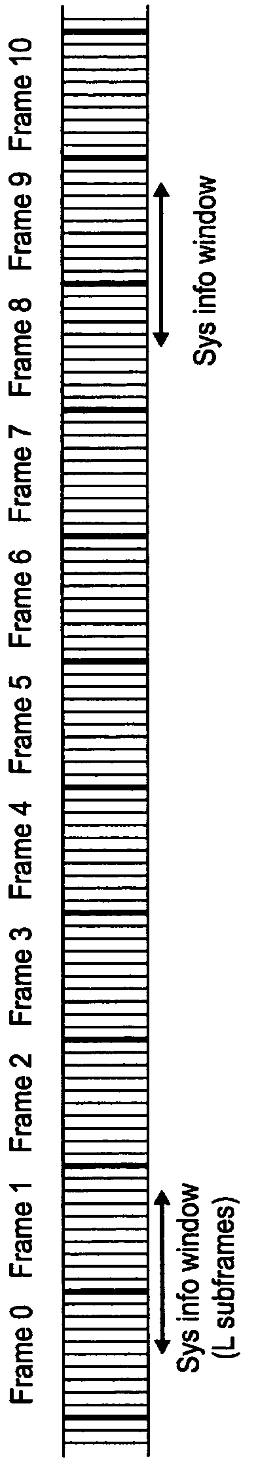
Frame 0
Frame 1
Frame 2
Frame 3
Frame 4
Frame 5
Frame 6
Frame 7
Frame 8
Frame 9
Frame 10
Sys info window
(L subframes)
Sys info window

FIG. 3

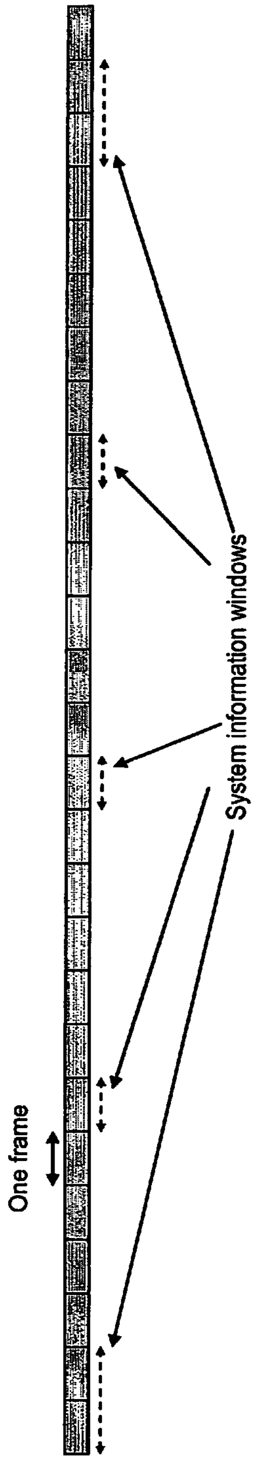

FIG. 4

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P24241WO1	**FOR FURTHER ACTION** See Form PCT/IPEA/416	
International application No. PCT/SE2008/050407	International filing date *(day/month/year)* 10-04-2008	Priority date *(day/month/year)* 18-06-2007
International Patent Classification (IPC) or national classification and IPC See Supplemental Box		
Applicant TELEFONAKTIEBOLAGET LM ERICSSON (PUBL) et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 8 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☐ *(sent to the applicant and to the International Bureau)* a total of ______ sheets, as follows:
      - ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) ______, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I — Basis of the report
   - ☐ Box No. II — Priority
   - ☐ Box No. III — Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV — Lack of unity of invention
   - ☒ Box No. V — Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI — Certain documents cited
   - ☐ Box No. VII — Certain defects in the international application
   - ☒ Box No. VIII — Certain observations on the international application

Date of submission of the demand	Date of completion of this report
16-04-2009	22-09-2009
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Anders Ackeberg / EÖ Telephone No. +46 8 782 25 00

Form PCT/IPEA/409 (cover sheet) (January 2009)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/SE2008/050407

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of: Cover sheet

International patent classification (IPC)
H04J 3/00 (2006.01)
H04B 7/26 (2006.01)
H04W 68/00 (2009.01)
H04W 74/04 (2009.01)

Form PCT/IPEA/409 (Supplemental Box) (January 2009)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY	International application No. PCT/SE2008/050407

Box No. I **Basis of the report**

1. With regard to the **language**, this report is based on:
   - [x] the international application in the language in which it was filed.
   - [ ] a translation of the international application into ____ which is the language of a translation furnished for the purposes of:
     - [ ] international search (Rules 12.3(a) and 23.1(b)).
     - [ ] publication of the international application (Rule 12.4(a)).
     - [ ] international preliminary examination (Rules 55.2(a) and/or 55.3(a)).

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*
   - [x] the international application as originally filed/furnished.
   - [ ] the description:
     - pages ____ as originally filed/furnished.
     - pages* ____ received by this Authority on ____
     - pages* ____ received by this Authority on ____
   - [ ] the claims:
     - pages ____ as originally filed/furnished.
     - pages* ____ as amended (together with any statement) under Article 19
     - pages* ____ received by this Authority on ____
     - pages* ____ received by this Authority on ____
   - [ ] the drawings:
     - pages ____ as originally filed/furnished.
     - pages* ____ received by this Authority on ____
     - pages* ____ received by this Authority on ____
   - [ ] a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. [ ] The amendments have resulted in the cancellation of:
   - [ ] the description, pages ____
   - [ ] the claims, Nos. ____
   - [ ] the drawings, sheets/figs ____
   - [ ] the sequence listing *(specify)*: ____
   - [ ] any table(s) related to the sequence listing *(specify)*: ____

4. [ ] This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - [ ] the description, pages ____
   - [ ] the claims, Nos. ____
   - [ ] the drawings, sheets/figs ____
   - [ ] the sequence listing *(specify)*: ____
   - [ ] any table(s) related to the sequence listing *(specify)*: ____

5. [ ] This report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 70.2(e)).

6. [ ] Supplementary international search report(s) from Authority(ies) ____ have been received and taken into account in drawing up this report (Rule 45*bis*.8(b) and (c)).

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-25	YES
	Claims	----	NO
Inventive step (IS)	Claims	1-11, 13-25	YES
	Claims	12	NO
Industrial applicability (IA)	Claims	1-25	YES
	Claims	----	NO

2. Citations and explanations (Rule 70.7)

The claimed invention

The claimed invention concerns a method for transmitting system information.
In LTE, system information can be divided in two parts, a fixed part sent on BCH and a dynamic part sent on the DL-SCH. Different portions of the dynamic part of the system information need to be repeated more or less often.

The claimed invention solves this problem by transmitting control information in recurring time windows and indicating to the receiving UE which subframes that are dynamically selected to carry control information.

Cited documents:

D1: "Draft text proposal capturing agreements on system Information"
R2-072205
3GPP TSG-RAN2 Meeting #58
Kobe, Japan, 7th-11th May 2007

D2: "System information scheduling and change notification"
R2-071912
3GPP TSG-RAN2 Meeting #58
Kobe, Japan, 7th-11th May 2007

D3: 3GPP TS36.300 V8.0.0 (2007-03)

D4: WO 2007052917 A1
D5: EP 1799003 A1

.../...

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of: Box V

D1, which is considered to represent the most relevant prior art, describes transmission of system information in LTE. See the whole document.

D2, which is also considered to be a relevant document, describes system information scheduling. See the whole document.

D3, which is a background art document, is the 3Gpp specification for E-UTRA and E-UTRAN, overall description. See pages 36 and 72-74.

D4 is a background art document. According to D4, in the related art, it can be said that the system information is always fixed or non- flexible. Such fixed format allows a mobile terminal to easily detect and properly read the system information transmitted from the network. In contrast, the features of the invention in D4 allow at least some portions of the system information to be dynamically (or flexibly) changed. Appropriate indicators are included such that a mobile terminal can properly detect and read the dynamic (flexible) system information. See abstract, sections [3]-[4], [15], [32]-[34] and [44]-[59] and figures 2-3 and 7-8.

D5, which is a background art document, describes mapping of broadcast system information to a shared transport channel. See abstract, sections [0025]-[0026] and [0032]-[0048] and figures 6 and 10-12.

Claim 12

In D1, a group of system information blocks (SIBs) that have the same scheduling requirements are referred to as a Scheduling Unit (SU). The most frequently repeated SU (SU-1) carries scheduling information of the other SUs and indication in which the SU the SIB is included. An SU may furthermore be segmented, in which case segments are scheduled in subsequent consecutive subframes.

To indicate in which the SU the SIB is included is considered to be comparable to indicate which subframes that carries system information.

.../...

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of: Box V

Hence, the claimed invention differs from D1 in that each subframe includes an indicator to indicate which subframe that carries system information. However, to include an indicator in each subframe, instead of an indicator in SU-1 that indicates which subframes that carries system information, is not considered to go beyond what can be expected from a person skilled in the art. Consequently, claim 12 is considered to fail to involve an inventive step.

Claims 1-11 and 13-25

The invention defined in claims 1-11 and 13-25 is not disclosed by any of these documents.
The cited prior art does not give any indication that would lead a person skilled in the art to the claimed invention of transmitting the system information in recurring time windows, each said time window spanning a
number of signal subframes, and dynamically selecting which sub-frames within a given time window are to be used and including an indicator in each of the selected sub-frames to indicate to receiving User Equipment that the sub-frame carries system information. Therefore, the claimed invention is not obvious to a person skilled in the art.

Accordingly, the invention defined in claims 1-11 and 13-25 is novel and is considered to involve an inventive step. The invention is industrially applicable.

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claims 1, 10, 12, 15 and 21 are not supported by the description as required by Article 6 PCT, as their scope is broader than justified by the description and drawings. The technical feature "downlink shared channel", included in claim 12, is missing in claims 1, 10, 15 and 21. Furthermore, the feature "dynamically selecting which subframes to be used for carrying the system information", included in claims 1 and 10, is missing in claim 12.
Since independent claims 1, 10, 12, 15 and 21 do not contain the same technical features, they do not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention.

Furthermore, claims 1, 10, 15 and 21 do not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. In claims 1 and 10 the expression "recurring time windows overlaid on a sequence of transmit channel subframes" is used. However, in claims 15 and 21 it is stated "recurring time window **used for transmission of system information**". Since different wordings are used, it is unclear if the matter for which protection is sought is equal for claims 1 and 10 as for claims 15 and 21.

The applicant has stated that the feature "downlink shared channel", included in claim 12, not is a technical feature essential to the definition of the invention, since it follows that "in LTE, the **fixed part** of the system information is transmitted using the BCH (broadcast control channel) transport channel" (see page 2). What should also be noted is found on page 2, lines 12-14, where it is stated **"The dynamic part** of the system information is assumed to be transmitted using the DL-SCH, or at least DL-SCH-like transport channel, similar to normal data transmission as described above". The applicant thus claims that transmitting system information on the DL-SCH is merely an alternative.

However, from the description it is obvious that the mentioned system information that is transmitted is **the dynamic part** of the system information (see page 2: lines 20-25 and 31).

.../...

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of: Box VIII

The claimed invention is said to solve the problem that different portions of **the dynamic part** of the system information are more or less time critical, and thus need to be repeated more or less often. Furthermore, line 31 on page 2 states that "The invention described below allows for transmission of **the dynamic part** of the system information fulfilling these requirements and desirable properties while, at the same time, allowing for low UE complexity.

Hence, since the dynamic part is transmitted using the DL-SCH, the technical feature "downlink shared channel", missing in claims 1, 10, 15 and 21, is considered to be a technical features essential to the definition of the invention.

Furthermore, the applicant has referred to page 5, lines 24-26, in order to show the support in the description for claims 1 and 10. In the same section on that page (on lines 22-24) it is stated that "for latency reasons there may in some situations, be a benefit to not having too many consecutive subframes used for transmission of system information, thus making them unavailable for downlink user data transmission", i.e. the system information and downlink user data **shares** the same resources. This clearly shows that the system information, in claims 1 and 10, is sent on the DL-SCH.

VIII-2-1	**Declaration: Entitlement to apply for and be granted a patent** Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent (Rules 4.17(ii) and 51bis.1(a)(ii)), in a case where the declaration under Rule 4.17(iv) is not appropriate: Name (LAST, First)	in relation to this international application TELEFONAKTIEBOLAGET LM ERICSSON (PUBL) is entitled to apply for and be granted a patent by virtue of the following:
VIII-2-1(iv)		an assignment from DAHLMAN, Erik to TELEFONAKTIEBOLAGET LM ERICSSON (PUBL), dated 14 November 2007 (14.11.2007)
VIII-2-1(iv)		an assignment from VUKAJLOVIC, Vera to TELEFONAKTIEBOLAGET LM ERICSSON (PUBL), dated 14 November 2007 (14.11.2007)

VIII-3-1	**Declaration: Entitlement to claim priority** Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application specified below, where the applicant is not the applicant who filed the earlier application or where the applicant's name has changed since the filing of the earlier application (Rules 4.17(iii) and 51bis.1(a)(iii)) Name	in relation to this international application TELEFONAKTIEBOLAGET LM ERICSSON (PUBL) is entitled to claim priority of earlier application No. 60/944,628 by virtue of the following:
VIII-3-1(iv)		an assignment from DAHLMAN, Erik to TELEFONAKTIEBOLAGET LM ERICSSON (PUBL), dated 14 November 2007 (14.11.2007)
VIII-3-1(iv)		an assignment from VUKAJLOVIC, Vera to TELEFONAKTIEBOLAGET LM ERICSSON (PUBL), dated 14 November 2007 (14.11.2007)

Box No. VIII (iv) DECLARATION: INVENTORSHIP (only for the purposes of the designation of the United States of America)
The declaration must conform to the following standardized wording provided for in Section 214; see Notes to Boxes Nos. VIII, VIII (i) to (v) (in general) and the specific Notes to Box No. VIII (iv). If this Box is not used, this sheet should not be included in the request.

Declaration of inventorship (Rules 4.17(iv) and 51*bis*.1(a)(iv)) for the purposes of the designation of the United States of America:

I hereby declare that I believe I am the original, first and sole (if only one inventor is listed below) or joint (if more than one inventor is listed below) inventor of the subject matter which is claimed and for which a patent is sought.

This declaration is directed to the international application of which it forms a part (if filing declaration with application).

This declaration is directed to international application No. PCT/ SE2008/050407 (if furnishing declaration pursuant to Rule 26*ter*).

I hereby declare that my residence, mailing address, and citizenship are as stated next to my name.

I hereby state that I have reviewed and understand the contents of the above-identified international application, including the claims of said application. I have identified in the request of said application, in compliance with PCT Rule 4.10, any claim to foreign priority, and I have identified below, under the heading "Prior Applications," by application number, country or Member of the World Trade Organization, day, month and year of filing, any application for a patent or inventor's certificate filed in a country other than the United States of America, including any PCT international application designating at least one country other than the United States of America, having a filing date before that of the application on which foreign priority is claimed.

Prior Applications: US 60/944,628

I hereby acknowledge the duty to disclose information that is known by me to be material to patentability as defined by 37 C.F.R. § 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the PCT international filing date of the continuation-in-part application.

I hereby declare that all statements made herein of my own 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 Section 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.

Name: DAHLMAN, Erik

Residence: Tackjärnsvägen 12 ,168 68 BROMMA ,Sweden
(city and either US state, if applicable, or country)

Mailing Address:

Citizenship: Sweden

Inventor's Signature: Date: 2008-04-13
(The signature must be that of the inventor, not that of the agent)

Name: VUKAJLOVIC, Vera

Residence: Frejgatan 45 ,113 49 STOCKHOLM ,Sweden
(city and either US state, if applicable, or country)

Mailing Address:

Citizenship: Sweden

Inventor's Signature: Date: 20 May 08
(The signature must be that of the inventor, not that of the agent)

☐ This declaration is continued on the following sheet, "Continuation of Box No. VIII (iv)".

VIII-2-1	**Declaration: Entitlement to apply for and be granted a patent** Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent (Rules 4.17(ii) and 51bis.1(a)(ii)), in a case where the declaration under Rule 4.17(iv) is not appropriate: Name (LAST, First)	**in relation to this international application** **TELEFONAKTIEBOLAGET LM ERICSSON (PUBL) is entitled to apply for and be granted a patent by virtue of the following:**
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VIII-3-1	**Declaration: Entitlement to claim priority** Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application specified below, where the applicant is not the applicant who filed the earlier application or where the applicant's name has changed since the filing of the earlier application (Rules 4.17(iii) and 51bis.1(a)(iii))	in relation to this international application
	Name	TELEFONAKTIEBOLAGET LM ERICSSON (PUBL) is entitled to claim priority of earlier application No. 60/944,628 by virtue of the following:
VIII-3-1(iv)		an assignment from DAHLMAN, Erik to TELEFONAKTIEBOLAGET LM ERICSSON (PUBL), dated 14 November 2007 (14.11.2007)
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VIII-3-1(iv)		an assignment from VUKAJLOVIC, Vera to TELEFONAKTIEBOLAGET LM ERICSSON (PUBL), dated 14 November 2007 (14.11.2007)

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/664,347	Filing Date 12/11/2009	☐ To be Mailed

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☐ RATE ($)	FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			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 $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	

APPLICATION AS AMENDED – PART II

AMENDMENT	12/11/2009	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 25	Minus	** 25	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 4	Minus	***4	= 0	X $ =		OR	X $220=	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 ($)	ADDITIONAL FEE ($)		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:
/ANDREA BURDEN/

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby appoint the Practitioners associated with the following Customer Number:

24112

as attorneys or agents to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b). This appointment will automatically lapse five years after the date of execution of this document unless earlier revoked.

Assignee Name and Address:

Telefonaktiebolaget L M Ericsson (publ)
SE-164 83 Stockholm
Sweden

SIGNATURE of Assignee of Record

The individuals whose signatures and titles are supplied below are authorized to act on behalf of the assignee

Name: Carl Olof Blomqvist		
Signature	Date	October 15, 2007
Title: Senior Vice President and General Counsel	Telephone	+46 8 7198250

Name: Nina Macpherson		
Signature	Date	October 15, 2007
Title: Vice President	Telephone	+46 8 7190619

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Dahlman

Application No./Patent No.: 12/664,347 Filed/Issue Date: December 11, 2009

Entitled: Transmission of System Information on a Downlink Shared Channel

Telefonaktiebolaget LM Ericsson (publ), a Corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:
1. ☑ the assignee of the entire right, title, and interest; or

2. ☐ an assignee of less than the entire right, title and interest
(The extent (by percentage) of its ownership interest is________ %)

in the patent application/patent identified above by virtue of either:

A. ☑ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 023644, Frame 0119, or for which a copy thereof is attached.

OR

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: ____________ To: ____________
The document was recorded in the United States Patent and Trademark Office at
Reel ________, Frame ________, or for which a copy thereof is attached.

2. From: ____________ To: ____________
The document was recorded in the United States Patent and Trademark Office at
Reel ________, Frame ________, or for which a copy thereof is attached.

3. From: ____________ To: ____________
The document was recorded in the United States Patent and Trademark Office at
Reel ________, Frame ________, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet.

☐ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.,* a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Michael D. Murphy/	December 23, 2009
Signature	Date
Michael D. Murphy	919-854-1844
Printed or Typed Name	Telephone Number
Attorney, Reg. No. 44,958	
Title	

Electronic Acknowledgement Receipt

EFS ID:	6704176
Application Number:	12664347
International Application Number:	
Confirmation Number:	1464
Title of Invention:	Transmission of System Information on a Downlink Shared Channel
First Named Inventor/Applicant Name:	Erik Dahlman
Customer Number:	24112
Filer:	Michael Murphy/Laura Wade
Filer Authorized By:	Michael Murphy
Attorney Docket Number:	4015-6727 / P24241-US2
Receipt Date:	23-DEC-2009
Filing Date:	
Time Stamp:	17:30:05
Application Type:	U.S. National Stage under 35 USC 371

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	Power of Attorney	POA.pdf	29796 cc366f6b785e3a92ff7d215f19176ecdfb394bcb	no	1

Warnings:

Information:

2	Assignee showing of ownership per 37 CFR 3.73(b).	SB96.pdf	43093 2f548205ad94c9f4650fada12fc30e2f03e083de	no	1
Warnings:					
Information:					
		Total Files Size (in bytes):	72889		

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 NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/664,347	12/11/2009		1680	4015-6727 / P24241-US2	25	5

CONFIRMATION NO. 1464

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

FILING RECEIPT

OC000000043055458

Date Mailed: 08/17/2010

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)

Erik Dahlman, Bromma, SWEDEN;
Vera Vukajlovic, Stockholm, SWEDEN;

Assignment For Published Patent Application

TELEFONAKTIEBOLAGET LM ERICSSON (PUBL), Stockholm, SE

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

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/SE2008/050407 04/10/2008
which claims benefit of 60/944,628 06/18/2007

Foreign Applications

If Required, Foreign Filing License Granted: 08/13/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/664,347**

Projected Publication Date: 11/25/2010

Non-Publication Request: No

Early Publication Request: No

Title

Transmission of System Information on a Downlink Shared Channel

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
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

U.S. APPLICATION NUMBER NO.	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
12/664,347	Erik Dahlman	4015-6727 / P24241-US2

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

INTERNATIONAL APPLICATION NO.	
PCT/SE2008/050407	
I.A. FILING DATE	PRIORITY DATE
04/10/2008	06/18/2007

CONFIRMATION NO. 1464
371 ACCEPTANCE LETTER

OC000000043055459

Date Mailed: 08/17/2010

NOTICE OF ACCEPTANCE OF APPLICATION UNDER 35 U.S.C 371 AND 37 CFR 1.495

The applicant is hereby advised that the United States Patent and Trademark Office in its capacity as a Designated / Elected Office (37 CFR 1.495), has determined that the above identified international application has met the requirements of 35 U.S.C. 371, and is ACCEPTED for national patentability examination in the United States Patent and Trademark Office.

The United States Application Number assigned to the application is shown above and the relevant dates are:

12/11/2009	12/18/2009
DATE OF RECEIPT OF 35 U.S.C. 371(c)(1), (c)(2) and (c)(4) REQUIREMENTS	DATE OF COMPLETION OF ALL 35 U.S.C. 371 REQUIREMENTS

A Filing Receipt (PTO-103X) will be issued for the present application in due course. **THE DATE APPEARING ON THE FILING RECEIPT AS THE " FILING DATE" IS THE DATE ON WHICH THE LAST OF THE 35 U.S.C. 371 (c)(1), (c)(2) and (c)(4) REQUIREMENTS HAS BEEN RECEIVED IN THE OFFICE. THIS DATE IS SHOWN ABOVE.** *The filing date of the above identified application is the international filing date of the international application (Article 11(3) and 35 U.S.C. 363).* Once the Filing Receipt has been received, send all correspondence to the Group Art Unit designated thereon.

The following items have been received:

- Copy of the International Application filed on 12/11/2009
- Copy of the International Search Report filed on 12/11/2009
- Copy of IPE Report filed on 12/11/2009
- Preliminary Amendments filed on 12/11/2009
- Information Disclosure Statements filed on 12/11/2009
- Oath or Declaration filed on 12/11/2009
- U.S. Basic National Fees filed on 12/11/2009
- Assignee Statement for PGPUB filed on 12/11/2009
- Priority Documents filed on 12/11/2009
- Power of Attorney filed on 12/23/2009

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

KAREN R MCLEAN

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/664,347	12/11/2009	Erik Dahlman	4015-6727 / P24241-US2

CONFIRMATION NO. 1464

PUBLICATION NOTICE

OC000000044679708

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

Title: Transmission of System Information on a Downlink Shared Channel

Publication No. US-2010-0297991-A1
Publication Date: 11/25/2010

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.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/664,347	12/11/2009	Erik Dahlman	4015-6727 / P24241-US2	1464

24112 7590 12/20/2011
COATS & BENNETT, PLLC
1400 Crescent Green, Suite 300
Cary, NC 27518

EXAMINER	
WONG, XAVIER S	

ART UNIT	PAPER NUMBER
2462	

MAIL DATE	DELIVERY MODE
12/20/2011	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.

PTOL-90A (Rev. 04/07)

Office Action Summary	**Application No.** 12/664,347	**Applicant(s)** DAHLMAN ET AL.	
	Examiner Xavier Szewai Wong	**Art Unit** 2462	

-- 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 _11th December 2009_.

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) _1-25_ 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) _1-25_ is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on _11th December 2009_ 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).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☒ 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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _12.11.2009_.

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

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d).

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 11^{th} December 2009 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Objections

Delete all occurrences of "adapting," "adapted to" and "operable to" because these terms lack positive assertion, e.g. change them into -- configured to --. Appropriate correction is required.

Claim Rejections - 35 USC § 102

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 –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1 – 4, 7 – 10, 12, 15, 18, 21 and 25 are rejected under 35 U.S.C. 102(a) as being anticipated by "Draft Text Proposal Capturing Agreements on System Information" (R2-072205).

1. R2-072205 teaches a method of transmitting system information on the downlink of a wireless communication network (sec 7.4 downlink system) comprising: transmitting system information in recurring time windows overlaid on a sequence of transmit channel subframes (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are

recurring); dynamically selecting which subframes within a given time window are to be used for carrying the system information (sec 7.4 – An SU may be segmented, in which case segments are scheduled… eNB may schedule more than one SU in a subframe); and including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information (sec 7.4 – SB value tag in each SU).

10. R2-072205 teaches a network transmitter comprising a baseband processor (fig. 5.4.1.2) configured to: generate system information in recurring time windows overlaid on a sequence of transmit channel subframes (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); dynamically select which subframes within a given time window are to be used for carrying system information (sec 7.4 – An SU may be segmented, in which case segments are scheduled… eNB may schedule more than one SU in a subframe); and include an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information (sec 7.4 – SB value tag in each SU).

12. R2-072205 teaches a method of transmitting system information on a downlink shared channel structured as successive subframes (fig. 5.4.1.2 and fig. x), the method comprising: transmitting system information in regularly occurring time windows (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are recurring), each time window spanning some number of successive subframes (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); and indicating to receiving user equipment which subframes within a given time window carry system information (sec 7.4 – SB value tag in each SU).

15. R2-072205 teaches a method for a mobile station to receive system information from a supporting wireless communication network (fig. 5.4.1.2:: UE), the method comprising: beginning monitoring for the receipt of system information at the start of each time window in a succession of recurring time windows used for the transmission of system information (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are recurring), each said time window spanning a number of signal subframes (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); within each time window, monitoring each signal subframe for an indication of system information and reading system information from the signal subframe if such information is present (sec 7.4 – SB value tag in each SU); and terminating monitoring at least at the end of the time window (if there are no more subframes to be monitored, it is only reasonable to terminate monitoring).

21. R2-072205 teaches a mobile station comprising a baseband processor (fig. 5.4.1.2:: UE) operable to: begin monitoring for the receipt of system information at the start of each time window in a succession of recurring time windows used for the transmission of system information (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are recurring), each said time window spanning a number of signal subframes (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); within each time window,

monitor each signal subframe for an indication of system information and reading system information from the signal subframe if such information is present (fig. x:: SIB); and terminate monitoring at least at the end of the time window (if there are no more subframes to be monitored, it is only reasonable to terminate monitoring).

-------- -------- --------

2. R2-072205 teaches the method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a contiguous set of subframes within the given time window (fig. x:: subframes 3 and 131).

3. R2-072205 teaches the method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a non-contiguous set of subframes within the given time window (fig. x:: subframes 19 and 67).

4. R2-072205 teaches the method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting which subframes to use for transmitting system information in view of competing transmission priorities associated with other control or data signaling (fig. x:: SIB).

7. R2-072205 teaches the method of claim 1, further comprising varying window sizes of the recurring time windows (fig. x:: SU-1, SU-2 and SU-3 have different sizes).

8. R2-072205 teaches the method of claim 1, further comprising dynamically configuring a window size for the recurring time windows (sec. 7.4 – MIB paragraph).

9. R2-072205 teaches the method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using different indicators corresponding to different types of system information (sec 7.4 – MIB paragraph), such that the indicator used for a particular subframe indicates the type of system information carried in that subframe (sec 7.4 – SIB).

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11. R2-072205 teaches the network transmitter of claim 10, wherein the network transmitter comprises a radio base station configured for operation in accordance with 3GPP E-UTRA standards (3GPP TSG-RAN2).

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14. R2-072205 teaches the method of claim 12, further comprising dynamically selecting which subframes within a given time window are to be used for carrying system information (fig. x:: SIB).

----

18. R2-072205 teaches the method of claim 15, further comprising storing a default window size for monitoring for system information transmissions (fig. x:: SU-1, SU-2 and SU-3 have default sizes).

----

25. R2-072205 teaches the mobile station of claim 21, wherein the baseband processor is operable to recognize different types of system information based on different system information indicators detected in different signal subframes (fig. x:: SIB-a,b,c,d,e).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over “Draft Text Proposal Capturing Agreements on System Information” (R2-072205) in view of “System Information Scheduling and Change Notification” (R2-071912).

5. R2-072205 teaches the method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information; R2-072205 does not very explicitly show it comprises using an RNTI (Radio Network Temporary Identifier) to denote that the subframe carries system information. R2-071912 explicitly teaches subframes indicators are in RNTI format (page 3 bottom). It would have been obvious to one of ordinary skill in the art when the invention was made to understand that both R2 documents refer to the same 3GPP systems information techniques and the R2-072205 (primary reference), while being silent on its application to the indications, also uses RNTI.

Claims 17, 19, 20, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Draft Text Proposal Capturing Agreements on System Information” (R2-072205) in view of Marinier et al (US 2008/0225765 A1, Marinier).

17. R2-072205 teaches the method of claim 15; R2-072205 may not have explicitly mentioned further comprising adapting to changing or configurable window sizes used for the time window. Marinier teaches changing or configurable window sizes used for the time window ([0457]). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 to allow configurable window sizes to facilitate reordering procedure.

19. R2-072205 teaches the method of claim 18; R2-072205 does not explicitly mention further comprising monitoring for system information transmissions based on a specified window size indicated in received information rather than the default window size. Marinier teaches monitoring for system information transmissions based on a specified window size indicated in received information rather than a default window size ([0457]:: if window size is changed for reordering purpose, then it is only reasonable that the changing window sizes are monitored). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 to allow configurable window sizes to facilitate reordering procedure.

20. R2-072205 teaches the method of claim 15; R2-072205 does not explicitly mention further comprising recognizing different types of system information based on recognizing different system information indicators in different signal subframes.

Marinier teaches recognizing different types of system information based on recognizing different system information indicators in different signal subframes ([0457]:: if window size is changed for reordering purpose, then it is only reasonable that the changing window sizes are recognized). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 to allow configurable window sizes to facilitate reordering procedure.

23. R2-072205 teaches the mobile station of claim 21; R2-072205 may not have explicitly mentioned wherein the baseband processor is operable to adapt to changing or configurable window sizes used for the time window. Marinier teaches changing or configurable window sizes used for the time window ([0457]). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 to allow configurable window sizes to facilitate reordering procedure.

24. R2-072205 teaches the mobile station of claim 21; R2-072205 does not explicitly mention wherein the baseband processor is operable to monitor for system information transmissions based on a specified window size indicated in received information rather than a default window size. Marinier teaches monitoring for system information transmissions based on a specified window size indicated in received information rather than a default window size ([0457]:: if window size is changed for reordering purpose, then it is only reasonable that the changing window sizes are monitored). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 to allow configurable window sizes to facilitate reordering procedure.

Claims 6, 13, 16 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Draft Text Proposal Capturing Agreements on System Information” (R2-072205) in view of Kashima et al (US 2007/0217362 A1, Kashima).

6. R2-072205 teaches the method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information; R-072205 does not explicitly shows it includes using an end-of-system-information indicator in a last subframe of the given time window that carries system information. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information (0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 to maintain flexibility of scheduling.

13. R2-072205 teaches the method of claim 12; R-072205 does not explicitly shows wherein indicating to receiving user equipment which subframes within a given time window carry system information includes indicating the last subframe within the given time window that carries system information, thereby allowing the receiving user equipment to cease monitoring for system information within the given time window. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information so to cease monitoring within a given time (0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 as a flexibility to scheduling subframes.

16. R2-072205 teaches the method of claim 15; R-072205 does not explicitly shows it further comprising recognizing an end-of-system-information indicator in a signal subframe received within the time window and terminating monitoring for the time window in response. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information (0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 to maintain flexibility of scheduling.

22. R2-072205 teaches the mobile station of claim 21; R-072205 does not explicitly shows wherein the baseband processor is operable to recognize an end-of-system-information indicator in a signal subframe received within the time window and terminate monitoring for the time window in response. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information (0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 to maintain flexibility of scheduling.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1. Tenny, US 2008/0225823 A1:: scheduling of dynamic broadcast channel
2. Umesh et al, US 2009/0303939 A1:: shared data channel assigning

3. Nguyen, US 2006/0034245 A1:: showing a part of the HS-SCCH subframe or a part of its associated HS-PDSCH subframe overlaps with a downlink transmission gap on the associated DPCH, fig. 6.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xavier Wong whose telephone number is 571.270.1780. The examiner can normally be reached on Monday through Friday 10:30 am - 8:00 pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on 571.272.3174. 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.

/Xavier Szewai Wong/
Primary Examiner, Art Unit 2462
17th December 2011

Notice of References Cited	Application/Control No. 12/664,347	Applicant(s)/Patent Under Reexamination DAHLMAN ET AL.	
	Examiner Xavier Szewai Wong	Art Unit 2462	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2009/0303939 A1	12-2009	Umesh et al.	370/329
*	B	US-2008/0225823 A1	09-2008	Tenny, Nathan Edward	370/345
*	C	US-2008/0225765 A1	09-2008	Marinier et al.	370/310
*	D	US-2007/0217362 A1	09-2007	Kashima et al.	370/330
*	E	US-2006/0034245 A1	02-2006	Nguyen, Phong	370/345
	F	US-			
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	H	US-			
	I	US-			
	J	US-			
	K	US-			
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FOREIGN PATENT DOCUMENTS

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

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	273924	("370"/$.ccls. "455"/$.ccls.) and (@rlad < "20070618" @ad < "20070618")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 21:16
L3	3	L2 and (over$1lap $5 over$1laid) with (scheduling adj unit SU SU$2) same (system adj information SIB)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 21:16
L4	1618	L2 and (over$1lap $5 over$1laid) with (scheduling adj unit SU SU$2)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 21:18
L5	51	L2 and (over$1lap $5 over$1laid) near3 (scheduling adj unit SU SU$2) and (system adj information SIB)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 21:18
L7	23	L2 and (over$1lap $5 over$1laid) with sub$1frame with channel	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 21:56

EAST Search History (Interference)

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BIB DATA SHEET

CONFIRMATION NO. 1464

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/664,347	12/11/2009 **RULE**	370	2462	4015-6727 / P24241-US2

APPLICANTS
Erik Dahlman, Bromma, SWEDEN;
Vera Vukajlovic, Stockholm, SWEDEN;

** **CONTINUING DATA** *************************
This application is a 371 of PCT/SE2008/050407 04/10/2008
which claims benefit of 60/944,628 06/18/2007

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

Verified /XSW/ 2011.12.17

** **IF REQUIRED, FOREIGN FILING LICENSE GRANTED** **
08/13/2010

Foreign Priority claimed ☑ Yes ☐ No 35 USC 119(a-d) conditions met ☑ Yes ☐ No Verified and Acknowledged /Xavier Szewai Wong/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		SWEDEN	6	25	5

ADDRESS

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

TITLE

Transmission of System Information on a Downlink Shared Channel

FILING FEE RECEIVED		
1680	FEES: Authority has been given in Paper No.____________ to charge/credit DEPOSIT ACCOUNT No.____________ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other ________________ ☐ Credit

BIB (Rev. 05/07).

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	12/664347
	Filing Date	2009.12.11
	First Named Inventor	Dahlman
	Art Unit	2462
	Examiner Name	/Xavier Szewai Wong/
	Attorney Docket Number	4015-6727

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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/XSW/	1	1799003	EP	A1	2007-06-20	Matsushita Electric Industrial Co., Ltd.		☐
/XSW/	2	2007/052917	WO	A1	2007-05-10	LG Electronics, Inc.		☐

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	
First Named Inventor	Dahlman
Art Unit	
Examiner Name	
Attorney Docket Number	4015-6727

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.	T5
/XSW/	1	3RD GENERATION PARTNERSHIP PROJECT. "System Information Scheduling and Change Notification." 3GPP TSG-RAN2 Meeting #58, Tdoc R2-071912, Kobe, Japan, 7-11 May 2007.	☐
	2	3RD GENERATION PARTNERSHIP PROJECT. "Draft Text Proposal Capturing Agreements on System Information." 3GPP TSG-RAN2 Meeting #58, Tdoc R2-072205, Kobe, Japan, 7-11 May 2007.	☐
	3	3RD GENERATION PARTNERSHIP PROJECT. "Transmission of Dynamic System Information." 3GPP TSG-RAN2 Meeting #58bis, R2-072543, Orlando, FL, US, 25-29 June 2007.	☐
	4	3RD GENERATION PARTNERSHIP PROJECT. "Transmission of Dynamic System Information." 3GPP TSG-RAN2 Ad-hoc Meeting, Tdoc R2-075559, Vienna, Austria, 13-14 December 2007.	☐
	5	3RD GENERATION PARTNERSHIP PROJECT. 3GPP TS 36.300 V8.0.0 (2007-03). 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access network (E-UTAN); Overall description; Stage 2 (Release 8).	☐

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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.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	12/664347	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 06:17
L2	49196	(Dahlman Vukajlovic).IN. Ericsson.AS.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 06:32
L3	2	L2 and (re$1cur $5 adj2 window).clm.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 06:38

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L4	10008	(Dahlman Vukajlovic).IN. Ericsson.AS.	USPAT; UPAD	OR	ON	2011/12/18 06:38
L5	1	L4 and (re$1cur $5 adj2 window).clm.	USPAT; UPAD	OR	ON	2011/12/18 06:38
L6	6	L4 and RNTI.clm.	USPAT; UPAD	OR	ON	2011/12/18 06:55

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	23391	(370/311,328-334,468.ccls. 455/422.1.ccls.) and (@rlad < "20070618" @ad < "20070618")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 13:55
L2	44	L1 and RNTI same (schedul$5 SU SU $2)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 13:55
L4	425	L1 and (repetitive repeat$3 recurr$5) with (schedul$5 adj unit SU SU$2)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 14:17
L5	2	L1 and (repetitive repeat$3 recurr$5) with (schedul$5 adj unit SU SU$2) and RNTI	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 14:18
L6	273924	("370"/$.ccls. "455"/$.ccls.) and (@rlad < "20070618" @ad < "20070618")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 14:19
L7	1	L6 and (repetitive repeat$3 recurr$5) with (schedul$5 adj unit SU) and RNTI	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 14:19
L8	10	L6 and (repetitive repeat$3 recurr$5) with window and RNTI	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 14:24
L9	0	L6 and (overlap5 over$1laid) with (schedul$5 adj unit SU) and RNTI	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 14:27

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L1	23391	(370/311,328-334,468.ccls. 455/422.1.ccls.) and (@rlad < "20070618" @ad < "20070618")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 13:55
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L11	37	L1 and RNTI same (schedul$5 SU SU $2) and (repeat$6 repetitive recurr$5 over$1lap$5 over $1laid)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 14:36
L12	15	L1 and RNTI same (schedul$5 SU SU $2) and (repeat$6 repetitive recurr$5 over$1lap$5 over $1laid) and (window system adj information)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 14:37
L13	37	L1 and RNTI same (schedul$5 SU SU $2) and (repeat$6 repetitive recurr$5 over$1lap$5 over $1laid) and (window system adj information RNTI)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 14:37
L14	43	L6 and RNTI same (schedul$5 SU SU $2) and (repeat$6 repetitive recurr$5 over$1lap$5 over $1laid) and (window system adj information)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 14:52

L15	2	L6 and RNTI and (schedul$5 SU SU $2) same (repeat$6 repetitive recurr$5 over$1lap$5 over $1laid) with sub $1frame	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 15:19

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Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L6	273924	("370"/$.ccls. "455"/$.ccls.) and (@rlad < "20070618" @ad < "20070618")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 14:19
L7	1	L6 and (repetitive repeat$3 recurr$5) with (schedul$5 adj unit SU) and RNTI	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 14:19
L8	10	L6 and (repetitive repeat$3 recurr$5) with window and RNTI	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 14:24
L9	1	L6 and (over$lap $5 over$1laid) with window and RNTI	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 14:30
L10	1	L6 and (repetitive repeat$3 recurr$5) with (schedul$5 adj unit SU) and RNTI and system adj information	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 14:31

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... ina) la, oiti mii..l tpm irui n tlw i'ni..iilu ut l-uM»,Uwu.sl L . S. Deion uiou ia .Vglivuliure. Page 6. / I KAn Ml .ilS ' l;ri.i.KTI.N s:Hl. Inseet attaek ; ig; i iii **sl rntl** on begins With tin. Seedlinl' und eon ,nuns nniil the |il:ilil is destro\ed when pieking is over. li seems hest . I herefoiv. In I li . **...**
Cited by 5 - Related articles - Library Search - All 2 versions

Sull'interruttore di Wehnelt
OM Corbino - Il Nuovo Cimento (1895-1900), 1900 - Springer
... anode non 6 maggiore di quella di pl'ima. Espe,~'ienza 3". --~ Sullo s~esso nucleo di levee sono av- volt.i due **si~rnti** (li file gPosso, i qunli fan pnrte di un civcuito Page 3. (34 O. 31. CORBINO the contiene anche una batteria di 5 **...**

Using untagged B^{0}→ DK_ {S} to determine γ [PDF]
M Gronau, Y Grossman, N Shuhmaher, A Soffer… - Physical Review D, 2004 - APS
Page 1. Using untagged B0\DKS to determine M. Gronau,1 Y. Grossman,1,2,3 N. Shuhmaher,1 A. Soffer,4 and J. Zupan1,5 1Department of Physics, Technion–Israel Institute of Technology, Technion City, 32000 Haifa, Israel **...**
Cited by 26 - Related articles - BL Direct - All 15 versions

불꽃기-수분해 증착에 의한 Ti-doped BSG 도파박막의 제작
전영윤 , 이용태 , 전은숙 , 정석종… - 한국광학회지, 1994 - dbpia.co.kr
... Tio, doped BSG 박막이 BSG 박막의 흡수대 역과 유사하게 나타났다. 이것은 **Si-rnTi** 결합 흡수대역 T8이im가S01i7c첨0를가나나되Si타지C내-B않고는흡있수B었S대G지역의만에경굴포우절함B률된, o변,것화의으를로함고량여이려겨진최할다대때. 10mol%가 추정되고 있다. **...**

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L2	273924	("370"/$.ccls. "455"/$.ccls.) and (@rlad < "20070618" @ad < "20070618")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 21:16
L11	177	L2 and (modif$6 chang$1able) with window adj size	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/19 00:10
L12	1	L2 and (modif$6 chang$1able) with window adj size and SIB	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/19 00:10

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Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	273924	("370"/$.ccls. "455"/$.ccls.) and (@rlad < "20070618" @ad < "20070618")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 21:16
L8	1	"SI-RNTI" and "ESI-RNTI"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 23:04
L9	0	L2 and RNTI with (end adj system)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/18 23:09

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Search Notes	Application/Control No. 12664347	Applicant(s)/Patent Under Reexamination DAHLMAN ET AL.
	Examiner Xavier Szewai Wong	Art Unit 2462

SEARCHED

Class	Subclass	Date	Examiner

SEARCH NOTES

Search Notes	Date	Examiner
EAST image, class and keyword search in USPAT, US-PGPUB, DERWENT, EPO, JPO, and IBM_TDB (please see search history)	2011.12.17	/XSW/
Inventor Name and Assignee search in PALM and EAST	2011.12.17	/XSW/
EAST combined subclass, image and text search:: 370/311,328-334,468 and 455/422.1	2011.12.17	/XSW/

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of **Dahlman**	)	
Serial No.: **12/664,347**	)	Examiner: Xavier S. Wong
Filed: **December 11, 2009**	)	Group Art Unit: 2462
For: **Transmission of System Information on a Downlink Shared Channel**	)	Confirmation No.: 1464
Docket No: **4015-6727**	)	

Mail Stop Amendment
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11 June 2012
Date

Cora L. Fedornock

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RESPONSE TO OFFICE ACTION

This paper is being filed in response to the Office Action mailed December 20, 2011. A **three-month time extension** is requested, and the corresponding fee is submitted herewith. Reconsideration is respectfully requested in light of the amendments and remarks below. The Office is hereby authorized to charge any additional fees required for entry of this paper to Deposit Account 18-1167.

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method of transmitting system information on [[the]] a downlink shared channel of a wireless communication network comprising:

transmitting system information in recurring time windows, each time window spanning a plurality of subframes; ~~overlaid on a sequence of transmit channel subframes;~~

dynamically selecting which subframes within a given time window are to be used for carrying the system information; and

including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

2. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a contiguous set of subframes within the given time window.

3. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a non-contiguous set of subframes within the given time window.

4. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting which subframes to use for transmitting system information in view of competing transmission priorities associated with other control or data signaling.

5. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information comprises using an RNTI (Radio Network Temporary Identifier) to denote that the subframe carries system information.

6. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using an end-of-system-information indicator in a last subframe of the given time window that carries system information.

7. (Original) The method of claim 1, further comprising varying window sizes of the recurring time windows.

8. (Original) The method of claim 1, further comprising dynamically configuring a window size for the recurring time windows.

9. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using different indicators corresponding to different types of system information, such that the indicator used for a particular subframe indicates the type of system information carried in that subframe.

10. (Currently amended) A network transmitter for transmitting system information on a downlink shared channel in a wireless communications network, the network transmitter configured to ~~comprising a baseband processor configured to: generate~~ transmit system information in recurring time windows, each time window spanning a plurality of subframes; ~~overlaid on a sequence of transmit channel subframes;~~ the network transmitter comprising a baseband processor configured to:

dynamically select which subframes within a given time window are to be used for carrying system information; and

include an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

11. (Original) The network transmitter of claim 10, wherein the network transmitter comprises a radio base station configured for operation in accordance with 3GPP E-UTRA standards.

12. (Currently amended) A method of transmitting system information on a downlink shared channel structured as successive subframes, the method comprising:

transmitting system information in regularly occurring time windows, each time window spanning ~~some number~~ a plurality of successive subframes; ~~and~~

dynamically selecting which subframes within a given time window are to be used for carrying system information;

indicating to receiving user equipment which subframes within a given time window carry system information.

13. (Original) The method of claim 12, wherein indicating to receiving user equipment which subframes within a given time window carry system information includes indicating the last subframe within the given time window that carries system information, thereby allowing the receiving user equipment to cease monitoring for system information within the given time window.

14. (Cancelled)

15. (Currently amended) A method, in [[for]] a mobile station, for receiving ~~to receive~~ system information on a downlink shared channel from a network transmitter in a ~~from a supporting~~ wireless communication network, the method comprising:

~~beginning~~ monitoring for the receipt of system information ~~at the start of each time window in a succession of~~ in recurring time windows used for the transmission of system information, each said time window spanning a ~~number of signal~~ plurality of subframes;

within each time window, monitoring each ~~signal~~ subframe for an indication of the presence of system information and reading system information from the ~~signal~~ subframe if such information is present; and

terminating monitoring at least at the end of the time window.

16. (Currently amended) The method of claim 15, further comprising recognizing an end-of-system-information indicator in a ~~signal~~ subframe received within the time window and terminating monitoring for the time window in response.

17. (Currently amended) The method of claim 15, further comprising adapting to variable ~~changing or configurable~~ window sizes used for the time window.

18. (Original) The method of claim 15, further comprising storing a default window size for monitoring for system information transmissions.

19. (Original) The method of claim 18, further comprising monitoring for system information transmissions based on a specified window size indicated in received information rather than the default window size.

20. (Currently amended) The method of claim 15, further comprising recognizing different types of system information based on recognizing different system information indicators in different ~~signal~~ subframes.

21. (Currently amended) A mobile station operative to receive system information on a downlink channel from a network transmitter in a wireless communications network, the mobile station comprising a baseband processor operable to:

~~begin monitoring~~ monitor for the receipt of system information ~~at the start of each time window in a succession of~~ in recurring time windows used for the transmission of system information, each said time window spanning a ~~number of signal~~ plurality of subframes;

within each time window, monitor each ~~signal~~ subframe for an indication of the presence of system information and ~~reading~~ read system information from the ~~signal~~ subframe if such information is present; and

terminate monitoring at least at the end of the time window.

22. (Currently amended) The mobile station of claim 21, wherein the baseband processor is operable to recognize an end-of-system-information indicator in a ~~signal~~ subframe received within the time window and terminate monitoring for the time window in response.

23. (Currently amended) The mobile station of claim 21, wherein the baseband processor is ~~operable to~~ configured to adapt to variable ~~changing or configurable~~ window sizes used for the time window.

24. (Original) The mobile station of claim 21, wherein the baseband processor is operable to monitor for system information transmissions based on a specified window size indicated in received information rather than a default window size.

25. (Currently amended) The mobile station of claim 21, wherein the baseband processor is operable to recognize different types of system information based on different system information indicators detected in different ~~signal~~ subframes.

26. (New) The method of claim 1 wherein the dynamically selecting comprises dynamically selecting subframes such that the same system information is assigned for transmission to different non-aligned subframes in first and second consecutive time windows.

REMARKS

Claim Amendments

Claim 14 has been canceled.

Claims 1, 10, 12, 15-17, 20, 21-23, 25 have been amended.

Claim 26 has been added.

Support for these amendments is found throughout the specification and drawings, *see*, *e.g.*, pages 4-7 and accompanying drawings. These amendments do not introduce new matter herein.

Claim Objections

The Action includes instructions to "delete all occurrences of 'adapting,' 'adapted to,' and 'operable to'.... into -- configured to --." The only places that Applicant notes use of such words is in claims 17 and 23. Applicant has amended claim 23 to change "operable to" to now read "configured to", without changing the scope thereof. With regard to claim 17, Applicant submits that "adapting to" is a positive assertion in a method claim. However, in order to improve grammar without changing claim scope, Applicant has changed "changing or configurable window sizes" in claims 17 and 23 to now read "variable window sizes." Withdrawal of the corresponding claim objection(s) is therefore requested.

§102/103 Rejections

Claims 1-4, 7-10, 12, 14-15,[1] 18, 21, 25 stand rejected under §102 as anticipated by R2-072205. Claims 5-6, 11, 13, 16-17, 19-20, 23-24 stand rejected under §103 as being obvious over R2-072205 in combination with various secondary references. Applicant requests reconsideration.

Claim 1 requires, *inter alia*, "dynamically selecting which subframes within a given time window are to be used for carrying the system information," and "including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information." R2-072205 does not show either feature.

As an initial point, Applicant notes that the Examiner misinterprets R2-072205 when the Examiner interprets fig. x of R2-072205 to show "SU-1, SU-2 and SU-3 are in a same subframe and are recurring." An examination of fig. x finds that SU-1, SU-2, and SU-3 are plainly not in the same subframe. They may be in the same frame, but are explicitly not in the same subframe. The size of the subframe is shown by the double-headed arrow. Further, the different SU's (SU-1, SU-2, SU-3) are indicated by different colors and are plainly shown as non-overlapping in both the upper and lower portions of fig. x. Thus, the SU-1, SU-2, and SU-3 in R2-072205 are quite clearly not in the same subframe, as posited by the Examiner.

The "subframe" misinterpretation of R2-072205 leads the Examiner to misinterpret R2-072205 to show dynamic selection of subframes for a given piece of

[1] The summary of the §102 rejection does not indicate that claim 14 is rejected under §102, but other text of the Action might possibly indicate that claim 14 is rejected under §102. Clarification of the record on

system information. R2-072205 does not show this. Instead, in R2-072205, the subframes to be used for transmitting the system information in a given SU are exactly determined by the periodicity and the amount of system information. This means that once the system information blocks (SIBs) have been mapped onto SUs to be scheduled for transmission the selection of subframes is fixed. There simply is no dynamic selection whatsoever of which subframes within a given time window the system information is to be transmitted in.

Further, the Examiner misconstrues the teachings of R2-072205 on the "value tags", and therefore wrongly asserts that R2-072205 teaches the claimed method of "including an indicator in each of the selected subframes." Assuming *arguendo* that the R2-072205 "value tags" are otherwise analogous to the claimed indicators, the value tags are simply not "in each of the selected subframes." R2-072205 makes clear in Section 7.4 is that "It is FFS [for future study] whether the SB [scheduling block] includes a value tag for each SU." This means that the value tag for an SU is located in the SB [scheduling block], not in the SU itself. For clarity, R2-072205 specifically states in Section 7.4 line 5-14 that Value tags are carried on the BCH, "in a System Information Block called the Master Information Block (MIB)." Thus, these value tags are carried in the MIB, which fig. x plainly shows is NOT part of SU-1, SU-2, or SU-3. Therefore, R2-072205 at most teaches that the "value tags" are carried in a different subframe than the subframes of the "SU" to which they pertain. As such, it is clear that R2-072205 simply does not contemplate "including an indicator in each of the selected

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this point is requested in the next communication from the Office. Absent such clarification, Applicant will understand that claim 14 is not rejected under §102.

subframes to indicate to receiving user equipment that the subframe carries system information."

Further still, claim 1 requires that the "indicator" -- besides being present in each of the selected subframes -- must "indicate to receiving user equipment that the subframe carries system information." There simply is no evidence that the "value tag" described by R2-072205 serves such a purpose. At most, R2-072205 states the following with regard to the "value tag":

> "It is FFS [for future study] whether the SB [scheduling block] includes a value tag for each SU, whether a common value tag is used. The common value tag could either be carried in the MIB or in the SIB."

(R2-072205, p. 5). This passage nowhere suggests that the "value tag" serves any function to "indicate to receiving user equipment that the subframe carries system information," as claimed. Indeed, the function of the "value tag" is not defined in R2-072205, so the Examiner's postulation about its purpose is nothing but conjecture. There simply is no suggestion that the presence or absence of the "value tag" can or should be interpreted by the receiving user equipment that the subframe having the "value tag" carries system information. As such, the R2-072205 "value tag" is neither present where required nor indicative of what is required by claim 1.

As pointed out above, R2-072205 fails to teach at least two limitations of claim 1. As such, independent claim 1 cannot be anticipated by R2-072205. Further, none of the other cited art cures these defects. Accordingly, independent claim 1 and its dependent claims define over the cited art.

With further regard to new dependent claim 26, this claim requires "dynamically selecting subframes such that the same system information is assigned for transmission to different non-aligned subframes in first and second consecutive time windows." In contrast to this dynamic assignment approach, R2-072205 clearly contemplates that any given piece of system information (the same system information) will be transmitted in the same subframes in each successive multi-frame time window, assuming *arguendo* that different multi-frame/scheduling periods can be considered to be different multi-frame time windows. Thus, whatever else R2-072205 may teach, it does not teach the limitations added by dependent claim 26.

For claims 10-11, Applicant notes that independent claim 10 includes limitations identical or similar to the "dynamically selecting" and "including an indicator in each selected subframe" limitations found in claim 1. Accordingly, Applicant submits that independent claim 10 and its dependent claims define over the cited art for reasons similar to those discussed above with respect to independent claim 1.

For claims 12-13, Applicant notes that independent claim 12 includes "dynamically selecting" limitations identical or similar to those found in claim 1. Accordingly, Applicant submits that independent claim 12, and its dependent claims define over the cited art for reasons similar to those discussed above with respect to independent claim 1.

For claims 15-20, 21-25 Applicant notes that independent claim 15 requires "monitoring each subframe for an indication of the presence of system information and reading system information from the subframe if such information is present" while independent claim 21 likewise requires "monitor each subframe for an indication of the presence of system information and read system information from the subframe if such information is present." The claimed monitoring of each subframe in these claims is related to the "including an indicator in each selected subframe" limitation found in claim 1. As pointed out above, R2-072205 does not show the "value tags" in each relevant subframe, but at most only in the SB. Nor does R2-072205 suggest looking for "value tags" anywhere but in the SB. Therefore, R2-072205 necessarily does not teach "monitoring" each subframe for the "value tags." Further, as pointed out above the "value tag" of R2-072205 is not "an indication of the presence of system information." Thus, R2-072205 cannot teach "monitor[ing] each subframe for an indication of the presence of system information and read[ing] system information from the subframe if such information is present," as claimed. As such, Applicant submits that independent claims 15 and 21, and their corresponding dependent claims, define over the cited art for reasons similar to those discussed above with respect to independent claim 1.

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

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

Dated: 11 June 2012

John R. Owen
Registration No.: 42,055
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Electronic Patent Application Fee Transmittal

Application Number:	12664347
Filing Date:	11-Dec-2009
Title of Invention:	Transmission of System Information on a Downlink Shared Channel
First Named Inventor/Applicant Name:	Erik Dahlman
Filer:	John R. Owen/Cora Fedornock
Attorney Docket Number:	4015-6727 / P24241-US2

Filed as Large Entity

U.S. National Stage under 35 USC 371 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:				
Extension - 3 months with $0 paid	1253	1	1270	1270

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
		Total in USD ($)		**1270**

Electronic Acknowledgement Receipt

EFS ID:	12981583
Application Number:	12664347
International Application Number:	
Confirmation Number:	1464
Title of Invention:	Transmission of System Information on a Downlink Shared Channel
First Named Inventor/Applicant Name:	Erik Dahlman
Customer Number:	24112
Filer:	John R. Owen/Cora Fedornock
Filer Authorized By:	John R. Owen
Attorney Docket Number:	4015-6727 / P24241-US2
Receipt Date:	11-JUN-2012
Filing Date:	11-DEC-2009
Time Stamp:	15:01:58
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	$1270
RAM confirmation Number	1554
Deposit Account	
Authorized User	

File Listing:

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

1		40156727RESPONSE.pdf	545720 f523745944e52e3b86e0b22602f78a4f7027c2b0	yes	14

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment/Req. Reconsideration-After Non-Final Reject	1	1
Claims	2	7
Applicant Arguments/Remarks Made in an Amendment	8	14

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30076 a0864b325202066e151178df5248fee98b949a4d	no	2

Warnings:

Information:

Total Files Size (in bytes):	575796

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<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 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number	Filing Date	
12/664,347	12/11/2009	☐ To be Mailed

APPLICATION AS FILED – PART I

FOR	NUMBER FILED (Column 1)	NUMBER EXTRA (Column 2)	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	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			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 $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))							
			TOTAL			TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

AMENDMENT 06/11/2012	CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	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))	* 25	Minus	** 25	= 0	X $ =		OR	X $60=	0
Independent (37 CFR 1.16(h))	* 5	Minus	***4	= 1	X $ =		OR	X $250=	250
☐ 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	250

AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	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 FLOYD/

Document code: WFEE

United States Patent and Trademark Office
Sales Receipt for Accounting Date: 06/14/2012

DFLOYD SALE #00000001 Mailroom Dt: 06/11/2012 181167 12664347
01 FC : 1201 250.00 DA

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United States Patent and Trademark Office
Sales Receipt for Accounting Date: 06/11/2014

JOLSEN   ADJ #00000001   Mailroom Dt: 06/11/2012
Seq No: 1   Sales Acctg Dt: 06/14/2012   181167   12664347
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/664,347	12/11/2009	Erik Dahlman	4015-6727 / P24241-US2	1464

24112 7590 10/17/2012
COATS & BENNETT, PLLC
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Cary, NC 27518

EXAMINER	
WONG, XAVIER S	

ART UNIT	PAPER NUMBER
2413	

MAIL DATE	DELIVERY MODE
10/17/2012	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.

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No. 12/664,347	Applicant(s) DAHLMAN ET AL.	
	Examiner Xavier Szewai Wong	Art Unit 2462	

-- 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 *11th June 2012*.

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) *1-13 and 15-26* 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) *1-13 and 15-26* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

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).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☐ 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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

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

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Detailed Action

Claim Objections

In claims **17**, **21**, **22**, **24** and **25**, delete all occurrences of “adapt to,” “adapting,” “adapted to,” “oper*able* to” and “operat*ive* to” because these terms lack positive assertion, e.g. change them into -- configured to --.

Appropriate corrections are required.

Claim Rejections - 35 USC § 112

Claim 26 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 26 mentions – “different *non-aligned* subframes” *in first and second consecutive time windows*.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1 – 4 and 7 – 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Draft Text Proposal Capturing Agreements on System Information” (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale), and in further view of Dimou et al (US 2009/0131057 A1, Dimou).

1. R2-072205 teaches a method of transmitting system information on the downlink shared channel of a wireless communication network (sec 7.4 downlink system) comprising: transmitting system information in recurring time windows (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); dynamically selecting which

subframes within a given time window are to be used for carrying the system information (sec 7.4 – An SU may be segmented, in which case segments are scheduled… eNB may schedule more than one SU in a subframe); and including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information (sec 7.4 – SB value tag in each SU).
R2-072205 *may not have explicitly* shown “each time window spanning a plurality of subframes.” Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.
Dimou

10. R2-072205 teaches a network transmitter for transmitting system information on a downlink shared channel in a wireless communications network, the network transmitter configured to comprising a baseband processor (fig. 5.4.1.2) generate system information in recurring time windows (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are recurring), the network transmitter comprising a baseband processor configured to: include an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information (sec 7.4 – SB value tag in each SU).
R2-072205 *may not have explicitly* shown “each time window spanning a plurality of subframes.” Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.
R2-072205, modified by Arundale, *may not have explicitly* mentioned “*dynamically* select which subframes within a given time window are to be used for carrying system information.
Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]:: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.

12. R2-072205 teaches a method of transmitting system information on a downlink shared channel structured as successive subframes (fig. 5.4.1.2 and fig. x), the method comprising: transmitting system information in regularly occurring time windows (fig. x::

SU-1, SU-2 and SU-3 are in a same subframe and are recurring), (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); and indicating to receiving user equipment which subframes within a given time window carry system information (sec 7.4 – SB value tag in each SU).
R2-072205 *may not have explicitly* shown "each time window spanning a plurality of successive subframes." Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.
R2-072205, modified by Arundale, may not have explicitly depicted "*dynamically* selecting which subframes within a given time window are to be used for carrying system information."
Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]:: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.

Claims 15, 18, 21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Draft Text Proposal Capturing Agreements on System Information" (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale), and in further view of Dimou et al (US 2009/0131057 A1, Dimou) and Love et al (US 2004/0219917 A1, Love).

15. R2-072205 teaches a method for a mobile station for receiving system information on a downlink shared channel from a network transmitter in a wireless communication network (fig. 5.4.1.2:: UE), the method comprising: monitoring for the receipt of system information in recurring time windows used for the transmission of system information (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); within each time window, monitoring each subframe for an indication of system information and reading system information from the signal subframe if such information is present (sec 7.4 – SB value tag in each SU); and terminating monitoring at least at the end of the time window (if there are no more subframes to be monitored, it is only reasonable to terminate monitoring).

R2-072205 *may not have explicitly* shown "each time window spanning a plurality of successive subframes." Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.
R2-072205, modified by Arundale, may not have explicitly depicted "*dynamically* selecting which subframes within a given time window are to be used for carrying system information."
Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]:: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.
While R2-072205/Arundale/Dimou mention said system information, they *may not have explicitly* mentioned "presence indication" of said system information.
Love mentions presence indication of system information in subframe ([0071]:: one TFCI bit (EU indication bit) out of one of the slots per frame or sub-frame is used to indicate the presence or absence of the EU field while the other bits in each TFCI field of the remaining slots per frame or sub-frame are still used to represent the TFCI). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the presence indication of system information as taught by Love to the downlink shared channel information subframe of R2-072205/Arundale/Dimou for soft handoff.

21. R2-072205 teaches a mobile station operative to receive system information on a downlink channel from a network transmitter in a wireless communications network, the mobile station comprising a baseband processor (fig. 5.4.1.2:: UE) operable to: monitor for the receipt of system information in recurring time windows used for the transmission of system information (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); within each time window, monitor each subframe for an indication of system information and reading system information from the signal subframe if such information is present (fig. x:: SIB); and terminate monitoring at least at the end of the time window (if there are no more subframes to be monitored, it is only reasonable to terminate monitoring).
R2-072205 *may not have explicitly* shown "each time window spanning a plurality of successive subframes." Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink

shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.
R2-072205, modified by Arundale, may not have explicitly depicted "*dynamically* selecting which subframes within a given time window are to be used for carrying system information."
Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]:: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.
While R2-072205/Arundale/Dimou mention said system information, they *may not have explicitly* mentioned "presence indication" of said system information.
Love mentions presence indication of system information in subframe ([0071]:: one TFCI bit (EU indication bit) out of one of the slots per frame or sub-frame is used to indicate the presence or absence of the EU field while the other bits in each TFCI field of the remaining slots per frame or sub-frame are still used to represent the TFCI). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the presence indication of system information as taught by Love to the downlink shared channel information subframe of R2-072205/Arundale/Dimou for soft handoff.

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2. R2-072205 teaches the method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a contiguous set of subframes within the given time window (fig. x:: subframes 3 and 131).

3. R2-072205 teaches the method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a non-contiguous set of subframes within the given time window (fig. x:: subframes 19 and 67).

4. R2-072205 teaches the method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting which subframes to use for transmitting system information in view of competing transmission priorities associated with other control or data signaling (fig. x:: SIB).

7. R2-072205 teaches the method of claim 1, further comprising varying window sizes of the recurring time windows (fig. x:: SU-1, SU-2 and SU-3 have different sizes).

8. R2-072205 teaches the method of claim 1, further comprising dynamically configuring a window size for the recurring time windows (sec. 7.4 – MIB paragraph).

9. R2-072205 teaches the method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using different indicators corresponding to different types of system information (sec 7.4 – MIB paragraph), such that the indicator used for a particular subframe indicates the type of system information carried in that subframe (sec 7.4 – SIB).

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11. R2-072205 teaches the network transmitter of claim 10, wherein the network transmitter comprises a radio base station configured for operation in accordance with 3GPP E-UTRA standards (3GPP TSG-RAN2).

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18. R2-072205 teaches the method of claim 15, further comprising storing a default window size for monitoring for system information transmissions (fig. x:: SU-1, SU-2 and SU-3 have default sizes).

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25. R2-072205 teaches the mobile station of claim 21, wherein the baseband processor is operable to recognize different types of system information based on different system information indicators detected in different subframes (fig. x:: SIB-a,b,c,d,e).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over “Draft Text Proposal Capturing Agreements on System Information” (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale), Dimou et al (US 2009/0131057 A1, Dimou) (hereinafter R2-072205 etc.), applied to claim 1, and in further view of “System Information Scheduling and Change Notification” (R2-071912).

5. R2-072205 etc. teaches the method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe

carries system information; R2-072205 etc. does not very explicitly show it comprises using an RNTI (Radio Network Temporary Identifier) to denote that the subframe carries system information. R2-071912 explicitly teaches subframes indicators are in RNTI format (page 3 bottom). It would have been obvious to one of ordinary skill in the art when the invention was made to understand that both R2 documents refer to the same 3GPP systems information techniques and the R2-072205 (primary reference), while being silent on its application to the indications, also uses RNTI.

Claims 17, 19, 20, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Draft Text Proposal Capturing Agreements on System Information" (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale), Dimou et al (US 2009/0131057 A1, Dimou) and Love et al (US 2004/0219917 A1, Love) (hereinafter R2-072205); and in further view of Marinier et al (US 2008/0225765 A1, Marinier).

17. R2-072205 etc. teaches the method of claim 15; R2-072205 etc. may not have explicitly mentioned further comprising adapting to changing or configurable window sizes used for the time window. Marinier teaches changing or configurable window sizes used for the time window ([0457]). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 etc. to allow configurable window sizes to facilitate reordering procedure.

19. R2-072205 etc. teaches the method of claim 18; R2-072205 etc. does not explicitly mention further comprising monitoring for system information transmissions based on a specified window size indicated in received information rather than the default window size. Marinier teaches monitoring for system information transmissions based on a specified window size indicated in received information rather than a default window size ([0457]:: if window size is changed for reordering purpose, then it is only reasonable that the changing window sizes are monitored). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 etc. to allow configurable window sizes to facilitate reordering procedure.

20. R2-072205 etc. teaches the method of claim 15; R2-072205 etc. does not explicitly mention further comprising recognizing different types of system information based on recognizing different system information indicators in different signal subframes. Marinier teaches recognizing different types of system information based on recognizing different system information indicators in different signal subframes ([0457]:: if window size is changed for reordering purpose, then it is only reasonable that the changing

window sizes are recognized). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 etc. to allow configurable window sizes to facilitate reordering procedure.

23. R2-072205 etc. teaches the mobile station of claim 21; R2-072205 etc. may not have explicitly mentioned wherein the baseband processor is operable to adapt to changing or configurable window sizes used for the time window. Marinier teaches changing or configurable window sizes used for the time window ([0457]). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 etc. to allow configurable window sizes to facilitate reordering procedure.

24. R2-072205 etc. teaches the mobile station of claim 21; R2-072205 etc. does not explicitly mention wherein the baseband processor is operable to monitor for system information transmissions based on a specified window size indicated in received information rather than a default window size. Marinier teaches monitoring for system information transmissions based on a specified window size indicated in received information rather than a default window size ([0457]:: if window size is changed for reordering purpose, then it is only reasonable that the changing window sizes are monitored). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 etc. to allow configurable window sizes to facilitate reordering procedure.

Claims 6, 13, 16 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Draft Text Proposal Capturing Agreements on System Information” (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale), and in further view of Dimou et al (US 2009/0131057 A1, Dimou) (hereinafter R2-072205 etc.); and in further view of Kashima et al (US 2007/0217362 A1, Kashima).

6. R2-072205 etc. teaches the method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information; R-072205 etc. do not explicitly shows it includes using an end-of-system-information indicator in a last subframe of the given time window that carries system information. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information (0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention

was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 etc. to maintain flexibility of scheduling.

13. R2-072205 etc. teaches the method of claim 12; R-072205 etc. does not explicitly shows wherein indicating to receiving user equipment which subframes within a given time window carry system information includes indicating the last subframe within the given time window that carries system information, thereby allowing the receiving user equipment to cease monitoring for system information within the given time window. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information so to cease monitoring within a given time (0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 etc. for flexibility of scheduling subframes.

16. R2-072205 etc. teaches the method of claim 15; R-072205 etc. does not explicitly shows it further comprising recognizing an end-of-system-information indicator in a signal subframe received within the time window and terminating monitoring for the time window in response. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information (0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 to maintain flexibility of scheduling.

22. R2-072205 etc. teaches the mobile station of claim 21; R-072205 etc. does not explicitly shows wherein the baseband processor is operable to recognize an end-of-system-information indicator in a signal subframe received within the time window and terminate monitoring for the time window in response. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information (0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 etc. to maintain flexibility of scheduling.

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 or earlier communications from the examiner should be directed to Xavier Wong whose telephone number is 571.270.1780. The examiner can normally be reached on Monday through Friday 11:30 am - 9:00 pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yemane Mesfin can be reached on 571.272.3927. 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.

/Xavier Szewai Wong/
Primary Examiner, Art Unit 2462
27th September 2012

Notice of References Cited	Application/Control No. 12/664,347	Applicant(s)/Patent Under Reexamination DAHLMAN ET AL.	
	Examiner Xavier Szewai Wong	Art Unit 2462	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2004/0219917 A1	11-2004	Love et al.	455/436
*	B	US-7,675,852 B1	03-2010	Arundale et al.	370/229
*	C	US-2009/0131057 A1	05-2009	Dimou, Konstantinos	455/436
	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					
	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.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L10	0	12/664347 and non adj align$5	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/10/01 00:03
L11	1	12/664347	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/10/01 00:03
L12	0	12/664347 and align$5	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/10/01 00:03

EAST Search History (Interference)

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Search Notes	Application/Control No. 12664347	Applicant(s)/Patent Under Reexamination DAHLMAN ET AL.
	Examiner Xavier Szewai Wong	**Art Unit** 2462

SEARCHED

Class	Subclass	Date	Examiner

SEARCH NOTES

Search Notes	Date	Examiner
EAST image, class and keyword search in USPAT, US-PGPUB, DERWENT, EPO, JPO, and IBM_TDB (please see search history)	2011.12.17	/XSW/
Inventor Name and Assignee search in PALM and EAST	2011.12.17	/XSW/
EAST combined subclass, image and text search:: 370/311,328-334,468 and 455/422.1	2011.12.17	/XSW/
Updated Searches Above	2012.09.30	/XSW/

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	283415	("370"/$.ccls. "455"/$.ccls.) and (@rlad < "20070618" @ad < "20070618")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/09/30 21:29
L2	4	L1 AND plurality WITH window WITH sub$1frame	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/09/30 21:29
L3	4	L1 AND within WITH window WITH sub$1frame	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/09/30 21:50
L4	14	L1 AND one WITH window WITH sub$1frame	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/09/30 21:55
L5	2	L1 AND dynamic$5 with select$5 with sub$1frame	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/09/30 22:04
L6	38	L1 AND dynamic$5 near3 (choos$4 pick$3 select$5) with (window sub$1frame)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/09/30 22:10
L7	1	L1 AND dynamic$5 with (window with sub$1frame)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/09/30 22:57
L8	35	L1 AND sub$1frame with (present presence) with indicat$5	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/09/30 23:16
L9	2	L1 AND sub$1frame with (present presence) with indicat$5 with system	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/09/30 23:19

EAST Search History (Interference)

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L10	0	L1 AND sub$1frame with non$1align$5	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/10/01 00:11

EAST Search History (Interference)

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10/1/2012 12:12:35 AM
C:\Users\xwong\Documents\EAST\Workspaces\Dahlman 2012.09.30.wsp

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of **Dahlman**	)	
Serial No.: **12/664,347**	)	Examiner: Xavier S. Wong
Filed: **December 11, 2009**	)	Group Art Unit: 2462
For: **Transmission of System Information on a Downlink Shared Channel**	)	Confirmation No.: 1464
Docket No: **4015-6727**	)	

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Commissioner for Patents
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Alexandria, VA 22313-1450

25 January 2013

RESPONSE TO FINAL ACTION

This paper is being filed in response to the Final Action mailed 17 October 2012. A suitable time extension is requested. Reconsideration is respectfully requested in light of the amendments and 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 of transmitting system information on a downlink shared channel of a wireless communication network comprising:

transmitting system information in recurring time windows, each time window spanning a plurality of subframes;

dynamically selecting which subframes within a given time window are to be used for carrying the system information; and

including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

2. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a contiguous set of subframes within the given time window.

3. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a non-contiguous set of subframes within the given time window.

4. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting which subframes to use for transmitting system information in view of competing transmission priorities associated with other control or data signaling.

5. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries

system information comprises using an RNTI (Radio Network Temporary Identifier) to denote that the subframe carries system information.

6. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using an end-of-system-information indicator in a last subframe of the given time window that carries system information.

7. (Original) The method of claim 1, further comprising varying window sizes of the recurring time windows.

8. (Original) The method of claim 1, further comprising dynamically configuring a window size for the recurring time windows.

9. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using different indicators corresponding to different types of system information, such that the indicator used for a particular subframe indicates the type of system information carried in that subframe.

10. (Previously presented) A network transmitter for transmitting system information on a downlink shared channel in a wireless communications network, the network transmitter configured to transmit system information in recurring time windows, each time window spanning a plurality of subframes; the network transmitter comprising a baseband processor configured to:

dynamically select which subframes within a given time window are to be used for carrying system information; and

include an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

11. (Original) The network transmitter of claim 10, wherein the network transmitter comprises a radio base station configured for operation in accordance with 3GPP E-UTRA standards.

12. (Previously presented) A method of transmitting system information on a downlink shared channel structured as successive subframes, the method comprising:

transmitting system information in regularly occurring time windows, each time window spanning a plurality of successive subframes;

dynamically selecting which subframes within a given time window are to be used for carrying system information;

indicating to receiving user equipment which subframes within a given time window carry system information.

13. (Original) The method of claim 12, wherein indicating to receiving user equipment which subframes within a given time window carry system information includes indicating the last subframe within the given time window that carries system information, thereby allowing the receiving user equipment to cease monitoring for system information within the given time window.

14. (Cancelled)

15. (Previously presented) A method, in a mobile station, for receiving system information on a downlink shared channel from a network transmitter in a wireless communication network, the method comprising:

monitoring for the receipt of system information in recurring time windows used for the transmission of system information, each said time window spanning a plurality of subframes;

within each time window, monitoring each subframe for an indication of the presence of system information and reading system information from the subframe if such information is present; and

terminating monitoring at least at the end of the time window.

16. (Previously presented) The method of claim 15, further comprising recognizing an end-of-system-information indicator in a subframe received within the time window and terminating monitoring for the time window in response.

17. (Previously presented) The method of claim 15, further comprising adapting to variable window sizes used for the time window.

18. (Original) The method of claim 15, further comprising storing a default window size for monitoring for system information transmissions.

19. (Original) The method of claim 18, further comprising monitoring for system information transmissions based on a specified window size indicated in received information rather than the default window size.

20. (Previously presented) The method of claim 15, further comprising recognizing different types of system information based on recognizing different system information indicators in different subframes.

21. (Currently amended) A mobile station operative to receive system information on a downlink shared channel from a network transmitter in a wireless communications network, the mobile station comprising a baseband processor ~~operable~~ configured to:

monitor for the receipt of system information in recurring time windows used for the transmission of system information, each said time window spanning a plurality of subframes;

within each time window, monitor each subframe for an indication of the presence of system information and read system information from the subframe if such information is present; and

terminate monitoring at least at the end of the time window.

22. (Currently amended) The mobile station of claim 21, wherein the baseband processor is ~~operable~~ configured to recognize an end-of-system-information indicator in

a subframe received within the time window and terminate monitoring for the time window in response.

23. (Previously presented) The mobile station of claim 21, wherein the baseband processor is configured to adapt to variable window sizes used for the time window.

24. (Currently amended) The mobile station of claim 21, wherein the baseband processor is ~~operable~~ configured to monitor for system information transmissions based on a specified window size indicated in received information rather than a default window size.

25. (Currently amended) The mobile station of claim 21, wherein the baseband processor is ~~operable~~ configured to recognize different types of system information based on different system information indicators detected in different subframes.

26. (Currently amended) The method of claim 1 wherein the dynamically selecting comprises dynamically selecting subframes such that the same system information is assigned for transmission to different ~~non-aligned~~ subframes in first and second consecutive time windows, with the different subframes occupying differing respective positions within their corresponding frames.

REMARKS

Claim Amendments

Claims 21-22, 24-26 have been amended.

Support for these amendments is found throughout the specification and drawings, *see*, *e.g.*, pages 4-7 and accompanying drawings. These amendments do not introduce new matter herein.

These amendments are submitted per the Examiner's suggestion and/or to correct typographical errors, and act to narrow the issues for Appeal. As such, entry of the amendments is requested.

Claim Objections

The Action includes instructions to "delete all occurrences of 'adapting,' 'adapted to,' and 'operable to'.... into -- configured to --" for claims 21, 22, 24, 25. Applicant has amended claims 21, 22, 24, 25 on this point, without changing their respective scopes on this point.

With regard to claim 17, Applicant is confused by the Examiner's position. Applicant notes that the Examiner has failed to further explain or cite any legal authority for the position that the verb "adapting" "lacks positive assertion" in a method claim (versus in an apparatus claim). Applicant submits that "adapting to" is a positive assertion in a method claim. Further, the Examiner's suggestion to change the language to "configured to" simply makes no sense in the context of claim 17. Accordingly, Applicant requests withdrawal of the objection to claim 17.

<u>§112 Rejection</u>

The Action states that claim 26 is rejected for an alleged indefiniteness violation of §112,¶2 for use "different non-aligned subframes." However, the Action fails to explain how such language is allegedly indefinite. Nevertheless, and solely to narrow the issues for appeal, Applicant amends claim 26 to alternatively state the non-aligned nature with the language "with the different subframes occupying differing respective positions within their corresponding frames." This amendment is supported throughout the specification and drawings, *see*, *e.g.*, pages 4-5 of the specification (corresponding to ¶¶[0023]-[0026] of the published U.S. application). Withdrawal of the corresponding §112 rejection is requested.

<u>§103 Rejections</u>

Claims 1-4, 7-12 stand rejected under §103 as obvious over R2-072205 in view of Arundale (US 7675852) and Dimou (US 20090121057). Claims 5-6, 13, 15-25 stand rejected under §103 as being obvious over R2-072205/Arundale/Dimou in combination with various tertiary references. Applicant requests reconsideration.

Claim 1 requires, *inter alia*, "<u>dynamically selecting</u> which subframes within a given time window are to be used for carrying the system information," and "including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information." R2-072205 does not show either feature.

As an initial matter, Applicant directs the Examiner's attention to MPEP §706.07 which states in part, "Before final rejection is in order a clear issue should be developed between the examiner and applicant… The examiner should never lose sight of the fact that …a clear issue between applicant and examiner should be developed, if possible, before appeal." In this regard, Applicant notes that Applicant presented several arguments in the last response, which the Examiner has completely failed to rebut. Indeed, the Examiner has not even attempted to rebut most of the arguments.

For example, Applicant previously explained that "fig. x" of R2-072205 plainly shows that SU-1, SU-2, and SU-3 are not in the same subframe. Despite this, the Examiner still asserts fig x shows "SU-1, SU-2 and SU-3 are in a same subframe and are recurring." However, the Examiner provides absolutely no explanation in the present Action of how R2-072205 does this in the face of the Applicant's explanation to the contrary. Instead, the Examiner merely repeats exactly the same language without any further explanation at all. Thus, Applicant's position on this point stands unrebutted. Further, Applicant notes that claim 1 requires "transmitting system information in recurring time windows, each time window spanning a plurality of subframes." Thus, claim 1 requires that the time windows be recurring, and that the time window span multiple subframes, not that the subframes are recurring and that the subframes span a number of time windows, as seemingly suggested by the Examiner. Further still, the SU's of R2-072205 are neither the claimed recurring time windows nor the claimed subframes. Thus, the Examiner 's statement on this point is both wrong and appears to be irrelevant.

As another example, Applicant previously explained how the Examiner was plainly misconstruing the teachings of R2-072205 on the "value tags", and therefore wrongly asserting that R2-072205 teaches the claimed method of "including an indicator in each of the selected subframes." Again, the Examiner provides absolutely no explanation in the present Action of how R2-072205 teaches the alleged indicators in the face of the Applicant's explanation to the contrary. Instead, again, the Examiner merely repeats exactly the same language without any further explanation at all. Thus, again, Applicant's position on this point stands unrebutted.

As yet another example, Applicant previously explained the R2-072205 value tag simply does not "indicate to receiving user equipment that the subframe carries system information." Again, the Examiner provides absolutely no explanation in the present Action of how R2-072205 teachings on the "value tag" might make the required indication in the face of the Applicant's explanation to the contrary. Instead, again, the Examiner merely repeats exactly the same language without any further explanation at all. Thus, again, Applicant's position on this point stands unrebutted.

In view of the above, Applicant submits the Examiner has avoided developing several issues, and that the finality of the Action should therefore be withdrawn. In particular, the Examiner's rejection relies on at least three plainly erroneous points regarding R2-072205, all of which have been pointed out to the Examiner previously, and none of which has the Examiner even attempted to rebut. And, none of the other cited art appears to cure these defects in R2-072205. As such, Applicant submits that all of the §103 rejections relying on R2-072205 are fatally flawed. Further, Applicant submits that the finality of the present action must be withdrawn as improper under MPEP §706.07.

Applicant notes that the Examiner misinterprets R2-072205 when the Examiner interprets fig. x of R2-072205 to show "SU-1, SU-2 and SU-3 are in a same subframe and are recurring." An examination of fig. x finds that SU-1, SU-2, and SU-3 are plainly not in the same subframe. The size of the subframe is shown by the double-headed arrow. Further, the different SU's (SU-1, SU-2, SU-3) are indicated by different colors and are plainly shown as non-overlapping in both the upper and lower portions of fig. x. Thus, the SU-1, SU-2, and SU-3 in R2-072205 are quite clearly not in the same subframe, as posited by the Examiner.

The "subframe" misinterpretation of R2-072205 leads the Examiner to misinterpret R2-072205 to show dynamic selection of subframes for a given piece of system information. R2-072205 does not show this. Instead, in R2-072205, the subframes to be used for transmitting the system information in a given SU are exactly determined by the periodicity and the amount of system information. This means that once the system information blocks (SIBs) have been mapped onto SUs to be scheduled for transmission the selection of subframes is fixed. There simply is no dynamic selection whatsoever of which subframes within a given time window the system information is to be transmitted in.

Further, the Examiner misconstrues the teachings of R2-072205 on the "value tags", and therefore wrongly asserts that R2-072205 teaches the claimed method of "including an indicator in each of the selected subframes." Assuming *arguendo* that the R2-072205 "value tags" are otherwise analogous to the claimed indicators, the value tags are simply not "in each of the selected subframes." R2-072205 makes clear in Section 7.4 is that "It is FFS [for future study] <u>whether the SB</u> [scheduling block] includes a value tag for each SU." This means that the value tag for an SU is located in the SB [scheduling block], not in the SU itself. For clarity, R2-072205 specifically states in Section 7.4 line 5-14 that Value tags are carried on the BCH, "in a System Information Block called the Master Information Block (MIB)." Thus, these value tags are carried in the MIB, which fig. x plainly shows is NOT part of SU-1, SU-2, or SU-3. Therefore, R2-072205 at most teaches that the "value tags" are carried in a different subframe than the subframes of the "SU" to which they pertain. As such, it is clear that R2-072205 simply does not contemplate "including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information."

Further still, claim 1 requires that the "indicator" -- besides being present in each of the selected subframes -- must "indicate to receiving user equipment that the subframe carries system information." There simply is no evidence that the "value tag" described by R2-072205 serves such a purpose. At most, R2-072205 states the following with regard to the "value tag":

> "It is FFS [for future study] whether the SB [scheduling block] includes a value tag for each SU, whether a common value tag is used. The common value tag could either be carried in the MIB or in the SB."

(R2-072205, p. 5). This passage nowhere suggests that the "value tag" serves any function to "indicate to receiving user equipment that the subframe carries system information," as claimed. Indeed, the function of the "value tag" is not defined in R2-072205, so the Examiner's postulation about its purpose is nothing but conjecture. There simply is no suggestion that the presence or absence of the "value tag" can or should be interpreted by the receiving user equipment that the subframe having the "value tag" carries system information. As such, the R2-072205 "value tag" is neither present where required nor indicative "to receiving user equipment that the subframe carries system information," as required by claim 1.

Applicant notes that the Examiner also points to Dimou for teachings regarding dynamic selection. The Examiner points to the passage in Dimou ¶[0039] reading in part "this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users" (emphasis added). Read in the Dimou context, it is clear that this portion of Dimou is discussing dynamically allocating uplink resources -- from the mobile terminals to the base stations. Such allocation of uplink resources is unrelated to allocation of downlink resources, particularly downlink resources broadcast at all relevant mobile terminals on a shared downlink channel, as claimed. As such, whatever Dimou may teach about uplink resource allocation is irrelevant to the claimed method of transmitting system information on a downlink shared channel, and does not cure the dynamic allocation defect of R2-072205 noted above.

Applicant notes that the Examiner, in rejecting other claims, points to Love for teachings related to an indication system. Applicant notes that the EU field discussed in Love is directed to a single mobile station, and is not sent on downlink shared channel. As such, whatever Love may teach about indications dedicated to a single mobile station situation is irrelevant to the claimed method, and does not cure the corresponding defect of R2-072205 noted above.

None of the other cited art appears relevant to the issues discussed above, and therefore are not believed to cure any of the defects noted above.

As pointed out above, R2-072205 fails to teach at least two limitations of claim 1. As such, independent claim 1 defines over the proffered combination of R2-072205/Arundale/Dimou, assuming *arguendo* that such combination is proper. Further, none of the other cited art (cited against the various dependent claims) cures these defects. Accordingly, independent claim 1 and its dependent claims define over the cited art.

For claims 10-11, Applicant notes that independent claim 10 includes limitations identical or similar to the "dynamically selecting" and "including an indicator in each selected subframe" limitations found in claim 1. Accordingly, Applicant submits that independent claim 10 and its dependent claims define over the cited art for reasons similar to those discussed above with respect to independent claim 1.

For claims 12-13, Applicant notes that independent claim 12 includes "dynamically selecting" limitations identical or similar to those found in claim 1. Accordingly, Applicant submits that independent claim 12, and its dependent claims define over the cited art for reasons similar to those discussed above with respect to independent claim 1.

For claims 15-20, 21-25 Applicant notes that independent claim 15 requires "monitoring <u>each subframe</u> for an indication of the presence of system information and reading system information from the subframe if such information is present" while independent claim 21 likewise requires "monitor each subframe for an indication of the presence of system information and read system information from the subframe if such information is present." The claimed monitoring of each subframe in these claims is related to the "including an indicator in each selected subframe" limitation found in claim 1. As pointed out above, R2-072205 does not show the "value tags" in each relevant subframe, but at most only in the SB. Nor does R2-072205 suggest looking for "value tags" anywhere but in the SB. Therefore, R2-072205 necessarily does not teach "monitoring" each subframe for the "value tags." Further, as pointed out above the "value tag" of R2-072205 is not "an indication of the presence of system information." Thus, R2-072205 cannot teach "monitor[ing] each subframe for an indication of the presence of system information and read[ing] system information from the subframe if such information is present," as claimed. And, as discussed above, the attempted reliance on Love is misplaced. Applicant notes that the EU field discussed in Love is directed to a single mobile station, and is not sent on downlink shared channel. As such, whatever Love may teach about indications in a dedicated to a single mobile station situation is irrelevant to the method claimed in independent claims 15 and 21, and does not cure the corresponding defect of R2-072205 noted above. As such, Applicant submits that independent claims 15 and 21, and their corresponding dependent claims, define over the cited art for reasons similar to those discussed above with respect to independent claim 1.

Dependent Claim 26

Applicant notes that dependent claim 26 is rejected solely on §112 grounds, and that no §102/§103 rejections are presented for this claim. The §112 rejection of claim 26 is addressed above. As such, Applicant submits that the §112 rejection is overcome and dependent claim 26 is directed to patentable subject matter as indicated in the Action.

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

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

Dated: 25 January 2013

<u>/John R. Owen Reg. No. 42055/</u>
John R. Owen
Registration No.: 42,055
Telephone: (919) 854-1844

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)	Docket Number (Optional) 4015-6727 / P24241-US2
Application Number 12/664,347	Filed 2009-12-11
For Transmission of System Information on a Downlink Shared Channel	
Art Unit 2462	Examiner Xavier S. Wong

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	
■ One month (37 CFR 1.17(a)(1))	$150	$75	$150.00
☐ Two months (37 CFR 1.17(a)(2))	$570	$285	$
☐ Three months (37 CFR 1.17(a)(3))	$1,290	$645	$
☐ Four months (37 CFR 1.17(a)(4))	$2,010	$1,005	$
☐ Five months (37 CFR 1.17(a)(5))	$2,730	$1,365	$

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

■ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 18-1167.

■ Payment made via EFS-Web.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71. 37 CFR 3.73(b) statement is enclosed (Form PTO/SB/96).

■ attorney or agent of record. Registration number 42,055.

☐ attorney or agent acting under 37 CFR 1.34. Registration number ______.

/John R. Owen Reg. No. 42055/	January 25, 2013
Signature	Date
John R. Owen	919-854-1844
Typed or printed name	Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

■ * Total of 1 forms are submitted.

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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 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:	12664347
Filing Date:	11-Dec-2009
Title of Invention:	Transmission of System Information on a Downlink Shared Channel
First Named Inventor/Applicant Name:	Erik Dahlman
Filer:	John R. Owen/Donna Donovan
Attorney Docket Number:	4015-6727 / P24241-US2

Filed as Large Entity

U.S. National Stage under 35 USC 371 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:				
Extension - 1 month with $0 paid	1251	1	150	150

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
		Total in USD ($)		**150**

Electronic Acknowledgement Receipt

EFS ID:	14792538
Application Number:	12664347
International Application Number:	
Confirmation Number:	1464
Title of Invention:	Transmission of System Information on a Downlink Shared Channel
First Named Inventor/Applicant Name:	Erik Dahlman
Customer Number:	24112
Filer:	John R. Owen/Donna Donovan
Filer Authorized By:	John R. Owen
Attorney Docket Number:	4015-6727 / P24241-US2
Receipt Date:	25-JAN-2013
Filing Date:	11-DEC-2009
Time Stamp:	13:38:36
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	$150
RAM confirmation Number	11773
Deposit Account	
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File Listing:

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

1		Response_to_FOA.pdf	71519 be2425f165c7bee5ee861fc16b353b677ba935f7	yes	17

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment After Final	1	1
Claims	2	7
Applicant Arguments/Remarks Made in an Amendment	8	17

Warnings:

Information:

2	Extension of Time	Petition_for_Extenstion_of_Time.pdf	83587 d32435cb61d8b513992082c1b29a7ae1be11f569	no	2

Warnings:

Information:

3	Fee Worksheet (SB06)	fee-info.pdf	30066 d51c16fd662e0d1522c6b8c92feb4149e0477b25	no	2

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Total Files Size (in bytes):	185172

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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.

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
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PTO/SB/06 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/664,347	Filing Date 12/11/2009	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			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 $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	

APPLICATION AS AMENDED – PART II

AMENDMENT	01/25/2013	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 25	Minus	** 25	= 0	X $ =		OR	X $62=	0
	Independent (37 CFR 1.16(h))	* 5	Minus	***5	= 0	X $ =		OR	X $250=	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 ($)	ADDITIONAL FEE ($)		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:
/PARTHENIA D. MERRILL/

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/664,347	12/11/2009	Erik Dahlman	4015-6727 / P24241-US2	1464

24112 7590 02/06/2013
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EXAMINER	
WONG, XAVIER S	

ART UNIT	PAPER NUMBER
2413	

MAIL DATE	DELIVERY MODE
02/06/2013	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.

PTOL-90A (Rev. 04/07)

Remarks

Applicant's representative mentions the examiner's objection to "**adapted to**" (in claim 17) makes no sense and asserts that "**adapted to**" is a positive assertion.

In contrast, claim scope is not limited by claim language that suggests or makes optional but does not require steps to be performed, or by claim language that does not limit a claim to a particular structure. However, examples of claim language, **although *not* exhaustive**, that may raise a question as to the **limiting effect of the language in a claim** are:

(A) " **adapted to** " or "adapted for " clauses;
(B) " wherein " clauses; and
(C) " whereby " clauses.

The determination of whether each of these clauses is a limitation in a claim depends on the specific facts of the case. In Hoffer v. Microsoft Corp., 405 F.3d 1326, 1329, 74 USPQ2d 1481, 1483 (Fed. Cir. 2005), the court held that when a "whereby' clause states a condition that is material to patentability, it cannot be ignored in order to change the substance of the invention." Id. However, the court noted (quoting Minton v. Nat '1 Ass 'n of Securities Dealers, Inc., 336 F.3d 1373, 1381, 67 USPQ2d 1614, 1620 (Fed. Cir. 2003)) that a "whereby clause in a method claim is not given weight when it simply expresses the intended result of a process step positively recited.'" Id.

See also **MPEP § 2111.04**.

In response to applicant's argument that the references fail to show certain features of applicant's invention and the examiner did not rebut (or misinterpret) to the remarks in the previous response, it is noted that the features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. The arguments mentioned in the previous remarks by the applicant read the specification into the actual claim limitations. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The examiner's rebuttal is based on broadest reasonable interpretation as seen in the claim language.

Applicant maintains that R2-077205, in combination with Arundale and Dimou, does not represent:

"recurring time windows" – as mentioned in section 7.4 of R2-077205, the SUs (scheduling units) in fig. x are considered so-called "time windows" because they represent "scheduling information" and "*periodicity*" in the DL-SCH (downlink schedule);

further down in fig. x, "multi-frame/scheduling period" portion, shows *repetitive* darkened portions of the SUs mentioned above in certain periods, thus, it is considered "recurring time windows";

"system information in subframes" – the examiner considers the SB value tag in each SU the so-called "system information in subframes" is because in section 7.4 top portion of R2-077205 mentions "system information" carried in the subframes comprises of, among other things, physical layer parameters, system frame number (SFN) and, *value tags*; not to mention, SIB represents "system information block" as shown in fig. x;

"indicator in each of selected subframes" – R2-077205 section 7.4 quotes "An SU may be segmented in which case segments are scheduled in subsequent consecutive subframes. In this case, PDCCH is used for each segment... SU-1 is scheduled in the subframe following the one carrying... It is FFS if the eNB may schedule more than one SU in a subframe" which describes itself; even if it is FFS (for future study), the concept and idea are presented and it should be considered due diligence;

"each time window spanning a plurality of subframes" – Arundale is introduced to explicitly show, in figures 3 and 4, plural subframes (fig. 3: subframes; fig. 4: subframe

435, 415) in a (each) time window (fig. 3: windows 310, 320, 330 and 340; fig. 4: windows 420, 425 and 430) among plural time windows; and,

"dynamically selecting subframes" – is a *function* to be implemented, in complementary to R2-077205, by Dimou.

In light of the above explanations, the rejection is maintained as follows:

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1 – 4 and 7 – 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Draft Text Proposal Capturing Agreements on System Information" (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale), and in further view of Dimou et al (US 2009/0131057 A1, Dimou).

1. R2-072205 teaches a method of transmitting system information on the downlink shared channel of a wireless communication network (sec 7.4 downlink system) comprising: transmitting system information in recurring time windows (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); dynamically selecting which subframes within a given time window are to be used for carrying the system information (sec 7.4 – An SU may be segmented, in which case segments are scheduled… eNB may schedule more than one SU in a subframe); and including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information (sec 7.4 – SB value tag in each SU).
R2-072205 *may not have explicitly* shown "each time window spanning a plurality of subframes." Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.
R2-072205, modified by Arundale, *may not have explicitly* mentioned "*dynamically* select which subframes within a given time window are to be used for carrying system information.

Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]:: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.

10. R2-072205 teaches a network transmitter for transmitting system information on a downlink shared channel in a wireless communications network, the network transmitter configured to comprising a baseband processor (fig. 5.4.1.2) generate system information in recurring time windows (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are recurring), the network transmitter comprising a baseband processor configured to: include an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information (sec 7.4 – SB value tag in each SU).
R2-072205 *may not have explicitly* shown “each time window spanning a plurality of subframes.” Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.
R2-072205, modified by Arundale, *may not have explicitly* mentioned “*dynamically* select which subframes within a given time window are to be used for carrying system information.
Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]:: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.

12. R2-072205 teaches a method of transmitting system information on a downlink shared channel structured as successive subframes (fig. 5.4.1.2 and fig. x), the method comprising: transmitting system information in regularly occurring time windows (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are recurring), (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); and indicating to receiving user equipment which subframes within a given time window carry system information (sec 7.4 – SB value tag in each SU).
R2-072205 *may not have explicitly* shown “each time window spanning a plurality of

successive subframes." Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.
R2-072205, modified by Arundale, may not have explicitly depicted "*dynamically* selecting which subframes within a given time window are to be used for carrying system information."
Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]:: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.

Claims 15, 18, 21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Draft Text Proposal Capturing Agreements on System Information" (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale), and in further view of Dimou et al (US 2009/0131057 A1, Dimou) and Love et al (US 2004/0219917 A1, Love).

15. R2-072205 teaches a method for a mobile station for receiving system information on a downlink shared channel from a network transmitter in a wireless communication network (fig. 5.4.1.2:: UE), the method comprising: monitoring for the receipt of system information in recurring time windows used for the transmission of system information (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); within each time window, monitoring each subframe for an indication of system information and reading system information from the signal subframe if such information is present (sec 7.4 – SB value tag in each SU); and terminating monitoring at least at the end of the time window (if there are no more subframes to be monitored, it is only reasonable to terminate monitoring).
R2-072205 *may not have explicitly* shown "each time window spanning a plurality of successive subframes." Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink

shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.

R2-072205, modified by Arundale, may not have explicitly depicted "*dynamically* selecting which subframes within a given time window are to be used for carrying system information."

Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]:: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.

While R2-072205/Arundale/Dimou mention said system information, they *may not have explicitly* mentioned "presence indication" of said system information.

Love mentions presence indication of system information in subframe ([0071]:: one TFCI bit (EU indication bit) out of one of the slots per frame or sub-frame is used to indicate the presence or absence of the EU field while the other bits in each TFCI field of the remaining slots per frame or sub-frame are still used to represent the TFCI). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the presence indication of system information as taught by Love to the downlink shared channel information subframe of R2-072205/Arundale/Dimou for soft handoff.

21. R2-072205 teaches a mobile station operative to receive system information on a downlink channel from a network transmitter in a wireless communications network, the mobile station comprising a baseband processor (fig. 5.4.1.2:: UE) operable to: monitor for the receipt of system information in recurring time windows used for the transmission of system information (fig. x:: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); within each time window, monitor each subframe for an indication of system information and reading system information from the signal subframe if such information is present (fig. x:: SIB); and terminate monitoring at least at the end of the time window (if there are no more subframes to be monitored, it is only reasonable to terminate monitoring).

R2-072205 *may not have explicitly* shown "each time window spanning a plurality of successive subframes." Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.

R2-072205, modified by Arundale, may not have explicitly depicted "*dynamically* selecting which subframes within a given time window are to be used for carrying system information."

Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]:: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.
While R2-072205/Arundale/Dimou mention said system information, they *may not have explicitly* mentioned "presence indication" of said system information.
Love mentions presence indication of system information in subframe ([0071]:: one TFCI bit (EU indication bit) out of one of the slots per frame or sub-frame is used to indicate the presence or absence of the EU field while the other bits in each TFCI field of the remaining slots per frame or sub-frame are still used to represent the TFCI). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the presence indication of system information as taught by Love to the downlink shared channel information subframe of R2-072205/Arundale/Dimou for soft handoff.

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2. R2-072205 teaches the method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a contiguous set of subframes within the given time window (fig. x:: subframes 3 and 131).

3. R2-072205 teaches the method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a non-contiguous set of subframes within the given time window (fig. x:: subframes 19 and 67).

4. R2-072205 teaches the method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting which subframes to use for transmitting system information in view of competing transmission priorities associated with other control or data signaling (fig. x:: SIB).

7. R2-072205 teaches the method of claim 1, further comprising varying window sizes of the recurring time windows (fig. x:: SU-1, SU-2 and SU-3 have different sizes).

8. R2-072205 teaches the method of claim 1, further comprising dynamically configuring a window size for the recurring time windows (sec. 7.4 – MIB paragraph).

9. R2-072205 teaches the method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using different indicators corresponding to different types of system information (sec 7.4 – MIB paragraph), such that the indicator used for a particular subframe indicates the type of system information carried in that subframe (sec 7.4 – SIB).

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11. R2-072205 teaches the network transmitter of claim 10, wherein the network transmitter comprises a radio base station configured for operation in accordance with 3GPP E-UTRA standards (3GPP TSG-RAN2).

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18. R2-072205 teaches the method of claim 15, further comprising storing a default window size for monitoring for system information transmissions (fig. x:: SU-1, SU-2 and SU-3 have default sizes).

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25. R2-072205 teaches the mobile station of claim 21, wherein the baseband processor is operable to recognize different types of system information based on different system information indicators detected in different subframes (fig. x:: SIB-a,b,c,d,e).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over “Draft Text Proposal Capturing Agreements on System Information” (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale), Dimou et al (US 2009/0131057 A1, Dimou) (hereinafter R2-072205 etc.), applied to claim 1, and in further view of “System Information Scheduling and Change Notification” (R2-071912).

5. R2-072205 etc. teaches the method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information; R2-072205 etc. does not very explicitly show it comprises using an RNTI (Radio Network Temporary Identifier) to denote that the subframe carries system information. R2-071912 explicitly teaches subframes indicators are in RNTI

format (page 3 bottom). It would have been obvious to one of ordinary skill in the art when the invention was made to understand that both R2 documents refer to the same 3GPP systems information techniques and the R2-072205 (primary reference), while being silent on its application to the indications, also uses RNTI.

Claims 17, 19, 20, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Draft Text Proposal Capturing Agreements on System Information” (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale), Dimou et al (US 2009/0131057 A1, Dimou) and Love et al (US 2004/0219917 A1, Love) (hereinafter R2-072205); and in further view of Marinier et al (US 2008/0225765 A1, Marinier).

17. R2-072205 etc. teaches the method of claim 15; R2-072205 etc. may not have explicitly mentioned further comprising adapting to changing or configurable window sizes used for the time window. Marinier teaches changing or configurable window sizes used for the time window ([0457]). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 etc. to allow configurable window sizes to facilitate reordering procedure.

19. R2-072205 etc. teaches the method of claim 18; R2-072205 etc. does not explicitly mention further comprising monitoring for system information transmissions based on a specified window size indicated in received information rather than the default window size. Marinier teaches monitoring for system information transmissions based on a specified window size indicated in received information rather than a default window size ([0457]:: if window size is changed for reordering purpose, then it is only reasonable that the changing window sizes are monitored). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 etc. to allow configurable window sizes to facilitate reordering procedure.

20. R2-072205 etc. teaches the method of claim 15; R2-072205 etc. does not explicitly mention further comprising recognizing different types of system information based on recognizing different system information indicators in different signal subframes. Marinier teaches recognizing different types of system information based on recognizing different system information indicators in different signal subframes ([0457]:: if window size is changed for reordering purpose, then it is only reasonable that the changing window sizes are recognized). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 etc. to allow configurable window sizes to facilitate reordering procedure.

23. R2-072205 etc. teaches the mobile station of claim 21; R2-072205 etc. may not have explicitly mentioned wherein the baseband processor is operable to adapt to changing or configurable window sizes used for the time window. Marinier teaches changing or configurable window sizes used for the time window ([0457]). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 etc. to allow configurable window sizes to facilitate reordering procedure.

24. R2-072205 etc. teaches the mobile station of claim 21; R2-072205 etc. does not explicitly mention wherein the baseband processor is operable to monitor for system information transmissions based on a specified window size indicated in received information rather than a default window size. Marinier teaches monitoring for system information transmissions based on a specified window size indicated in received information rather than a default window size ([0457]:: if window size is changed for reordering purpose, then it is only reasonable that the changing window sizes are monitored). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 etc. to allow configurable window sizes to facilitate reordering procedure.

Claims 6, 13, 16 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Draft Text Proposal Capturing Agreements on System Information” (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale), and in further view of Dimou et al (US 2009/0131057 A1, Dimou) (hereinafter R2-072205 etc.); and in further view of Kashima et al (US 2007/0217362 A1, Kashima).

6. R2-072205 etc. teaches the method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information; R-072205 etc. do not explicitly shows it includes using an end-of-system-information indicator in a last subframe of the given time window that carries system information. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information (0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 etc. to maintain flexibility of scheduling.

13. R2-072205 etc. teaches the method of claim 12; R-072205 etc. does not explicitly shows wherein indicating to receiving user equipment which subframes within a given

time window carry system information includes indicating the last subframe within the given time window that carries system information, thereby allowing the receiving user equipment to cease monitoring for system information within the given time window. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information so to cease monitoring within a given time (0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 etc. for flexibility of scheduling subframes.

16. R2-072205 etc. teaches the method of claim 15; R-072205 etc. does not explicitly shows it further comprising recognizing an end-of-system-information indicator in a signal subframe received within the time window and terminating monitoring for the time window in response. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information (0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 to maintain flexibility of scheduling.

22. R2-072205 etc. teaches the mobile station of claim 21; R-072205 etc. does not explicitly shows wherein the baseband processor is operable to recognize an end-of-system-information indicator in a signal subframe received within the time window and terminate monitoring for the time window in response. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information (0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 etc. to maintain flexibility of scheduling.

Conclusion

Applicant filed after-final response on 25th January 2013 and made amendments in claims 21 and 26 which consist of scope change.

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xavier S. Wong whose telephone number is 571.270.1780. The examiner can normally be reached on Monday through Friday 11:30 am - 9:00 pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Un C. Cho can be reached on 571.272.7917. 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.

/Xavier Szewai Wong/
Primary Examiner, Art Unit 2413
4th February 2013

Advisory Action Before the Filing of an Appeal Brief	**Application No.** 12/664,347	**Applicant(s)** DAHLMAN ET AL.
	Examiner Xavier Szewai Wong	**Art Unit** 2413

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 25th January 2013 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☒ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:
   a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.
   b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
   c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection. The current period for reply expires months from the mailing date of *the prior Advisory Action* or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.
      Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANT'S FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☒ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   a) ☒ They raise new issues that would require further consideration and/or search (see NOTE below);
   b) ☐ They raise the issue of new matter (see NOTE below);
   c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.
      NOTE: _____. (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☒ For purposes of appeal, the proposed amendment(s): (a) ☒ will not be entered, or (b) ☐ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
9. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

11. ☐ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: _____.
12. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
13. ☒ Other: see remarks and conclusion.

STATUS OF CLAIMS

14. The status of the claim(s) is (or will be) as follows:
   Claim(s) allowed: .
   Claim(s) objected to: .
   Claim(s) rejected: 1-26.
   Claim(s) withdrawn from consideration: .

DON'T ENTER
2013.02.01
/XSW/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of **Dahlman**	)	
Serial No.: **12/664,347**	)	Examiner: Xavier S. Wong
Filed: **December 11, 2009**	)	Group Art Unit: 2462
For: **Transmission of System Information on a Downlink Shared Channel**	)	Confirmation No.: 1464
Docket No: **4015-6727**	)	

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

25 January 2013

RESPONSE TO FINAL ACTION

This paper is being filed in response to the Final Action mailed 17 October 2012. A suitable time extension is requested. Reconsideration is respectfully requested in light of the amendments and remarks below. The Office is hereby authorized to charge any fees required for entry of this paper to Deposit Account 18-1167.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	12664347	Filing Date	2009-12-11	Docket Number (if applicable)	4015-6727 / P24241-US2	Art Unit	2462
First Named Inventor	Dahlman			Examiner Name	Wong		

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 Request for Extension of Time

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	/John R. Owen Reg. No. 42055/	Date (YYYY-MM-DD)	2013-03-16
Name	John R. Owen	Registration Number	42055

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of **Dahlman**	)	
Serial No.: **12/664,347**	)	Examiner: Xavier S. Wong
Filed: **December 11, 2009**	)	Group Art Unit: 2462
For: **Transmission of System Information on a Downlink Shared Channel**	)	Confirmation No.: 1464
Docket No: **4015-6727**	)	

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Alexandria, VA 22313-1450

16 March 2013

AMENDMENT WITH RCE

This paper is being filed in response to the Final Action mailed 17 October 2012, and the Advisory Action mailed 6 February 2013. A suitable time extension is requested, an RCE, and corresponding fees are being submitted herewith. Reconsideration is respectfully requested in light of the amendments and 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 of transmitting system information on a downlink shared channel of a wireless communication network comprising:

transmitting system information <u>on the downlink shared channel</u> in recurring time windows, each time window spanning a plurality of subframes;

dynamically selecting which subframes within a given time window are to be used for carrying the system information; and

including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

2. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a contiguous set of subframes within the given time window.

3. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a non-contiguous set of subframes within the given time window.

4. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting which subframes to use for transmitting system information in view of competing transmission priorities associated with other control or data signaling.

5. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries

system information comprises using an RNTI (Radio Network Temporary Identifier) to denote that the subframe carries system information.

6. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using an end-of-system-information indicator in a last subframe of the given time window that carries system information.

7. (Original) The method of claim 1, further comprising varying window sizes of the recurring time windows.

8. (Original) The method of claim 1, further comprising dynamically configuring a window size for the recurring time windows.

9. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using different indicators corresponding to different types of system information, such that the indicator used for a particular subframe indicates the type of system information carried in that subframe.

10. (Currently amended) A network transmitter for transmitting system information on a downlink shared channel in a wireless communications network, the network transmitter configured to transmit system information in recurring time windows, each time window spanning a plurality of subframes; the network transmitter comprising a baseband processor configured to:

dynamically select which subframes on the downlink shared channel within a given time window are to be used for carrying system information; and

include an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

11. (Original) The network transmitter of claim 10, wherein the network transmitter comprises a radio base station configured for operation in accordance with 3GPP E-UTRA standards.

12. (Previously presented) A method of transmitting system information on a downlink shared channel structured as successive subframes, the method comprising:

transmitting system information on the downlink shared channel in regularly occurring time windows, each time window spanning a plurality of successive subframes;

dynamically selecting which subframes within a given time window are to be used for carrying system information;

indicating to receiving user equipment which subframes within a given time window carry system information.

13. (Original) The method of claim 12, wherein indicating to receiving user equipment which subframes within a given time window carry system information includes indicating the last subframe within the given time window that carries system information, thereby allowing the receiving user equipment to cease monitoring for system information within the given time window.

14. (Cancelled)

15. (Currently amended) A method, in a mobile station, for receiving system information on a downlink shared channel from a network transmitter in a wireless communication network, the method comprising:

monitoring for the receipt of system information <u>on the downlink shared channel</u> in recurring time windows used for the transmission of system information, each said time window spanning a plurality of subframes;

within each time window, monitoring each subframe for an indication of the presence of system information and reading system information from the subframe if such information is present; and

terminating monitoring at least at the end of the time window.

16. (Previously presented) The method of claim 15, further comprising recognizing an end-of-system-information indicator in a subframe received within the time window and terminating monitoring for the time window in response.

17. (Cancelled)

18. (Original) The method of claim 15, further comprising storing a default window size for monitoring for system information transmissions.

19. (Original) The method of claim 18, further comprising monitoring for system information transmissions based on a specified window size indicated in received information rather than the default window size.

20. (Previously presented) The method of claim 15, further comprising recognizing different types of system information based on recognizing different system information indicators in different subframes.

21. (Currently amended) A mobile station operative to receive system information on a downlink shared channel from a network transmitter in a wireless communications network, the mobile station comprising a baseband processor configured to:

monitor for the receipt of system information <u>on the downlink shared channel</u> in recurring time windows used for the transmission of system information, each said time window spanning a plurality of subframes;

within each time window, monitor each subframe for an indication of the presence of system information and read system information from the subframe if such information is present; and

terminate monitoring at least at the end of the time window.

22. (Previously presented) The mobile station of claim 21, wherein the baseband processor is configured to recognize an end-of-system-information indicator in a subframe received within the time window and terminate monitoring for the time window in response.

23. (Previously presented) The mobile station of claim 21, wherein the baseband processor is configured to adapt to variable window sizes used for the time window.

24. (Previously presented) The mobile station of claim 21, wherein the baseband processor is configured to monitor for system information transmissions based on a specified window size indicated in received information rather than a default window size.

25. (Previously presented) The mobile station of claim 21, wherein the baseband processor is configured to recognize different types of system information based on different system information indicators detected in different subframes.

26. (Previously presented) The method of claim 1 wherein the dynamically selecting comprises dynamically selecting subframes such that the same system information is assigned for transmission to different subframes in first and second consecutive time windows, with the different subframes occupying differing respective positions within their corresponding frames.

REMARKS

The Examiner's attention is directed to the remarks presented in the response filed 25 January 2013, which are incorporated herein but not reprinted herein for brevity.

Claim Amendments

These amendments assume that the amendments submitted 25 January 2013 have been entered, as mandated by the submission of the RCE.

Claim 17 has been canceled.

Claims 1, 10, 15, 21 have been amended to repeat limitations found in the preamble in the "main body" of the claim. Support for these amendments is found throughout the specification and drawings, *see*, *e.g.*, page 6, lines 4-15; original claims. No new matter is added.

Claim Objections

See the remarks presented in the response of January 2013. Note that claim 17 has been canceled.

§112 Rejection

See the remarks presented in the response of January 2013.

§103 Rejections

Claims 1-4, 7-12 stand rejected under §103 as obvious over R2-072205 (herein after "R2") in view of Arundale (US 7675852) and Dimou (US 20090121057). Claims

5-6, 13, 15-25 stand rejected under §103 as being obvious over R2/Arundale/Dimou in combination with various tertiary references. Applicant requests reconsideration.

Claim 1 requires, *inter alia*, "dynamically selecting which subframes within a given time window are to be used for carrying the system information," and "including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information." R2 does not show either feature.

In the Advisory Action, the Examiner sets forth the following interpretation of R2 which the Examiner *expressly relies on* to make the §103 rejections:

1. The Scheduling Units (SU) of R2 are the claimed "time windows."
2. The SB value tag in R2 is the claimed "system information."

As an initial matter, Applicant submits that the R2 SUs are not "time windows", but are instead understood by one of skill in the art to be an amount of system information grouped into System Information Blocks (SIBs). In other words, SUs are understood to be a specific type of data (system information), which are then transmitted. Data is not a time window. Instead, one of skill in the art would understand that a subframe might be considered a time window (generically), or a collection of subframes (e.g., a frame) might be considered a time window, but the data itself is not a time window. Nevertheless, the discussion below will be in the context of the R2 SUs being time windows so that the errors in the Examiner's analysis can be discussed in terms that the Examiner used to make the rejections. Regardless of the correctness of the Examiner's terminology, R2 does not make the showings relied on to make the §103 rejections.

First, assuming *arguendo* that an SU is a "time window", R2 does not show "transmitting system information in recurring time windows, each time window spanning a plurality of subframes." SU-1 is plainly shown in Fig. x as being only one subframe. Thus, SU-1 simply cannot be the claimed "time window" as it does not "span[] a plurality of subframes," as required by claim 1. In contrast, both SU-2 and SU-3 are shown as being multiple subframes in size. However, the SB value tag is not in SU-2 or SU-3. There is no indication anywhere in R2 that the SB is located anywhere other than in SU-1. Thus, the only SU that has the SB (i.e., SU-1) cannot be the claimed time window because it never spans multiple subframes and the SUs that span multiple subframes (SU-2 and SU-3) never contain the putative "system information." Thus, despite the Examiner's assertions to the contrary, R2 does not show "transmitting system information in recurring time windows, each time window spanning a plurality of subframes," as claimed in claim 1.

Applicant notes that the Examiner points to the statement in R2 that "an SU may be segmented, in which case segments are scheduled in subsequent consecutive subframes." However, one of skill in the art understands that such statement only applies to SU-2 and SU-3, as these are the only multi-subframe SU's. There is no suggestion anywhere in R2 that SU-1 is multi-subframe. Further, the SB (and hence, the putative "system information" according to the Examiner) is only located in SU-1 according to R2 ("the scheduling information within SU-1 is contained in a System Information Block called the Scheduling Block (SB)." The SB is not present in either SU-2 or SU-3. Thus, the putative "system information" in R2 is transmitted only in a single subframe SU (SU-1), and is not repeated for any other subframe. Accordingly, R2 does not teach "transmitting system information in recurring time windows, each time window spanning a plurality of subframes" under this interpretation.

Applicant also notes that the Examiner points to Arundale to show that "time windows" can span multiple subframes. The reliance on Arundale is baffling. R2 already shows that some putative "time windows" (SUs) can span multiple subframes, see SU-2 and SU-3. Thus, the concept of multiple subframe SUs is already present in R2. However, the R2 approach is fundamentally based on the notion that SU-1 will be only one subframe, and that this subframe will be in a known, non-varying location. Thus, the attempted combination of R2 and Arundale suffers from at least two defects: 1) the proffered reason of "to determine the sizes and number of frames" is a specious argument, as the R2 SU-1 <u>necessarily</u> has a fixed size and a fixed location (in the directly after the subframe carrying the BCH, with a fixed periodicity of 80 ms, see R2 §7.4); and 2) changing R2 so that SU-1 spans multiple subframes would alter the fundamental workings of R2 and render is unusable for its intended purpose. Thus, Arundale cannot properly cure this defect in R2.

Second, assuming *arguendo* that an SU is a "time window", R2 does not show -- despite the Examiner's express assertion to the contrary -- "<u>dynamically selecting</u> which subframe<u>s</u> within a given time window are to be used for carrying the system information," as claimed in claim 1. SU-1 is plainly shown in Fig. x as being only one subframe. Thus, as noted above, SU-1 simply cannot be the claimed "time window" as it does not "span[] a plurality of subframes," as required by claim 1. Further, while both SU-2 and SU-3 are shown as being multiple subframes in size, neither uses any sort of "<u>dynamic[] selecting</u> [of] which subframe<u>s</u> within a given time window are to be used for carrying the system information." Instead, the putative "system information" -- the SB according to the Examiner -- is only carried in SU-1, and is never carried in SU-2 or SU-3. Further still, even if one assumes all the non-SB System Information Blocks (SIB) as containing "system information" (contrary to the Examiner's stated position), R2 still does not show any dynamic selection. Instead, R2 plainly shows that <u>all</u> of SU-2 and <u>all</u> of SU-3 contain non-SB "system information." Thus, <u>all</u> of the subframes of SU-2 and SU-3 contain this non-SB "system information," so there can be no <u>dynamic selection</u> of which subframes carry the "system information" - quite simply because they <u>all</u> carry it. As such, R2 simply does not show the claimed dynamic selection.

Applicant notes that the Examiner expressly states that R2 shows the claimed dynamic selection, but then states "R2 … *may not have explicitly* mentioned 'dynamically <u>selecting</u> which subframe<u>s</u> within a given time window are to be used for carrying the system information,' " and then points to Dimou. In view of this vague language, Applicant requests pursuant to MPEP §760.07 that the Examiner either explicitly state that he is contending that R2 makes this showing, or explicitly admit that R2 does not make this showing <u>and stop repeating language to the contrary in future explanations</u>.

In order to advance prosecution, Applicant will also explain below why Dimou does not cure this lack of "dynamically selecting which subframes … system information" defect of R2 (alone or in combination with Arundale).

The Examiner points to the passage in Dimou ¶[0039] reading in part "this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) <u>to their users</u>" (emphasis added). Read in the Dimou context, it is clear that this portion of Dimou is discussing dynamically allocating uplink resources -- from the mobile terminals to the base stations. Such allocation of uplink resources is unrelated to allocation of downlink resources, particularly downlink resources broadcast at all relevant mobile terminals on a shared downlink channel, as claimed. As such, whatever Dimou may teach about uplink resource allocation is irrelevant to the claimed method of transmitting system information on a downlink shared channel, and does not cure the dynamic selection defect of R2 noted above. In the only portion of the Advisory Action that addresses this argument, the Examiner states *in toto* " 'dynamically selecting subframes' - is a function to be implemented, in complementary to R2, by Dimou." With respect, this explanation is incomprehensible. What does "in complementary to" mean? To the extent understood, the rebuttal states that the Dimou dynamic selecting of subframes would be a function in Dimou. Assuming that to be true, what difference does it make what Dimou is doing, when the claims are rejected over R2 in combination with Arundale? The proffered rebuttal provides no explanation of how or why such Dimou function would be grafted into a combination of R2 and Arundale. The later text of "to allow system throughput being maximized or users not using the same resource blocks" is not helpful. The system throughput maximization effect of Dimou is due to the use of the Dimou "allocation" on the uplink, and is not conceptually related to increasing system throughput on the downlink. Further, the concept of "users not using the same resource blocks" is likewise unavailing because the point of the R2 SUs is that the various users would use the same resource blocks on the downlink (the blocks with the SUs), not different resource blocks. As such, a *prima facie* case of obviousness has not been established.

Independent claim 1 also requires "including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information." The putative "indicator" is the "value tag" discussed in R2. However, R2 specifically states in Section 7.4 line 5-14 that Value tags are carried on the BCH, "in a System Information Block called the Master Information Block (MIB)." Thus, these value tags are carried in the MIB, which Fig. x plainly shows is NOT part of SU-1, SU-2, or SU-3. Even setting this aside, and assuming that the MIB is somehow in the SB, R2 teaches that the SB is only present in SU-1, and SU-1 is only one sub-frame. Thus, there are simply not multiple subframes of the same "time window" in R2 that carry indicators. And, even if one assumes all the non-SB System Information Blocks (SIB) are part of the "system information" (contrary to the Examiner's stated position), R2 still does not teach the claimed indicator process, because the SB is present only in SU-1, and is expressly not present in SU-2 or SU-3. Thus, even if the R2 "value tag" is an indicator, R2 does not teach the claimed indicating portion of the method.

In the Advisory Action regarding claim 15, the Examiner points to Love (US 20040219917) for a potentially related teaching on "presence indication." However, Applicant notes that the EU field discussed in Love is directed to a single mobile station, and is not sent on downlink shared channel. As such, whatever Love may teach about indications dedicated to a single mobile station situation is irrelevant to the method of claim 1, and does not cure the corresponding defect of R2-072205 noted above. And, one of skill in the art would not use Love in combination with R2/Arundale/Dimou.

Important: Note that the argument in the following paragraph assumes that the "system information" necessarily includes the SB and the non-SB SIB information because if only the SB information is the "system information," the §103 rejections necessarily fail for other reasons outlined above (e.g., not multiple sub-frames, etc.).

R2 explicitly teaches that the SB is always broadcast in SU-1, and that SU-1 is always the "subframe following the one carrying BCH," (see R2 §7.4). Further, R2 teaches that "SU-1 is carried on the DL-SCH and uses a fixed schedule with a periodicity of 80 ms." From this it follows that there is no need for a value tag to indicate that a subframe contains SU-1, as SU-1 is always placed in the subframe directly following the subframe carrying the BCH, with a periodicity of 80 ms. At most, the SB value tag is indicating information about the *other* SUs, but not SU-1 itself. And, there would simply be no reason to indicate the presence of the "system information" in SU-1, because SU-1 always carries the SB and is always in a fixed time location (every 80ms). One of skill in the art would not add an indication of presence, when the "presence" is guaranteed to always be there. Thus, adding the "presence indication" of Love to R2/Arundale/Dimou would not make sense. And, without having the indication in every relevant subframe in the time window that carries the claimed system information, the combination would not read on the claimed device.

Applicant would like to emphasize this last point, which goes at a fundamental difference between the claimed approach and R2. R2 is fundamentally built on the idea that the system information will always be in a non-varying predicable subframe -- one directly after the BCH that, starts every 80ms, and continues contiguously as appropriate. Claim 1, in contrast, claims a method where the system information is dynamically placed in potentially varying subframes, which may or may not be contiguous. Thus, attempts to graft other teachings onto R2 in order to reach the subject matter of claim 1 must necessarily fundamentally alter the way R2 works, which is legally impressible to support a §103 rejection.

None of the other cited art appears relevant to the issues discussed above, and therefore are not believed to cure any of the defects noted above.

As pointed out above, R2-072205 fails to teach at least two limitations of claim 1. As such, independent claim 1 defines over the proffered combination of R2-072205/Arundale/Dimou, assuming *arguendo* that such combination is proper. Further, none of the other cited art (cited against the various dependent claims) cures these defects. Accordingly, independent claim 1 and its dependent claims define over the cited art.

For claims 10-11, Applicant notes that independent claim 10 includes limitations identical or similar to the "dynamically selecting" and "including an indicator in each selected subframe" limitations found in claim 1. Accordingly, Applicant submits that independent claim 10 and its dependent claims define over the cited art for reasons similar to those discussed above with respect to independent claim 1.

For claims 12-13, Applicant notes that independent claim 12 includes "dynamically selecting" limitations identical or similar to those found in claim 1. Accordingly, Applicant submits that independent claim 12, and its dependent claims define over the cited art for reasons similar to those discussed above with respect to independent claim 1.

For claims 15-20, 21-25 Applicant notes that independent claim 15 requires "monitoring each subframe for an indication of the presence of system information and reading system information from the subframe if such information is present" while independent claim 21 likewise requires "monitor each subframe for an indication of the presence of system information and read system information from the subframe if such information is present." The claimed monitoring of each subframe in these claims is related to the "including an indicator in each selected subframe" limitation found in claim 1. As pointed out above, R2 does not show the "value tags" in each relevant subframe, but at most only in the SB. Nor does R2 suggest looking for "value tags" anywhere but in the SB. Therefore, R2 necessarily does not teach "monitoring" each subframe for the "value tags." Further, the "value tag" of R2 is not "an indication of the presence of system information." Thus, R2 cannot teach "monitor[ing] each subframe for an indication of the presence of system information and read[ing] system information from the subframe if such information is present," as claimed. And, as discussed above, the attempted reliance on Love is misplaced. As such, Applicant submits that independent claims 15 and 21, and their corresponding dependent claims, define over the cited art for reasons similar to those discussed above with respect to independent claim 1.

Dependent Claim 26

Applicant notes that dependent claim 26 is rejected solely on §112 grounds, and that no §102/§103 rejections are presented for this claim. The §112 rejection of claim 26 is addressed above. As such, Applicant submits that the §112 rejection is overcome and dependent claim 26 is directed to patentable subject matter as indicated in the Action.

Request for Clarification of the Record

In the Advisory Action, the Examiner continues to explicitly maintain that "SU-1, SU-2 and SU-3 are in the same subframe and are recurring," and bases the §103 rejections on this premise. For a discussion of how R2 makes it abundantly clear that SU-1, SU-2, and SU-3 are NOT in the same subframe, see the explanation provided in the Response of January 2013. Applicant notes that the Examiner, other than repeating verbatim that R2 makes this showing, has not rebutted the substance of Applicant's arguments on this point. Pursuant to MPEP§706.07, Applicant request that the Examiner clearly state the Examiner's position on this characterization of R2, and provide an analysis identifying any errors in Applicant's argument on this point. Because this "same subframe" assertion by the Examiner regarding R2 clearly forms a basis for one or more claim rejections, Applicant is entitled to an explanation of the Examiner's position on this point in view of Applicant's contrary explanation.

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

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

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Dated: 16 March 2013

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PTO/SB/22 (10-12)
Approved for use through 1/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)	Docket Number (Optional) 4015-6727/P24241-US2
Application Number 12664347	Filed 2009-12-11
For Transmission of System Information on a Downlink Shared Channel	
Art Unit 2462	Examiner Wong

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	
☐ One month (37 CFR 1.17(a)(1))	$150	$75	$
☒ Two months (37 CFR 1.17(a)(2))	$570	$285	$570
☐ Three months (37 CFR 1.17(a)(3))	$1,290	$645	$
☐ Four months (37 CFR 1.17(a)(4))	$2,010	$1,005	$
☐ Five months (37 CFR 1.17(a)(5))	$2,730	$1,365	$

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 181167.

☐ Payment made via EFS-Web.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71. 37 CFR 3.73(b) statement is enclosed (Form PTO/SB/96).

☒ attorney or agent of record. Registration number 42055.

☐ attorney or agent acting under 37 CFR 1.34. Registration number ______.

/John R. Owen Reg. No. 42055/	16 March 2013
Signature	Date
John R. Owen	919-854-1844
Typed or printed name	Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.

☒ * Total of 1 forms are submitted.

Electronic Patent Application Fee Transmittal

Application Number:	12664347
Filing Date:	11-Dec-2009
Title of Invention:	Transmission of System Information on a Downlink Shared Channel
First Named Inventor/Applicant Name:	Erik Dahlman
Filer:	John R. Owen/Cora Fedornock
Attorney Docket Number:	4015-6727 / P24241-US2

Filed as Large Entity

U.S. National Stage under 35 USC 371 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:				
Extension - 2 months with $0 paid	1252	1	570	570

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
		Total in USD ($)		**570**

Electronic Acknowledgement Receipt

EFS ID:	15275882
Application Number:	12664347
International Application Number:	
Confirmation Number:	1464
Title of Invention:	Transmission of System Information on a Downlink Shared Channel
First Named Inventor/Applicant Name:	Erik Dahlman
Customer Number:	24112
Filer:	John R. Owen/Cora Fedornock
Filer Authorized By:	John R. Owen
Attorney Docket Number:	4015-6727 / P24241-US2
Receipt Date:	16-MAR-2013
Filing Date:	11-DEC-2009
Time Stamp:	13:49:52
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	$570
RAM confirmation Number	32333
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)	40156727RCE.pdf	33707 e388ee68d71bd53ec37fd15b3da3606008892298	no	2
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
2		40156727RESPONSE.pdf	109769 3c948dda439137f751faef99fdb478f4550feae6	yes	19
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Amendment Submitted/Entered with Filing of CPA/RCE		1	1	
	Claims		2	7	
	Applicant Arguments/Remarks Made in an Amendment		8	19	
Warnings:					
Information:					
3	Extension of Time	40156727EOT.pdf	28683 a97f3395263ff260e96dfb5321ac2cb56518fe2e	no	1
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	30006 8165af28348ffbb15f8def015a83ccf3119432d6	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	202165		

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.

Electronic Patent Application Fee Transmittal

Application Number:	12664347
Filing Date:	11-Dec-2009
Title of Invention:	Transmission of System Information on a Downlink Shared Channel
First Named Inventor/Applicant Name:	Erik Dahlman
Filer:	John R. Owen
Attorney Docket Number:	4015-6727 / P24241-US2

Filed as Large Entity

U.S. National Stage under 35 USC 371 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($)
Miscellaneous:				
Request for Continued Examination	1801	1	930	930
		Total in USD ($)		**930**

Electronic Acknowledgement Receipt

EFS ID:	15276072
Application Number:	12664347
International Application Number:	
Confirmation Number:	1464
Title of Invention:	Transmission of System Information on a Downlink Shared Channel
First Named Inventor/Applicant Name:	Erik Dahlman
Customer Number:	24112
Filer:	John R. Owen
Filer Authorized By:	
Attorney Docket Number:	4015-6727 / P24241-US2
Receipt Date:	16-MAR-2013
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PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/664,347	Filing Date 12/11/2009	☐ To be Mailed

APPLICATION AS FILED – PART I

FOR	NUMBER FILED (Column 1)	NUMBER EXTRA (Column 2)	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	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			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 $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))							
			TOTAL			TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

AMENDMENT 03/16/2013	CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	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))	* 24	Minus	** 25	= 0	X $ =		OR	X $62=	0
Independent (37 CFR 1.16(h))	* 5	Minus	***5	= 0	X $ =		OR	X $250=	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	CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	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:
/GAIL WOOTEN/

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/664,347	12/11/2009	Erik Dahlman	4015-6727 / P24241-US2	1464

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EXAMINER	
WONG, XAVIER S	

ART UNIT	PAPER NUMBER
2413	

MAIL DATE	DELIVERY MODE
08/28/2013	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.

PTOL-90A (Rev. 04/07)

Office Action Summary	**Application No.** 12/664,347	**Applicant(s)** DAHLMAN ET AL.	
	Examiner Xavier Szewai Wong	**Art Unit** 2413	

-- 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 *16 March 2013*.

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) *1-13, 15, 16 and 18-25* 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) *1-13,15,16 and 18-25* is/are rejected.

8)☒ Claim(s) *26* is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

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).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☐ 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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

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

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

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 16th March 2013 has been entered.

Response to Arguments

Applicant's arguments/amendments have been considered but are moot in the current new rejection grounds.

Allowable Subject Matter

Claim **26** is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including *all* of the limitations of the base claim and *all* intervening claims.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1 – 4 and 7 – 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Draft Text Proposal Capturing Agreements on System Information” (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale) and Dimou et al (US 2009/0131057 A1, Dimou), and in further view of Nguyen (US 2006/0034245 A1).

1. R2-072205 teaches a method of transmitting system information on the downlink shared channel of a wireless communication network (sec 7.4 downlink system) comprising: transmitting system information in recurring time windows (fig. x: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); dynamically selecting which subframes within a given time window are to be used for carrying the system information (sec 7.4 – An SU may be segmented, in which case segments are scheduled… eNB may schedule more than one SU in a subframe); and including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information (sec 7.4 – SB value tag in each SU).
R2-072205 *may not have explicitly* shown "each time window spanning a plurality of subframes." Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.
Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.
R2-072205/Arundale/Dimou may not have explicitly mentioned said transmission of said system information is "on downlink shared channel" as amended. Nguyen teaches transmitting system information on a downlink shared channel ([0047]: high speed physical downlink shared channel (HS-PDSCH) transmission if a part of the HS-SCCH subframe or a part of its associated HS-PDSCH subframe overlaps with a downlink transmission gap on the associated DPCH). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the transmission method of R2-072205/Arundale/Dimou into that as taught by Nguyen to identify a transmission gap in a downlink transmission from a base station and suspend high speed data packet reception by the user equipment during the reception suspension period (Nguyen, [0012] and [0015]).

10. R2-072205 teaches a network transmitter for transmitting system information on a downlink shared channel in a wireless communications network, the network transmitter configured to comprising a baseband processor (fig. 5.4.1.2) generate system information in recurring time windows (fig. x: SU-1, SU-2 and SU-3 are in a same subframe and are recurring), the network transmitter comprising a baseband processor configured to: include an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information (sec 7.4 – SB value tag in each SU).
R2-072205 *may not have explicitly* shown "each time window spanning a plurality of

subframes." Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.
R2-072205, modified by Arundale, *may not have explicitly* mentioned "*dynamically* select which subframes within a given time window are to be used for carrying system information.
Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.
R2-072205/Arundale/Dimou may not have explicitly mentioned said transmission of said system information is "on downlink shared channel" as amended. Nguyen teaches transmitting system information on a downlink shared channel ([0047]: high speed physical downlink shared channel (HS-PDSCH) transmission if a part of the HS-SCCH subframe or a part of its associated HS-PDSCH subframe overlaps with a downlink transmission gap on the associated DPCH). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the transmission method of R2-072205/Arundale/Dimou into that as taught by Nguyen to identify a transmission gap in a downlink transmission from a base station and suspend high speed data packet reception by the user equipment during the reception suspension period (Nguyen, [0012] and [0015]).

12. R2-072205 teaches a method of transmitting system information on a downlink shared channel structured as successive subframes (fig. 5.4.1.2 and fig. x), the method comprising: transmitting system information in regularly occurring time windows (fig. x: SU-1, SU-2 and SU-3 are in a same subframe and are recurring), (fig. x: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); and indicating to receiving user equipment which subframes within a given time window carry system information (sec 7.4 – SB value tag in each SU).
R2-072205 *may not have explicitly* shown "each time window spanning a plurality of successive subframes." Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.
R2-072205, modified by Arundale, may not have explicitly depicted "*dynamically* selecting which subframes within a given time window are to be used for carrying

system information."
Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.
R2-072205/Arundale/Dimou may not have explicitly mentioned said transmission of said system information is "on downlink shared channel" as amended. Nguyen teaches transmitting system information on a downlink shared channel ([0047]: high speed physical downlink shared channel (HS-PDSCH) transmission if a part of the HS-SCCH subframe or a part of its associated HS-PDSCH subframe overlaps with a downlink transmission gap on the associated DPCH). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the transmission method of R2-072205/Arundale/Dimou into that as taught by Nguyen to identify a transmission gap in a downlink transmission from a base station and suspend high speed data packet reception by the user equipment during the reception suspension period (Nguyen, [0012] and [0015]).

Claims 15, 18, 21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Draft Text Proposal Capturing Agreements on System Information" (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale), and Dimou et al (US 2009/0131057 A1, Dimou) and Love et al (US 2004/0219917 A1, Love), and in further view of Cheng et al (US 7,680,507 B2, Cheng).

15. R2-072205 teaches a method for a mobile station for receiving system information on a downlink shared channel from a network transmitter in a wireless communication network (fig. 5.4.1.2: UE), the method comprising: monitoring for the receipt of system information in recurring time windows used for the transmission of system information (fig. x: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); within each time window, monitoring each subframe for an indication of system information and reading system information from the signal subframe if such information is present (sec 7.4 – SB value tag in each SU); and terminating monitoring at least at the end of the time window (if there are no more subframes to be monitored, it is only reasonable to terminate monitoring).
R2-072205 *may not have explicitly* shown "each time window spanning a plurality of successive subframes." Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been

obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.

R2-072205, modified by Arundale, may not have explicitly depicted "*dynamically* selecting which subframes within a given time window are to be used for carrying system information."

Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.

While R2-072205/Arundale/Dimou mention said system information, they *may not have explicitly* mentioned "presence indication" of said system information.

Love mentions presence indication of system information in subframe ([0071]: one TFCI bit (EU indication bit) out of one of the slots per frame or sub-frame is used to indicate the presence or absence of the EU field while the other bits in each TFCI field of the remaining slots per frame or sub-frame are still used to represent the TFCI). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the presence indication of system information as taught by Love to the downlink shared channel information subframe of R2-072205/Arundale/Dimou for soft handoff.

R2-072205/Arundale/Dimou/Love may not have explicitly mentioned said monitoring receipt of said system information "on a downlink shared channel" as amended.

Cheng teaches function of monitoring receipt of system information on a downlink shared channel (claim 14: receiving, at a mobile station, at least a portion of a downlink shared channel shared by a plurality of mobiles and having a plurality of subframes, each subframe comprising a plurality of slots, each slot including a power control part composed of power control bits for the plurality of mobiles, a data status part and a data part). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the reception method of R2-072205/Arundale/Dimou/Love to the function as taught by Cheng to reduce use of channelization codes (Cheng, col. 1 lines 55-59).

21. R2-072205 teaches a mobile station operative to receive system information on a downlink channel from a network transmitter in a wireless communications network, the mobile station comprising a baseband processor (fig. 5.4.1.2: UE) operable to: monitor for the receipt of system information in recurring time windows used for the transmission of system information (fig. x: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); within each time window, monitor each subframe for an indication of system information and reading system information from the signal subframe if such information is present (fig. x: SIB); and terminate monitoring at least at

the end of the time window (if there are no more subframes to be monitored, it is only reasonable to terminate monitoring).

R2-072205 *may not have explicitly* shown "each time window spanning a plurality of successive subframes." Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.

R2-072205, modified by Arundale, may not have explicitly depicted "*dynamically* selecting which subframes within a given time window are to be used for carrying system information."

Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.

While R2-072205/Arundale/Dimou mention said system information, they *may not have explicitly* mentioned "presence indication" of said system information.

Love mentions presence indication of system information in subframe ([0071]: one TFCI bit (EU indication bit) out of one of the slots per frame or sub-frame is used to indicate the presence or absence of the EU field while the other bits in each TFCI field of the remaining slots per frame or sub-frame are still used to represent the TFCI). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the presence indication of system information as taught by Love to the downlink shared channel information subframe of R2-072205/Arundale/Dimou for soft handoff.

R2-072205/Arundale/Dimou/Love may not have explicitly mentioned said monitoring receipt of said system information "on a downlink shared channel" as amended.

Cheng teaches function of monitoring receipt of system information on a downlink shared channel (claim 14: receiving, at a mobile station, at least a portion of a downlink shared channel shared by a plurality of mobiles and having a plurality of subframes, each subframe comprising a plurality of slots, each slot including a power control part composed of power control bits for the plurality of mobiles, a data status part and a data part). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the reception method of R2-072205/Arundale/Dimou/Love to the function as taught by Cheng to reduce use of channelization codes (Cheng, col. 1 lines 55-59).

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2. R2-072205 teaches the method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a contiguous set of subframes within the given time window (fig. x: subframes 3 and 131).

3. R2-072205 teaches the method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a non-contiguous set of subframes within the given time window (fig. x: subframes 19 and 67).

4. R2-072205 teaches the method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting which subframes to use for transmitting system information in view of competing transmission priorities associated with other control or data signaling (fig. x: SIB).

7. R2-072205 teaches the method of claim 1, further comprising varying window sizes of the recurring time windows (fig. x: SU-1, SU-2 and SU-3 have different sizes).

8. R2-072205 teaches the method of claim 1, further comprising dynamically configuring a window size for the recurring time windows (sec. 7.4 – MIB paragraph).

9. R2-072205 teaches the method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using different indicators corresponding to different types of system information (sec 7.4 – MIB paragraph), such that the indicator used for a particular subframe indicates the type of system information carried in that subframe (sec 7.4 – SIB).

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11. R2-072205 teaches the network transmitter of claim 10, wherein the network transmitter comprises a radio base station configured for operation in accordance with 3GPP E-UTRA standards (3GPP TSG-RAN2).

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18. R2-072205 teaches the method of claim 15, further comprising storing a default window size for monitoring for system information transmissions (fig. x: SU-1, SU-2 and SU-3 have default sizes).

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25. R2-072205 teaches the mobile station of claim 21, wherein the baseband processor is operable to recognize different types of system information based on different system information indicators detected in different subframes (fig. x: SIB-a,b,c,d,e).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over "Draft Text Proposal Capturing Agreements on System Information" (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale), Dimou et al (US 2009/0131057 A1, Dimou) and Nguyen (US 2006/0034245 A1) (hereinafter R2-072205 etc.), applied to claim 1, and in further view of "System Information Scheduling and Change Notification" (R2-071912).

5. R2-072205 etc. teaches the method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information; R2-072205 etc. does not very explicitly show it comprises using an RNTI (Radio Network Temporary Identifier) to denote that the subframe carries system information. R2-071912 explicitly teaches subframes indicators are in RNTI format (page 3 bottom). It would have been obvious to one of ordinary skill in the art when the invention was made to understand that both R2 documents refer to the same 3GPP systems information techniques and the R2-072205 (primary reference), while being silent on its application to the indications, also uses RNTI.

Claims 19, 20, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Draft Text Proposal Capturing Agreements on System Information" (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale), Dimou et al (US 2009/0131057 A1, Dimou), Love et al (US 2004/0219917 A1, Love) and Nguyen (US 2006/0034245 A1) (hereinafter R2-072205); and in further view of Marinier et al (US 2008/0225765 A1, Marinier).

19. R2-072205 etc. teaches the method of claim 18; R2-072205 etc. does not explicitly mention further comprising monitoring for system information transmissions based on a specified window size indicated in received information rather than the default window size. Marinier teaches monitoring for system information transmissions based on a specified window size indicated in received information rather than a default window size ([0457]: if window size is changed for reordering purpose, then it is only reasonable that the changing window sizes are monitored). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 etc. to allow configurable window sizes to facilitate reordering procedure.

20. R2-072205 etc. teaches the method of claim 15; R2-072205 etc. does not explicitly mention further comprising recognizing different types of system information based on recognizing different system information indicators in different signal subframes. Marinier teaches recognizing different types of system information based on recognizing different system information indicators in different signal subframes ([0457]: if window size is changed for reordering purpose, then it is only reasonable that the changing window sizes are recognized). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 etc. to allow configurable window sizes to facilitate reordering procedure.

23. R2-072205 etc. teaches the mobile station of claim 21; R2-072205 etc. may not have explicitly mentioned wherein the baseband processor is operable to adapt to changing or configurable window sizes used for the time window. Marinier teaches changing or configurable window sizes used for the time window ([0457]). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 etc. to allow configurable window sizes to facilitate reordering procedure.

24. R2-072205 etc. teaches the mobile station of claim 21; R2-072205 etc. does not explicitly mention wherein the baseband processor is operable to monitor for system information transmissions based on a specified window size indicated in received information rather than a default window size. Marinier teaches monitoring for system information transmissions based on a specified window size indicated in received information rather than a default window size ([0457]: if window size is changed for reordering purpose, then it is only reasonable that the changing window sizes are monitored). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 etc. to allow configurable window sizes to facilitate reordering procedure.

Claims 6, 13, 16 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Draft Text Proposal Capturing Agreements on System Information"

(R2-072205) in view of Arundale et al (US 7675852 B1, Arundale), and in further view of Dimou et al (US 2009/0131057 A1, Dimou) (hereinafter R2-072205 etc.); and in further view of Kashima et al (US 2007/0217362 A1, Kashima).

6. R2-072205 etc. teaches the method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information; R-072205 etc. do not explicitly shows it includes using an end-of-system-information indicator in a last subframe of the given time window that carries system information. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information (0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 etc. to maintain flexibility of scheduling.

13. R2-072205 etc. teaches the method of claim 12; R-072205 etc. does not explicitly shows wherein indicating to receiving user equipment which subframes within a given time window carry system information includes indicating the last subframe within the given time window that carries system information, thereby allowing the receiving user equipment to cease monitoring for system information within the given time window. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information so to cease monitoring within a given time (0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 etc. for flexibility of scheduling subframes.

16. R2-072205 etc. teaches the method of claim 15; R-072205 etc. does not explicitly shows it further comprising recognizing an end-of-system-information indicator in a signal subframe received within the time window and terminating monitoring for the time window in response. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information (0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 to maintain flexibility of scheduling.

22. R2-072205 etc. teaches the mobile station of claim 21; R-072205 etc. does not explicitly shows wherein the baseband processor is operable to recognize an end-of-system-information indicator in a signal subframe received within the time window and terminate monitoring for the time window in response. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information (0069 and 0072). It would have been obvious to one of ordinary skill

in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 etc. to maintain flexibility of scheduling.

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 or earlier communications from the examiner should be directed to Xavier Wong whose telephone number is (571)270-1780. The examiner can normally be reached on Monday through Friday 11:30 am - 9:00 pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Un C. Cho can be reached on 571-272-7919. 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.

/Xavier Szewai Wong/
Primary Examiner, Art Unit 2462
27th September 2012

Notice of References Cited	Application/Control No. 12/664,347	Applicant(s)/Patent Under Reexamination DAHLMAN ET AL.	
	Examiner Xavier Szewai Wong	Art Unit 2413	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2006/0034245 A1	02-2006	Nguyen, Phong	370/345
*	B	US-7,680,507 B2	03-2010	Cheng et al.	455/522
	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

*		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.

Search Notes	Application/Control No. 12664347	Applicant(s)/Patent Under Reexamination DAHLMAN ET AL.
	Examiner Xavier Szewai Wong	**Art Unit** 2413

CPC- SEARCHED

Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED

Symbol	Date	Examiner

US CLASSIFICATION SEARCHED

Class	Subclass	Date	Examiner

SEARCH NOTES

Search Notes	Date	Examiner
EAST image, class and keyword search in USPAT, US-PGPUB, DERWENT, EPO, JPO, and IBM_TDB (please see search history)	2011.12.17	/XSW/
Inventor Name and Assignee search in PALM and EAST	2011.12.17	/XSW/
EAST combined subclass, image and text search:: 370/311,328-334,468 and 455/422.1	2011.12.17	/XSW/
Updated Searches Above	2012.09.30	/XSW/
Updated Searches Above	2013.08.23	/XSW/

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
L1	303877	("370"/$.ccls. "455"/$.ccls.) and (@rlad < "20070618" @ad < "20070618")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/08/26 02:28
L2	24	L1 and (downlink adj shared adj channel) with subframe	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/08/26 02:28
L3	20	L1 and (downlink adj shared adj channel) with subframe with transmi$5	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/08/26 02:37
L4	8	L3 and (receiv$3 reception) with (downlink adj shared adj channel) with subframe	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/08/26 02:59
L5	56975	(Dahlman Vukajlovic).IN. Ericsson.AS.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/08/26 03:14
L6	1	L5 and (re$1cur$5 adj2 window).clm. and (downlink adj shared).clm.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/08/26 03:14

EAST Search History (Interference)

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of **Dahlman**	)	
Serial No.: **12/664,347**	)	Examiner: Xavier S. Wong
Filed: **December 11, 2009**	)	Group Art Unit: 2462
For: **Transmission of System Information on a Downlink Shared Channel**	)	Confirmation No.: 1464
Docket No: **4015-6727**	)	

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

28 January 2014

RESPONSE TO OFFICE ACTION

This paper is being filed in response to the Office Action mailed 28 August 2013. Reconsideration is respectfully requested in light of the amendments and remarks below. **Suitable claim fees are submitted herewith along with fees for a two-month extension of time.** 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 of transmitting system information on a downlink shared channel of a wireless communication network, comprising:

transmitting system information on the downlink shared channel in recurring time windows, each time window spanning a plurality of subframes;

dynamically selecting which subframes within a given time window are to be used for carrying the system information; and

including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

2. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a contiguous set of subframes within the given time window.

3. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a non-contiguous set of subframes within the given time window.

4. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting which subframes to use for transmitting system information in view of competing transmission priorities associated with other control or data signaling.

5. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries

system information comprises using an RNTI (Radio Network Temporary Identifier) to denote that the subframe carries system information.

6. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using an end-of-system-information indicator in a last subframe of the given time window that carries system information.

7. (Original) The method of claim 1, further comprising varying window sizes of the recurring time windows.

8. (Original) The method of claim 1, further comprising dynamically configuring a window size for the recurring time windows.

9. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using different indicators corresponding to different types of system information, such that the indicator used for a particular subframe indicates the type of system information carried in that subframe.

10. (Previously presented) A network transmitter for transmitting system information on a downlink shared channel in a wireless communications network, the network transmitter configured to transmit system information in recurring time windows, each time window spanning a plurality of subframes; the network transmitter comprising a baseband processor configured to:

dynamically select which subframes on the downlink shared channel within a given time window are to be used for carrying system information; and

include an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

11. (Currently amended) The network transmitter of claim 10[[,]]:

wherein the network transmitter comprises a radio base station configured for operation in accordance with 3GPP E-UTRA standards;

wherein the indicator is a Radio Network Temporary Identifier (RNTI).

12. (Currently amended) A method of transmitting system information on a downlink shared channel structured as successive subframes, the method comprising:

transmitting system information on the downlink shared channel in regularly occurring time windows, each time window spanning a plurality of successive subframes;

dynamically selecting which subframes within ~~a given time window~~ the time windows are to be used for carrying system information;

indicating to receiving user equipment which subframes within ~~a given time window~~ the time windows carry system information, by including an indicator in each subframe with the time windows that carries system information.

13. (Currently amended) The method of claim 12, wherein indicating to receiving user equipment which subframes within ~~a given time window~~ the time windows carry system information includes indicating the last subframe within ~~the given~~ each time window that carries system information, thereby allowing the receiving user equipment to cease monitoring for system information within ~~the given~~ each time window.

14. (Cancelled)

15. (Currently amended) A method, in a mobile station, for receiving system information on a downlink shared channel from a network transmitter in a wireless communication network, the method comprising:

monitoring for the receipt of system information on the downlink shared channel in recurring time windows used for [[the]] transmission of system information, each [[said]] time window spanning a plurality of subframes[[;]], by monitoring within each time window, ~~monitoring~~ each subframe for an indication ~~of the~~ indicating presence of system information in the subframe and reading system information from the subframe if such information is present; and

terminating monitoring ~~at least~~ at or before the end of the time window.

16. (Currently amended) The method of claim 15, further comprising recognizing an end-of-system-information indicator in a subframe received within the time window and terminating monitoring for receipt of system information with the time window in response.

17. (Cancelled)

18. (Original) The method of claim 15, further comprising storing a default window size for monitoring for system information transmissions.

19. (Original) The method of claim 18, further comprising monitoring for system information transmissions based on a specified window size indicated in received information rather than the default window size.

20. (Previously presented) The method of claim 15, further comprising recognizing different types of system information based on recognizing different system information indicators in different subframes.

21. (Currently amended) A mobile station operative to receive system information on a downlink shared channel from a network transmitter in a wireless communications network, the mobile station comprising a baseband processor configured to:

monitor for the receipt of system information on the downlink shared channel in recurring time windows used for [[the]] transmission of system information, each [[said[[time window spanning a plurality of subframes[[;]], by monitoring within each time window, ~~monitor~~ each subframe for an indication ~~of the~~

indicating presence of system information in the subframe and read system information from the subframe if such information is present; and

terminate monitoring ~~at least~~ at or before the end of the time window.

22. (Currently amended) The mobile station of claim 21, wherein the baseband processor is configured to recognize an end-of-system-information indicator in a subframe received within the time window and terminate monitoring for receipt of system information within the time window in response.

23. (Previously presented) The mobile station of claim 21, wherein the baseband processor is configured to adapt to variable window sizes used for the time window.

24. (Previously presented) The mobile station of claim 21, wherein the baseband processor is configured to monitor for system information transmissions based on a specified window size indicated in received information rather than a default window size.

25. (Previously presented) The mobile station of claim 21, wherein the baseband processor is configured to recognize different types of system information based on different system information indicators detected in different subframes.

26. (Currently amended) ~~The method of claim 1~~ A method of transmitting system information on a downlink shared channel of a wireless communication network comprising:

transmitting system information in recurring time windows, each time window spanning a plurality of subframes;

dynamically selecting which subframes within a given time window are to be used for carrying the system information; and

including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information;

wherein the dynamically selecting comprises dynamically selecting subframes such that the same system information is assigned for transmission to different subframes in first and second consecutive time windows, with the different subframes occupying differing respective positions within their corresponding frames.

27. (New) The method of claim 1:

wherein the wireless communication network is configured for operation in accordance with 3GPP E-UTRA standards;

wherein the indicator is a System Information Radio Network Temporary Identifier (SI-RNTI).

28. (New) The method of claim 12:

wherein the transmitting the system information comprises transmitting the system information in accordance with 3GPP E-UTRA standards;

wherein the indicator is a System Information Radio Network Temporary Identifier (SI-RNTI).

29. (New) The method of claim 15:

wherein the wireless communication network is configured for operation in accordance with 3GPP E-UTRA standards;

wherein the indication is a System Information Radio Network Temporary Identifier (SI-RNTI).

30. (New) The method of claim 21:

wherein the wireless communication network is configured for operation in accordance with 3GPP E-UTRA standards;

wherein the indication is a System Information Radio Network Temporary Identifier (SI-RNTI).

31. (New) A method of transmitting system information on a downlink shared channel of a wireless communication network configured for operation in accordance with 3GPP E-UTRA standards, the system information having a fixed part and a dynamic part the method comprising:

transmitting the dynamic part of the system information on the downlink shared channel in recurring time windows, each time window spanning a plurality of subframes, and each time window being a predetermined time interval in one or more corresponding frames;

dynamically selecting which subframes within a given time window are to be used for carrying the dynamic part of the system information; wherein the selecting is such that subframes carrying the dynamic part of the system information within a given frame are non-consecutive, such that a second subframe not carrying any of the system information is disposed between first and third subframes carrying the dynamic part of the system information;

including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

32. (New) A method of transmitting system information on a downlink shared channel of a wireless communication network configured for operation in accordance with 3GPP E-UTRA standards, the system information having a fixed part and a dynamic part, the method comprising:

transmitting the dynamic part of the system information in recurring time windows, each time window spanning a plurality of subframes, and each time window being a predetermined time interval in one or more corresponding frames;

dynamically selecting which subframes within the time windows are to be used for carrying the dynamic part of the system information; wherein the selecting is such that subframes carrying the dynamic part of the system information for a first time window begin at a first subframe for a first frame, and the subframes carrying the dynamic part of the system information for a second time window begin at a second subframe in a second frame, where the first and second subframes have different subframe indexes relative to their corresponding frame;

including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

REMARKS

Claim Amendments

Claims 11-13, 15-16, 21-22, 26 have been amended, and claim 27-32 has been added. Support for these amendments is found throughout the specification and drawings, *see*, *e.g.*, Figs. 2-3 and accompanying text; page 4, line 15 to page 5, line 6; page 5, lines 14-26; page 1, lines 5-9; page 1, lines 19-34.

These amendments do not introduce new matter.

Clarification of Record on Finality of Action

Applicant notes that the current Action is the first Action after an RCE. Applicant further notes that the Office Action Summary indicates that the Action is non-final. However Conclusion section of the Action indicates that the Action is final. Applicant believes that the Examiner intended to make the Action non-final, because to do otherwise would be contrary to the MPEP. As such, Applicant understands that the present Action is ***non-final***, but requests clarification of the record on this point. If Applicant's understanding is incorrect, the Office is requested to telephone the undersigned immediately.

Allowable Subject Matter

Applicant notes with appreciation that claim 26 is indicated as being *allowable*. As such, Applicant has amended claim 26 to be independent form, including all the limitations of the corresponding base claim (claim 1) and any intervening claims (none).

Applicant submits that claim 26 is now in condition for allowance, as indicated in the Action.

§103 Claim Rejections

Claims 1-4, 7-12 stand rejected under §103 over R2-072205 (herein after "R2") in view of Arundale (US 7675852) and Dimou (US 20090121057), in further view of Nguyen (US 20060034245). Claims 5-6, 13, 15-16, 18-25 stands rejected under §103 over R2/Arundale/Dimou in combination with various tertiary references. For all rejections, the primary combination is R2/Arundale/Dimou. Applicant requests reconsideration.

As an initial matter, Applicant notes that the Examiner states that "applicant's arguments/amendments have been considered but are moot in [sic] the current new rejection grounds." This is clearly incorrect. For example, in rejecting claim 1, the Examiner previously rejected the claim based on R2/Arundale/Dimou, and now rejects the claim based on R2/Arundale/Dimou + Nguyen. However, Nguyen is used solely to address the added claim language "on the downlink shared channel," and all other portions of the claim are rejected using exactly the same logic as the prior rejections. Thus, the Examiner expressly uses the same logic to reject the same core claim language. Applicant's arguments in the prior response directly point out errors in the Examiner's logic. Despite this, the Examiner completely avoids addressing the substance of Applicant's arguments. Nowhere in the Action does the Examiner provide any rebuttal to Applicant's arguments. Such is improper. Applicant directs the Examiner's attention to MPEP §706.07's mandate that "The examiner should never lose sight of the fact that <u>in every case the applicant is entitled to a full and fair hearing</u>, and that a clear issue between applicant and examiner should be developed, if possible, before appeal." Applicant submits that the Examiner's failure to directly address Applicant's arguments is therefore improper.

As a second general matter, Applicant notes that the Examiner's rationale in the Action continues to contain the phrase "may not have explicitly shown" in several locations. Applicant respectfully requests pursuant to MPEP §706.07 that the Examiner specifically state either 1) that the reference shows; or 2) that the reference does not show each asserted associated feature/element. Absent such explicit statements by the Examiner, Applicant will understand that the Examiner's phrase "may not have explicitly shown" is the Examiner's personal way of saying "does not show," and future prosecution (including Appeal) will be based on that understanding.

Independent claim 1 requires, *inter alia*, "transmitting system information on the downlink shared channel in recurring time windows, each time window spanning a plurality of subframes; [and] dynamically selecting which subframes within a given time window are to be used for carrying the system information. The Examiner relies primarily on R2 for the majority of these features; however, R2, with or without the other cited art, does not teach what the Examiner asserts it does, as explained below.

In the Action, the Examiner sets forth the following interpretation of R2 which the Examiner <u>*expressly relies on*</u> to make the §103 rejections:

1. The Scheduling Units (SU) of R2 are the claimed "time windows."
2. The SB value tag in R2 is the claimed "indicator."

Applicant submits that the R2 SUs are not "time windows", but are instead understood by one of skill in the art to be an amount of system information grouped into System Information Blocks (SIBs). In other words, SUs are understood to be a specific type of data (system information), which are then transmitted. Data is not a time window. Instead, one of skill in the art would understand that a subframe might be considered a time window (generically), or a collection of subframes (e.g., a frame) might be considered a time window, but the data itself is not a time window. Nevertheless, the discussion below will be in the context of the R2 SUs being time windows so that the errors in the Examiner's analysis can be discussed in terms that the Examiner used to make the rejections. Regardless of the correctness of the Examiner's terminology, R2 does not make the showings relied on to make the §103 rejections.

First, assuming *arguendo* that an SU is a "time window", R2 does not show "transmitting system information in recurring time windows, each time window spanning a plurality of subframes…[and] including an indicator in <u>each</u> of the selected subframes to indicate to receiving user equipment that the subframe carries system information." SU-1 is plainly shown in Fig. x as being only <u>one</u> subframe. Thus, SU-1 simply cannot be the claimed "time window" as it does not "span[] a plurality of subframes," as required by claim 1. In contrast, both SU-2 and SU-3 are shown as being multiple subframes in size. However, the SB value tag -- the putative "indicator" -- is not in SU-2 or SU-3. The Examiner has not identified anywhere in R2 that states that the SB is located anywhere other than in SU-1. Thus, the only SU that has the SB (i.e., SU-1) cannot be the claimed time window because it never spans multiple subframes <u>and</u> the SUs that span multiple subframes (SU-2 and SU-3) never contain the putative "indicator." Thus, despite the Examiner's assertions to the contrary, R2 does not show "transmitting system information in recurring time windows, each time window spanning a plurality of subframes…[and] including an indicator in <u>each</u> of the selected subframes to indicate to receiving user equipment that the subframe carries system information," as claimed in claim 1.

Applicant notes that the Examiner points to the statement in R2 that "an SU may be segmented, in which case segments are scheduled in subsequent consecutive subframes." However, one of skill in the art understands that such statement only applies to SU-2 and SU-3, as these are the only multi-subframe SU's. There is no suggestion anywhere in R2 that SU-1 is multi-subframe.

Applicant also notes that the Examiner points to Arundale to show that "time windows" can span multiple subframes. The reliance on Arundale is baffling. R2 already shows that some putative "time windows" (SUs) can span multiple subframes, see SU-2 and SU-3. Thus, the concept of multiple subframe SUs is already present in R2. However, the R2 approach is fundamentally based on the notion that SU-1 will be only one subframe, and that this subframe will be in a known, non-varying location. Thus, the attempted combination of R2 and Arundale suffers from at least two defects: 1) the proffered reason of "to determine the sizes and number of frames" is a specious argument, as the R2 SU-1 <u>necessarily</u> has a fixed size and a fixed location (in the directly after the subframe carrying the BCH, with a fixed periodicity of 80 ms, see R2 §7.4); and 2) changing R2 so that SU-1 spans multiple subframes would alter the fundamental workings of R2 and render is unusable for its intended purpose. Thus, Arundale cannot properly cure this defect in R2.

Second, again assuming *arguendo* that an SU is a "time window", R2 does not show --despite the Examiner's express assertion to the contrary -- "dynamically selecting which subframes within a given time window are to be used for carrying the system information," as claimed in claim 1. SU-1 is plainly shown in Fig. x as being only one subframe. Thus, as noted above, SU-1 simply cannot be the claimed "time window" as it does not "span[] a plurality of subframes," as required by claim 1. Further, while both SU-2 and SU-3 are shown as being multiple subframes in size, neither uses any sort of "dynamic[] selecting [of] which subframes within a given time window are to be used for carrying the system information." Remember that claim 1 requires that all subframes carrying the system information include the "indicator," which the Examiner defines as the SB in R2. But, the SB is only carried in SU-1, and is never carried in SU-2 or SU-3. And, SU-1 is only in one subframe, and that subframe is in a predefined fixed location. There simply is no "dynamic selection" with respect to SU-1 in R2. As such, R2 simply does not show the claimed dynamic selection.

Applicant notes that the Examiner expressly states that R2 shows the claimed dynamic selection, but then states "R2 … *may not have explicitly* mentioned 'dynamically selecting which subframes within a given time window are to be used for carrying the system information,' " and then points to Dimou. In view of this vague language, Applicant requests pursuant to MPEP §760.07 that the Examiner either explicitly state that he is contending that R2 makes this showing, or explicitly admit that R2 does not make this showing and stop repeating language to the contrary in future explanations.

In order to advance prosecution, Applicant will also explain below why Dimou does not cure this lack of "dynamically selecting which subframes … system information" defect of R2 (alone or in combination with Arundale).

The Examiner points to the passage in Dimou ¶[0039] reading in part "this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) <u>to their users</u>" (emphasis added). Read in the Dimou context, it is clear that this portion of Dimou is discussing dynamically allocating <u>uplink</u> resources -- from the mobile terminals to the base stations. Such allocation of <u>uplink</u> resources is unrelated to allocation of <u>downlink</u> resources, particularly downlink resources broadcast at all relevant mobile terminals on a shared downlink channel, as claimed. As such, whatever Dimou may teach about uplink resource allocation is irrelevant to the claimed method of transmitting system information on a downlink shared channel, and does not cure the dynamic selection defect of R2 noted above.

Applicant notes that the Examiner points to Nguyen ¶[0047] for a teaching of transmitting system information on a "downlink shared channel". The Examiner's reliance on Nguyen is baffling, because R2 already teaches sending system information on a downlink shared channel. The Examiner also points to Nguyen ¶[0012] and ¶[0015] and states that it would have been obvious to modify R2/Arundale/Dimou "to identify a transmission gap in the downlink transmission from the base station and suspend high speed data packet reception by the user equipment during the reception suspension period." Even assuming arguendo that such is true, so what? Whether the UE suspends data packet reception or not does nothing to cure the defects identified above. Suspension or the lack of suspension does nothing to cure the defects in R2/Arundale/Dimou, nor has the Examiner attempted to explain how it conceivably could.

Independent claim 1 also requires "including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information." The Examiner identifies the putative "indicator" as the "value tag" discussed in R2. However, R2 specifically states in Section 7.4 line 5-14 that Value tags are carried on the BCH, "in a System Information Block called the Master Information Block (MIB)." Thus, these value tags are carried in the MIB, which Fig. x plainly shows is NOT part of SU-1, SU-2, or SU-3. Even setting this aside, and assuming that the "value tag" is somehow in the SB, R2 teaches that the SB is only present in SU-1, and SU-1 is only one sub-frame. Thus, there are simply not multiple subframes of the same "time window" in R2 that carry indicators. And the SB is present only in SU-1, and is expressly not present in SU-2 or SU-3. Thus, even if the R2 "value tag" is an indicator, R2 does not teach the claimed indicating portion of the method. And, nothing in the other cited art cures this defect.

In discussing claim 15, the Examiner points to Love (US 20040219917) for a potentially related teaching on "presence indication." However, Applicant notes that the EU field discussed in Love is directed to a <u>single</u> mobile station, and is not sent on <u>downlink shared</u> channel. More particularly, Love relates to a WCDMA system where an enhanced uplink dedicated transport channel (denoted E-DCH/EUDCH) is introduced. When the UE is scheduled for transmission (the UE transmitting in the uplink (UL)) on this channel, there is a need that the base stations transmit ACK/NACK information to the UE to let the UE know whether or not the transmission on the UL has been received by the base station. Love achieves this signaling by introducing "an EU field", and an indicator to indicate the presence of this field to a specific UE regarding a transmission made by that UE, where the indicator is defined using "TFCI bits" (TFCI in WCDMA stands for Transport Format Combination Indicator (TFCI)). Thus, Love describes dedicated communication of feedback to specific UEs. Love has nothing to do with indicating to UEs that they should read system information transmitted (broadcasted) on a downlink *shared* channel intended for several/all UEs being served by the network transmitter. As such, whatever Love may teach about indications dedicated to a single mobile station situation is irrelevant to the method of claim 1, and does not cure the corresponding defect of R2 noted above. And, one of skill in the art would not use Love in combination with R2/Arundale/Dimou.

Important: Note that the argument in the following paragraph assumes that the "system information" necessarily includes the SB and the non-SB SIB information because if only the SB information is the "system information," the §103 rejections necessarily fail for other reasons outlined above (e.g., not multiple sub-frames, etc.).

Applicant also notes that R2 explicitly teaches that the SB is always broadcast in SU-1, and that SU-1 is always the "subframe following the one carrying BCH," (see R2 §7.4). Further, R2 teaches that "SU-1 is carried on the DL-SCH and uses a fixed schedule with a periodicity of 80 ms." From this it follows that there is no need for a value tag to indicate that a subframe contains SU-1, as SU-1 is always placed in the subframe directly following the subframe carrying the BCH, with a periodicity of 80 ms. At most, the SB value tag is indicating information about the *other* SUs, but not SU-1 itself. And, there would simply be no reason to indicate the presence of the "system information" in SU-1, because SU-1 always carries the SB and is always in a fixed time location (every 80ms). One of skill in the art would not add an indication of presence, when the "presence" is guaranteed to always be there. Thus, adding the "presence indication" of Love to R2/Arundale/Dimou would not make sense. And, without having the indication in every relevant subframe in the time window that carries the claimed system information, the combination would not read on the claimed device.

Applicant would like to emphasize this last point, which goes at a fundamental difference between the claimed approach and R2. R2 is fundamentally built on the idea that the system information will always be in a non-varying predicable subframe -- one directly after the BCH that, starts every 80ms, and continues contiguously as appropriate. Claim 1, in contrast, claims a method where the system information is dynamically placed in potentially varying subframes, which may or may not be contiguous. Thus, attempts to graft other teachings onto R2 in order to reach the subject matter of claim 1 must necessarily fundamentally alter the way R2 works, which is legally impressible to support a §103 rejection.

As pointed out above, R2/Arundale/Dimou fails to teach at least two limitations of claim 1. And, the recent addition of Nguyen does not cure these defects. As such, independent claim 1 defines over the proffered combination of R2/Arundale/Dimou + Nguyen, assuming *arguendo* that such combination is proper. Further, none of the other cited art (cited against the various dependent claims) cures these defects. Accordingly, independent claim 1 and its dependent claims define patentable subject matter over the cited art.

For claims 10-11, Applicant notes that independent claim 10 includes limitations identical or similar to the "dynamically selecting" and "including an indicator in each selected subframe" limitations found in claim 1. Accordingly, Applicant submits that independent claim 10 and its dependent claims define over the cited art for reasons similar to those discussed above with respect to independent claim 1.

For claims 12-13, Applicant notes that independent claim 12 includes "dynamically selecting" limitations identical or similar to those found in claim 1. Accordingly, Applicant submits that independent claim 12, and its dependent claims define over the cited art for reasons similar to those discussed above with respect to independent claim 1.

For claims 15-20, 21-25 Applicant notes that independent claim 15 requires "monitoring <u>each subframe</u> for an indication indicating presence of system information in the subframe and reading system information from the subframe if such information is present" while independent claim 21 likewise requires "monitor <u>each subframe</u> for an indication indicating presence of system information in the subframe and read system information from the subframe if such information is present." The claimed monitoring of each subframe in these claims is related to the "including an indicator in each selected subframe" limitation found in claim 1. As pointed out above, R2 does not show the "value tags" in <u>each</u> relevant subframe, but at most <u>only in</u> the SB. And the SB does not indicate present of system information in the subframe (SU-1) carrying the SB.

Nor does R2 suggest looking for "value tags" anywhere but in the SB. Therefore, R2 necessarily does not teach "monitoring" each subframe for the "value tags." Further, the "value tag" of R2 is not "an indication of the presence of system information." Thus, R2 cannot teach "monitor[ing] each subframe for an indication indicating presence of system information in the subframe and read[ing] system information from the subframe if such information is present," as claimed. And, as discussed above, the attempted reliance on Love is misplaced. As such, Applicant submits that independent claims 15 and 21, and their corresponding dependent claims, define over the cited art for reasons similar to those discussed above with respect to independent claim 1.

New Claims 31-32

With regard to all claims, it appears that the Examiner is construing the Scheduling Units (SU) of R2 as the claimed "time windows." While Applicant disagrees that such a construction is reasonable or consistent with the understanding of one of skill in the art, the balance of this response will assume *arguendo* that such construction is appropriate.

Applicant submits that new claims 31-32 are patentable over the cited art for at least the reasons generally discussed above with respect to claim 1. Additional reasons are set forth below.

With regard to new independent claim 31, the claim requires that each time window span a plurality of subframes. Further, each time window must be "a predetermined time interval in one or more corresponding frames." In addition, the claim requires dynamically selecting which subframes within a given time window are to be used for carrying the system information, with the selecting being such that "subframes carrying the system information within a given frame are <u>non-consecutive</u>, such that a second subframe not carrying any of the system information is disposed between first and third subframes carrying the system information." It is undisputed that, in R2, the subframes carrying SU-1 to SU-3 for a given frame are contiguous. See, for example Fig. x. Likewise, it is undisputed subsequent transmissions of SU-1 (or SU-2 or SU-3) are necessarily occurring in different frames. Thus, within one frame, R2 at most teaches that the subframes carrying the system information are contiguous, not "non-consecutive" as claimed by claim 31. And, nothing in any of the other cited art cures this defect. As such, Applicant submits that independent claim 31, and its dependent claims, define patentable subject matter over the cited art.

With regard to new independent claim 32, this claim requires that each time window span a plurality of subframes. Further, each time window must be "a predetermined time interval in one or more corresponding frames." In addition, the claim requires dynamically selecting which subframes within a given time window are to be used for carrying the dynamic part of the system information, with the selecting being such that "subframes carrying the dynamic part of the system information for a first time window begin at a first subframe for a first frame, and subframes carrying the dynamic part of the system information for a second time window begin at a second subframe in a second frame, <u>where the first and second subframes have different subframe indexes relative to their corresponding frame</u>." In R2, the dynamic part of the system information is assumed to correspond to the collective data of SU-1, SU-2, and SU-3. It is undisputed that, in R2, the subframes carrying the collection of SU-1 to SU-3 always begin at the same subframe - the subframe immediately following the one carrying the BCH, and that the BCH is always in the first subframe of a frame. Thus, in R2, the start of the system information is always in the second subframe (subframe 2) of a frame. In contrast, claim 32 requires that the dynamic part of the system information for at least two different time windows start in different subframes of at least two different frames. Thus, assuming the first frame starts its dynamic part of the system information in the second subframe (subframe 2), the second frame starts its dynamic part of the system information in the third subframe (subframe 3)(or the fourth subframe, or the fifth subframe…). Thus, the always-start-in-the-same-place approach of R2 does not teach the allowed-to-start-in-different-places approach of claim 32. And, nothing in any of the other cited art cures this defect. As such, Applicant submits that independent claim 32 defines patentable subject matter over the cited art.

Renewed Request for Clarification of the Record

In the Action, the Examiner continues to explicitly maintain that "SU-1, SU-2 and SU-3 are in the same subframe and are recurring," (see, e.g., Action page 3, lines 3-4) and bases the §103 rejections on this premise. For a discussion of how R2 makes it abundantly clear that SU-1, SU-2, and SU-3 are NOT in the same subframe, see the explanation provided in the Response of January 2013, and discussed above. Applicant notes that the Examiner, other than again *repeating verbatim* that R2 makes this showing, has not rebutted the substance of Applicant's arguments on this point. Pursuant to MPEP§706.07, Applicant request that the Examiner clearly state the Examiner's position on this characterization of R2, and provide an analysis identifying any errors in Applicant's argument on this point. Because this "same subframe" assertion by the Examiner regarding R2 clearly forms a basis for one or more claim rejections, Applicant is entitled to an explanation of the Examiner's position on this point in view of Applicant's contrary explanation.

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

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

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Dated: 28 January 2014

Electronic Patent Application Fee Transmittal

Application Number:	12664347
Filing Date:	11-Dec-2009
Title of Invention:	Transmission of System Information on a Downlink Shared Channel
First Named Inventor/Applicant Name:	Erik Dahlman
Filer:	John R. Owen/Cora Fedornock
Attorney Docket Number:	4015-6727 / P24241-US2

Filed as Large Entity

U.S. National Stage under 35 USC 371 Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Claims in excess of 20	1615	3	80	240
Independent claims in excess of 3	1614	3	420	1260
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 - 2 months with $0 paid	1252	1	600	600
Miscellaneous:				
		Total in USD ($)		**2100**

Electronic Acknowledgement Receipt

EFS ID:	18041971
Application Number:	12664347
International Application Number:	
Confirmation Number:	1464
Title of Invention:	Transmission of System Information on a Downlink Shared Channel
First Named Inventor/Applicant Name:	Erik Dahlman
Customer Number:	24112
Filer:	John R. Owen/Cora Fedornock
Filer Authorized By:	John R. Owen
Attorney Docket Number:	4015-6727 / P24241-US2
Receipt Date:	28-JAN-2014
Filing Date:	11-DEC-2009
Time Stamp:	10:30:41
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Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	$2100
RAM confirmation Number	12477
Deposit Account	
Authorized User	

File Listing:

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

1		40156727RESPONSE.pdf	136568 21902ecc6d445659ce6ea5ac4cd4aec5680e1ab4	yes	26

	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	26

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	33282 74ebaacfe00c7c3124a381c41a9b88825707caae	no	2

Warnings:

Information:

Total Files Size (in bytes):	169850

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
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/664,347	Filing Date 12/11/2009	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	NUMBER FILED (Column 1)	NUMBER EXTRA (Column 2)	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	01/28/2014	CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 28	Minus	** 25	= 3	x $80 =	240
	Independent (37 CFR 1.16(h))	* 6	Minus	***5	= 1	x $420 =	420
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	**660**

AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	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	

LIE
/PHYLLIS CANTY/

* 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.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/664,347	12/11/2009	Erik Dahlman	4015-6727 / P24241-US2	1464

24112 7590 05/20/2014
COATS & BENNETT, PLLC
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EXAMINER	
WONG, XAVIER S	

ART UNIT	PAPER NUMBER
2413	

MAIL DATE	DELIVERY MODE
05/20/2014	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.

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No.	Applicant(s)	
	12/664,347	DAHLMAN ET AL.	
	Examiner	**Art Unit**	
	Xavier Szewai Wong	2413	

-- 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 *28th January 2014*.

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) *1-13,15,16 and 18-32* 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) *1-13,15,16 and 18-25* is/are rejected.

8)☒ Claim(s) *26-32* is/are objected to.

9)☐ Claim(s) ____ are subject to restriction and/or election requirement.

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).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☐ 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) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date ____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: ____.

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

Allowable Subject Matter

Claims 26 – 32 are allowed over the prior art of record.

Response to Arguments

Applicant's arguments/amendments to claims 1 – 25 have been considered but are not persuasive.

Applicant is not convinced that neither R2-072205 (R2), Arundale nor Dimou, individually or combined, teaches "transmitting system information in recurring time windows, each time window spanning a plurality of subframes… [and]… including indicator in each of the selected subframes to indicate to the receiving user equipment that the subframe carries system information" and "dynamically selecting … subframes."

The examiner maintains that R2 that the system information are in recurring time windows because in figure x "multi-frame/scheduling period" shows section 3, 19, 37 and 131 SUs are recurring according to the SUs shown above. The examiner also maintains "indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information" is taught in section 7.4 where it describes SB value tag in each SU because they show "minimum UE capability restricts BCCH mapped to DL-SCH, e.g regarding maximum rate" which is an "indicator" form.

The examiner maintains that Arundale teaches "each time window spanning a plurality of subframes" because Arundale further discloses "as one sub-frame expires it becomes a past frame and the current window slides to become new current window and include the first sub-frame of the previously committed window; the number of sub-frames and frame size is given above as a generic example and is therefore not limited to those sizes" in column 9 lines 8-15.

The examiner also maintains that secondary reference Dimou shows "*dynamically* select[ing] which subframes within a given time window are to be used for carrying system information because Dimou paragraph 0039 mentions "this resource block allocation is valid for a time window and *Node Bs can allocate resources dynamically* (e.g. even at a sub-frame level) to their users. For the users within a given inner or outer sector zone, the assignment is done among the resource blocks granted from the central Node B for this specific zone."

The examiner recognizes that obviousness may be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992), and *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007).

Also, 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).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1 – 4 and 7 – 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Draft Text Proposal Capturing Agreements on System Information" (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale) and Dimou et al (US 2009/0131057 A1, Dimou), and in further view of Nguyen (US 2006/0034245 A1).

1. R2-072205 teaches a method of transmitting system information on the downlink shared channel of a wireless communication network (sec 7.4 downlink system) comprising: transmitting system information in recurring time windows (fig. x: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); dynamically selecting which subframes within a given time window are to be used for carrying the system information (sec 7.4 – An SU may be segmented, in which case segments are scheduled… eNB may schedule more than one SU in a subframe); and including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information (sec 7.4 – SB value tag in each SU).
R2-072205 *may not have explicitly* shown "each time window spanning a plurality of subframes." Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.
Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.
R2-072205/Arundale/Dimou may not have explicitly mentioned said transmission of said system information is "on downlink shared channel" as amended. Nguyen teaches transmitting system information on a downlink shared channel ([0047]: high speed physical downlink shared channel (HS-PDSCH) transmission if a part of the HS-SCCH subframe or a part of its associated HS-PDSCH subframe overlaps with a downlink transmission gap on the associated DPCH). It would

have been obvious to one of ordinary skill in the art when the invention was made to modify the transmission method of R2-072205/Arundale/Dimou into that as taught by Nguyen to identify a transmission gap in a downlink transmission from a base station and suspend high speed data packet reception by the user equipment during the reception suspension period (Nguyen, [0012] and [0015]).

10. R2-072205 teaches a network transmitter for transmitting system information on a downlink shared channel in a wireless communications network, the network transmitter configured to comprising a baseband processor (fig. 5.4.1.2) generate system information in recurring time windows (fig. x: SU-1, SU-2 and SU-3 are in a same subframe and are recurring), the network transmitter comprising a baseband processor configured to: include an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information (sec 7.4 – SB value tag in each SU).
R2-072205 *may not have explicitly* shown “each time window spanning a plurality of subframes.” Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.
R2-072205, modified by Arundale, *may not have explicitly* mentioned “*dynamically* select which subframes within a given time window are to be used for carrying system information.
Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.
R2-072205/Arundale/Dimou may not have explicitly mentioned said transmission of said system information is “on downlink shared channel” as amended. Nguyen teaches transmitting system information on a downlink shared channel ([0047]: high speed physical downlink shared channel (HS-PDSCH) transmission if a part of the HS-SCCH subframe or a part of its associated HS-PDSCH subframe overlaps with a downlink transmission gap on the associated DPCH). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the transmission method of R2-072205/Arundale/Dimou into that as taught by Nguyen to identify a transmission gap in a downlink transmission from a base station and suspend high speed data packet reception by the user equipment during the reception suspension period (Nguyen, [0012] and [0015]).

12. R2-072205 teaches a method of transmitting system information on a downlink shared channel structured as successive subframes (fig. 5.4.1.2 and fig. x), the method comprising: transmitting system information in regularly occurring time windows (fig. x: SU-1, SU-2 and SU-3 are in a same subframe and are recurring), (fig. x: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); and indicating to receiving user equipment which subframes within a given time window carry system information (sec 7.4 – SB value tag in each SU).

R2-072205 *may not have explicitly* shown "each time window spanning a plurality of successive subframes." Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.

R2-072205, modified by Arundale, may not have explicitly depicted "*dynamically* selecting which subframes within a given time window are to be used for carrying system information."

Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.

R2-072205/Arundale/Dimou may not have explicitly mentioned said transmission of said system information is "on downlink shared channel" as amended. Nguyen teaches transmitting system information on a downlink shared channel ([0047]: high speed physical downlink shared channel (HS-PDSCH) transmission if a part of the HS-SCCH subframe or a part of its associated HS-PDSCH subframe overlaps with a downlink transmission gap on the associated DPCH). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the transmission method of R2-072205/Arundale/Dimou into that as taught by Nguyen to identify a transmission gap in a downlink transmission from a base station and suspend high speed data packet reception by the user equipment during the reception suspension period (Nguyen, [0012] and [0015]).

Claims 15, 18, 21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Draft Text Proposal Capturing Agreements on System Information" (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale), and Dimou et al (US

2009/0131057 A1, Dimou) and Love et al (US 2004/0219917 A1, Love), and in further view of Cheng et al (US 7,680,507 B2, Cheng).

15. R2-072205 teaches a method for a mobile station for receiving system information on a downlink shared channel from a network transmitter in a wireless communication network (fig. 5.4.1.2: UE), the method comprising: monitoring for the receipt of system information in recurring time windows used for the transmission of system information (fig. x: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); within each time window, monitoring each subframe for an indication of system information and reading system information from the signal subframe if such information is present (sec 7.4 – SB value tag in each SU); and terminating monitoring at least at the end of the time window (if there are no more subframes to be monitored, it is only reasonable to terminate monitoring).

R2-072205 *may not have explicitly* shown “each time window spanning a plurality of successive subframes.” Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.

R2-072205, modified by Arundale, may not have explicitly depicted “*dynamically* selecting which subframes within a given time window are to be used for carrying system information.”

Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.

While R2-072205/Arundale/Dimou mention said system information, they *may not have explicitly* mentioned “presence indication” of said system information.

Love mentions presence indication of system information in subframe ([0071]: one TFCI bit (EU indication bit) out of one of the slots per frame or sub-frame is used to indicate the presence or absence of the EU field while the other bits in each TFCI field of the remaining slots per frame or sub-frame are still used to represent the TFCI). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the presence indication of system information as taught by Love to the downlink shared channel information subframe of R2-072205/Arundale/Dimou for soft handoff.

R2-072205/Arundale/Dimou/Love may not have explicitly mentioned said monitoring receipt of

said system information "on a downlink shared channel" as amended.
Cheng teaches function of monitoring receipt of system information on a downlink shared channel (claim 14: receiving, at a mobile station, at least a portion of a downlink shared channel shared by a plurality of mobiles and having a plurality of subframes, each subframe comprising a plurality of slots, each slot including a power control part composed of power control bits for the plurality of mobiles, a data status part and a data part). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the reception method of R2-072205/Arundale/Dimou/Love to the function as taught by Cheng to reduce use of channelization codes (Cheng, col. 1 lines 55-59).

21. R2-072205 teaches a mobile station operative to receive system information on a downlink channel from a network transmitter in a wireless communications network, the mobile station comprising a baseband processor (fig. 5.4.1.2: UE) operable to: monitor for the receipt of system information in recurring time windows used for the transmission of system information (fig. x: SU-1, SU-2 and SU-3 are in a same subframe and are recurring); within each time window, monitor each subframe for an indication of system information and reading system information from the signal subframe if such information is present (fig. x: SIB); and terminate monitoring at least at the end of the time window (if there are no more subframes to be monitored, it is only reasonable to terminate monitoring).
R2-072205 *may not have explicitly* shown "each time window spanning a plurality of successive subframes." Arundale shows each time window spanning a plurality of subframes (fig. 3 subframes 315 in window 320; col. 8 lines 58-61). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the window to accommodate a plurality of subframes as taught by Arundale in the downlink shared channel transmitting method in R2-072205 to determine the sizes and number of frames to include in each window.
R2-072205, modified by Arundale, may not have explicitly depicted "*dynamically* selecting which subframes within a given time window are to be used for carrying system information."
Dimou teaches *dynamically* select which subframes within a given time window are to be used for carrying system information ([0039]: this resource block allocation is valid for a time window and Node Bs can allocate resources dynamically (e.g. even at a sub-frame level) to their users). It would have been obvious to one of ordinary skill in the art when the invention was made to implement the dynamic selection of subframe as taught by Dimou to the downlink shared channel transmitting method in R2-072205/Arundale to allow system throughput being maximized or users not using the same resource blocks.
While R2-072205/Arundale/Dimou mention said system information, they *may not have explicitly* mentioned "presence indication" of said system information.
Love mentions presence indication of system information in subframe ([0071]: one TFCI bit (EU indication bit) out of one of the slots per frame or sub-frame is used to indicate the presence or absence of the EU field while the other bits in each TFCI field of the remaining slots per frame or sub-frame are still used to represent the TFCI). It would

have been obvious to one of ordinary skill in the art when the invention was made to implement the presence indication of system information as taught by Love to the downlink shared channel information subframe of R2-072205/Arundale/Dimou for soft handoff.

R2-072205/Arundale/Dimou/Love may not have explicitly mentioned said monitoring receipt of said system information "on a downlink shared channel" as amended.

Cheng teaches function of monitoring receipt of system information on a downlink shared channel (claim 14: receiving, at a mobile station, at least a portion of a downlink shared channel shared by a plurality of mobiles and having a plurality of subframes, each subframe comprising a plurality of slots, each slot including a power control part composed of power control bits for the plurality of mobiles, a data status part and a data part). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the reception method of R2-072205/Arundale/Dimou/Love to the function as taught by Cheng to reduce use of channelization codes (Cheng, col. 1 lines 55-59).

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2. R2-072205 teaches the method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a contiguous set of subframes within the given time window (fig. x: subframes 3 and 131).

3. R2-072205 teaches the method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a non-contiguous set of subframes within the given time window (fig. x: subframes 19 and 67).

4. R2-072205 teaches the method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting which subframes to use for transmitting system information in view of competing transmission priorities associated with other control or data signaling (fig. x: SIB).

7. R2-072205 teaches the method of claim 1, further comprising varying window sizes of the recurring time windows (fig. x: SU-1, SU-2 and SU-3 have different sizes).

8. R2-072205 teaches the method of claim 1, further comprising dynamically configuring a window size for the recurring time windows (sec. 7.4 – MIB paragraph).

9. R2-072205 teaches the method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using different indicators corresponding to different types of system information (sec 7.4 – MIB paragraph), such that the indicator used for

a particular subframe indicates the type of system information carried in that subframe (sec 7.4 – SIB).

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11. R2-072205 teaches the network transmitter of claim 10, wherein the network transmitter comprises a radio base station configured for operation in accordance with 3GPP E-UTRA standards (3GPP TSG-RAN2).

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18. R2-072205 teaches the method of claim 15, further comprising storing a default window size for monitoring for system information transmissions (fig. x: SU-1, SU-2 and SU-3 have default sizes).

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25. R2-072205 teaches the mobile station of claim 21, wherein the baseband processor is operable to recognize different types of system information based on different system information indicators detected in different subframes (fig. x: SIB-a,b,c,d,e).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over "Draft Text Proposal Capturing Agreements on System Information" (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale), Dimou et al (US 2009/0131057 A1, Dimou) and Nguyen (US 2006/0034245 A1) (hereinafter R2-072205 etc.), applied to claim 1, and in further view of "System Information Scheduling and Change Notification" (R2-071912).

5. R2-072205 etc. teaches the method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information; R2-072205 etc. does not very explicitly show it comprises using an RNTI (Radio Network Temporary Identifier) to denote that the subframe carries system information. R2-071912 explicitly teaches subframes indicators are in RNTI format (page 3 bottom). It would have been obvious to one of ordinary skill in the art when the invention was made to understand that both R2 documents refer to the same

3GPP systems information techniques and the R2-072205 (primary reference), while being silent on its application to the indications, also uses RNTI.

Claims 19, 20, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Draft Text Proposal Capturing Agreements on System Information” (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale), Dimou et al (US 2009/0131057 A1, Dimou), Love et al (US 2004/0219917 A1, Love) and Nguyen (US 2006/0034245 A1) (hereinafter R2-072205); and in further view of Marinier et al (US 2008/0225765 A1, Marinier).

19. R2-072205 etc. teaches the method of claim 18; R2-072205 etc. does not explicitly mention further comprising monitoring for system information transmissions based on a specified window size indicated in received information rather than the default window size. Marinier teaches monitoring for system information transmissions based on a specified window size indicated in received information rather than a default window size ([0457]: if window size is changed for reordering purpose, then it is only reasonable that the changing window sizes are monitored). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 etc. to allow configurable window sizes to facilitate reordering procedure.

20. R2-072205 etc. teaches the method of claim 15; R2-072205 etc. does not explicitly mention further comprising recognizing different types of system information based on recognizing different system information indicators in different signal subframes. Marinier teaches recognizing different types of system information based on recognizing different system information indicators in different signal subframes ([0457]: if window size is changed for reordering purpose, then it is only reasonable that the changing window sizes are recognized). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 etc. to allow configurable window sizes to facilitate reordering procedure.

23. R2-072205 etc. teaches the mobile station of claim 21; R2-072205 etc. may not have explicitly mentioned wherein the baseband processor is operable to adapt to changing or configurable window sizes used for the time window. Marinier teaches changing or configurable window sizes used for the time window ([0457]). It would have been obvious to one of ordinary skill in the art when the invention was made to modify

the method in R2-072205 etc. to allow configurable window sizes to facilitate reordering procedure.

24. R2-072205 etc. teaches the mobile station of claim 21; R2-072205 etc. does not explicitly mention wherein the baseband processor is operable to monitor for system information transmissions based on a specified window size indicated in received information rather than a default window size. Marinier teaches monitoring for system information transmissions based on a specified window size indicated in received information rather than a default window size ([0457]: if window size is changed for reordering purpose, then it is only reasonable that the changing window sizes are monitored). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the method in R2-072205 etc. to allow configurable window sizes to facilitate reordering procedure.

Claims 6, 13, 16 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Draft Text Proposal Capturing Agreements on System Information" (R2-072205) in view of Arundale et al (US 7675852 B1, Arundale), and in further view of Dimou et al (US 2009/0131057 A1, Dimou) (hereinafter R2-072205 etc.); and in further view of Kashima et al (US 2007/0217362 A1, Kashima).

6. R2-072205 etc. teaches the method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information; R-072205 etc. do not explicitly shows it includes using an end-of-system-information indicator in a last subframe of the given time window that carries system information. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information (0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 etc. to maintain flexibility of scheduling.

13. R2-072205 etc. teaches the method of claim 12; R-072205 etc. does not explicitly shows wherein indicating to receiving user equipment which subframes within a given time window carry system information includes indicating the last subframe within the given time window that carries system information, thereby allowing the receiving user equipment to cease monitoring for system information within the given time window. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information so to cease monitoring within a given time

(0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 etc. for flexibility of scheduling subframes.

16. R2-072205 etc. teaches the method of claim 15; R-072205 etc. does not explicitly shows it further comprising recognizing an end-of-system-information indicator in a signal subframe received within the time window and terminating monitoring for the time window in response. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information (0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 to maintain flexibility of scheduling.

22. R2-072205 etc. teaches the mobile station of claim 21; R-072205 etc. does not explicitly shows wherein the baseband processor is operable to recognize an end-of-system-information indicator in a signal subframe received within the time window and terminate monitoring for the time window in response. Kashima teaches an end-of-system-information indicator in a last subframe of the given time window that carries system information (0069 and 0072). It would have been obvious to one of ordinary skill in the art when the invention was made to program an end-of-system information function as taught by Kashima to the indicator method in R2-072205 etc. to maintain flexibility of scheduling.

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 or earlier communications from the examiner should be directed to Xavier Wong whose telephone number is (571)270-1780. The examiner can normally be reached on Monday through Friday 11:30 am - 9:00 pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Un C. Cho can be reached on 571-272-7919. 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.

/Xavier Szewai Wong/
Primary Examiner, Art Unit 2413
17th May 2014

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12664347	DAHLMAN ET AL.
	Examiner	**Art Unit**
	Xavier Szewai Wong	2413

CPC- SEARCHED

Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED

Symbol	Date	Examiner

US CLASSIFICATION SEARCHED

Class	Subclass	Date	Examiner

SEARCH NOTES

Search Notes	Date	Examiner
EAST image, class and keyword search in USPAT, US-PGPUB, DERWENT, EPO, JPO, and IBM_TDB (please see search history)	2011.12.17	/XSW/
Inventor Name and Assignee search in PALM and EAST	2011.12.17	/XSW/
EAST combined subclass, image and text search: 370/311,328-334,468 and 455/422.1	2011.12.17	/XSW/
Updated Searches Above	2012.09.30	/XSW/
Updated Searches Above	2013.08.23	/XSW/

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
L1	2	"20090131057".pn.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2014/05/17 20:52
L2	2	"7675852".pn.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2014/05/17 20:56
L3	1	L2 and window same sub$1frame	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2014/05/17 21:02
L4	8	re$1cur$5 with window same sub$1frame	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2014/05/17 21:06
L5	0	370/311,328,334,468.ccls. and L4	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2014/05/17 21:07

EAST Search History (Interference)

<This search history is empty>

5/17/2014 9:08:00 PM

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **Dahlman**	
Serial No.: **12/664,347**	
Filed: **December 11, 2009**	Examiner: Xavier S. Wong
For: **Transmission of System Information on a Downlink Shared Channel**	Group Art Unit: 2462
Docket No: **4015-6727**	Confirmation No.: 1464

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

AFTER FINAL RESPONSE

This paper is being filed in response to the Final Office Action mailed May 20, 2014. Reconsideration is respectfully requested in light of the amendments and remarks below. The Office is hereby authorized to charge any fees required for entry of this paper to Deposit Account 18-1167.

LISTING OF CLAIMS

1. (Previously presented) A method of transmitting system information on a downlink shared channel of a wireless communication network, comprising:

transmitting system information on the downlink shared channel in recurring time windows, each time window spanning a plurality of subframes;

dynamically selecting which subframes within a given time window are to be used for carrying the system information; and

including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

2. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a contiguous set of subframes within the given time window.

3. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a non-contiguous set of subframes within the given time window.

4. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting which subframes to use for transmitting system information in view of competing transmission priorities associated with other control or data signaling.

5. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries

system information comprises using an RNTI (Radio Network Temporary Identifier) to denote that the subframe carries system information.

6. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using an end-of-system-information indicator in a last subframe of the given time window that carries system information.

7. (Original) The method of claim 1, further comprising varying window sizes of the recurring time windows.

8. (Original) The method of claim 1, further comprising dynamically configuring a window size for the recurring time windows.

9. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using different indicators corresponding to different types of system information, such that the indicator used for a particular subframe indicates the type of system information carried in that subframe.

10. (Previously presented) A network transmitter for transmitting system information on a downlink shared channel in a wireless communications network, the network transmitter configured to transmit system information in recurring time windows, each time window spanning a plurality of subframes; the network transmitter comprising a baseband processor configured to:

dynamically select which subframes on the downlink shared channel within a given time window are to be used for carrying system information; and

include an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

11. (Previously presented) The network transmitter of claim 10:

wherein the network transmitter comprises a radio base station configured for operation in accordance with 3GPP E-UTRA standards;

wherein the indicator is a Radio Network Temporary Identifier (RNTI).

12. (Previously presented) A method of transmitting system information on a downlink shared channel structured as successive subframes, the method comprising:

transmitting system information on the downlink shared channel in regularly occurring time windows, each time window spanning a plurality of successive subframes;

dynamically selecting which subframes within the time windows are to be used for carrying system information;

indicating to receiving user equipment which subframes within the time windows carry system information, by including an indicator in each subframe with the time windows that carries system information.

13. (Previously presented) The method of claim 12, wherein indicating to receiving user equipment which subframes within the time windows carry system information includes indicating the last subframe within each time window that carries system information, thereby allowing the receiving user equipment to cease monitoring for system information within each time window.

14. (Cancelled)

15. (Previously presented) A method, in a mobile station, for receiving system information on a downlink shared channel from a network transmitter in a wireless communication network, the method comprising:

monitoring for the receipt of system information on the downlink shared channel in recurring time windows used for [[the]] transmission of system information, each [[said]] time window spanning a plurality of subframes, by monitoring within each time window, each subframe for an indication indicating presence of system information in the subframe and reading system information from the subframe if such information is present; and

terminating monitoring at or before the end of the time window.

16. (Previously presented) The method of claim 15, further comprising recognizing an end-of-system-information indicator in a subframe received within the time window and terminating monitoring for receipt of system information with the time window in response.

17. (Cancelled)

18. (Original) The method of claim 15, further comprising storing a default window size for monitoring for system information transmissions.

19. (Original) The method of claim 18, further comprising monitoring for system information transmissions based on a specified window size indicated in received information rather than the default window size.

20. (Previously presented) The method of claim 15, further comprising recognizing different types of system information based on recognizing different system information indicators in different subframes.

21. (Previously presented) A mobile station operative to receive system information on a downlink shared channel from a network transmitter in a wireless communications network, the mobile station comprising a baseband processor configured to:

monitor for the receipt of system information on the downlink shared channel in recurring time windows used for transmission of system information, each [[said[[time window spanning a plurality of subframes, by monitoring within each time window, each subframe for an indication indicating presence of system information in the subframe and read system information from the subframe if such information is present; and

terminate monitoring at or before the end of the time window.

22. (Previously presented) The mobile station of claim 21, wherein the baseband processor is configured to recognize an end-of-system-information indicator in a subframe received within the time window and terminate monitoring for receipt of system information within the time window in response.

23. (Previously presented) The mobile station of claim 21, wherein the baseband processor is configured to adapt to variable window sizes used for the time window.

24. (Previously presented) The mobile station of claim 21, wherein the baseband processor is configured to monitor for system information transmissions based on a specified window size indicated in received information rather than a default window size.

25. (Previously presented) The mobile station of claim 21, wherein the baseband processor is configured to recognize different types of system information based on different system information indicators detected in different subframes.

26. (Previously presented) A method of transmitting system information on a downlink shared channel of a wireless communication network comprising:

transmitting system information in recurring time windows, each time window spanning a plurality of subframes;

dynamically selecting which subframes within a given time window are to be used for carrying the system information; and

including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information;

wherein the dynamically selecting comprises dynamically selecting subframes such that the same system information is assigned for transmission to different subframes in first and second consecutive time windows, with the different subframes occupying differing respective positions within their corresponding frames.

27. (Previously presented) The method of claim 1:

wherein the wireless communication network is configured for operation in accordance with 3GPP E-UTRA standards;

wherein the indicator is a System Information Radio Network Temporary Identifier (SI-RNTI).

28. (Previously presented) The method of claim 12:

wherein the transmitting the system information comprises transmitting the system information in accordance with 3GPP E-UTRA standards;

wherein the indicator is a System Information Radio Network Temporary Identifier (SI-RNTI).

29. (Previously presented) The method of claim 15:

wherein the wireless communication network is configured for operation in accordance with 3GPP E-UTRA standards;

wherein the indication is a System Information Radio Network Temporary Identifier (SI-RNTI).

30. (Previously presented) The method of claim 21:

wherein the wireless communication network is configured for operation in accordance with 3GPP E-UTRA standards;

wherein the indication is a System Information Radio Network Temporary Identifier (SI-RNTI).

31. (Previously presented) A method of transmitting system information on a downlink shared channel of a wireless communication network configured for operation in accordance with 3GPP E-UTRA standards, the system information having a fixed part and a dynamic part the method comprising:

transmitting the dynamic part of the system information on the downlink shared channel in recurring time windows, each time window spanning a plurality of subframes, and each time window being a predetermined time interval in one or more corresponding frames;

dynamically selecting which subframes within a given time window are to be used for carrying the dynamic part of the system information; wherein the selecting is such that subframes carrying the dynamic part of the system information within a given frame are non-consecutive, such that a second subframe not carrying any of the system information is disposed between first and third subframes carrying the dynamic part of the system information;

including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

32. (Previously presented) A method of transmitting system information on a downlink shared channel of a wireless communication network configured for operation in accordance with 3GPP E-UTRA standards, the system information having a fixed part and a dynamic part, the method comprising:

transmitting the dynamic part of the system information in recurring time windows, each time window spanning a plurality of subframes, and each time window being a predetermined time interval in one or more corresponding frames;

dynamically selecting which subframes within the time windows are to be used for carrying the dynamic part of the system information; wherein the selecting is such that subframes carrying the dynamic part of the system information for a first time window begin at a first subframe for a first frame, and the subframes carrying the dynamic part of the system information for a second time window begin at a second subframe in a second frame, where the first and second subframes have different subframe indexes relative to their corresponding frame;

including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

REMARKS

The indication by the Examiner that claims 26-32 recite allowable subject matter is greatly appreciated. However, Applicant believes that pending claims 1-25 are also allowable and therefore requests reconsideration of this application.

The claimed invention relates to dynamic selection of subframes for system information on a downlink shared channel. The claims recite a "recurring time window" spanning a number of subframes in which the system information is transmitted. One aspect of the invention is dynamically selecting which subframes in the time window are to be used for transmitting system information. Another aspect of the claim invention is "including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information."

Independent claims 1, 10 and 12 are rejected under 35 U.S.C §103 as being obvious over R2-072205 in view of Arundale (US 7675852) and further in view of Dimou (US 20090121057) and Nguyen (US 20060034245). It is respectfully submitted that the cited prior art fails to disclose dynamically selecting the subframes in a given time window used for transmitting system information as recited in claims 1, 10 and 12.

R2-072205 discloses a method of transmitting system information on the downlink. The system information is divided into scheduling units (SUs). Each SU comprises a group of system information with the same periodicity. The most frequently transmitted SU is referred to as SU-1 and is transmitted with a fixed periodicity. Subsequent SUs (e.g., SU-2, SU-3, etc) may be transmitted with different periodicity. All SUs are transmitted in the same subframe as SU-1 or in consecutive subframes. R2-072205 does not disclose dynamically selecting the subframes in a given time window used for transmitting system information or including an indicator in each subframe that carries system information. Rather, the transmission scheme in R2-072205 relies on a fixed schedule for system information.

Arundale is cited for disclosing a time window spanning multiple subframes. Dimou.is cited for disclosing dynamically selecting subframes for transmission of system information. Nguyen is cited solely for disclosing a downlink shared channel. None of these secondary references are related to transmission of system information and therefore do not cure the deficiency of R2-07220 because there is no reason, other than hindsight, for combining the references. Therefore, it is submitted that claims 1, 10 and 12 are allowable over the cited art.

Independent claims 15 and 21 are rejected under §103 over R2/Arundale/Dimou and further in view of Love (US 2004/0219917) and Cheng et al (US 7,680,507). It is respectfully submitted that the cited prior art fails to disclose including a system information indicator in each subframe that carries system information as recited in claims 15 and 21.

As noted above, R2-072205 discloses transmission of system information according to a fixed schedule. R2-072205 does not disclose including a system information indicator in each subframe that carries system information. The Examiner cites Love as disclosing a system information indicator. However, the indicator in Love is not for indicating the presence of system information. Further, there is not reason to include such indicator in R2-072205 because the fixed scheduling eliminates the need for an indicator because user equipment already knows what subframes carry the system information. Therefore, it is submitted that claims 15 and 21 are allowable over the cited art.

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

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

David E. Bennett

Dated: July 21, 2014

David E. Bennett
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Electronic Acknowledgement Receipt	
EFS ID:	19634248
Application Number:	12664347
International Application Number:	
Confirmation Number:	1464
Title of Invention:	Transmission of System Information on a Downlink Shared Channel
First Named Inventor/Applicant Name:	Erik Dahlman
Customer Number:	24112
Filer:	David E. Bennett/Donna Donovan
Filer Authorized By:	David E. Bennett
Attorney Docket Number:	4015-6727 / P24241-US2
Receipt Date:	21-JUL-2014
Filing Date:	11-DEC-2009
Time Stamp:	15:28:08
Application Type:	U.S. National Stage under 35 USC 371

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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_After_Final_Office_Action.pdf	54874 3a8ba104f182d224e4285d797ed07b0708898519	yes	14

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Response After Final Action	1	1
	Claims	2	11
	Applicant Arguments/Remarks Made in an Amendment	12	14
Warnings:			
Information:			
	Total Files Size (in bytes):	54874	

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
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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	Filing Date	
12/664,347	12/11/2009	☐ 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

07/21/2014	(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))	* 28	Minus	** 28	= 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
/GAIL WOOTEN/

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/664,347	12/11/2009	Erik Dahlman	4015-6727 / P24241-US2	1464

24112 7590 08/05/2014

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

EXAMINER	
WONG, XAVIER S	
ART UNIT	**PAPER NUMBER**
2413	
MAIL DATE	**DELIVERY MODE**
08/05/2014	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.

PTOL-90A (Rev. 04/07)

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

Response to Arguments

Applicant mentions R2-072205 (hereinafter, R2), Arundale, Dimou and Nguyen do not disclose "*dynamically selecting [the] subframe in a given time window used for transmitting system information*" as cited in claims 1, 10 and 12.

R2 section 7.4 and figure X show subframe(s) in given time window(s) for transmitting system information, but R2 does not explicitly discuss the "*dynamic selection*" of said "subframes" as claimed.

Dimou is introduced to explicitly show the *function* of "*dynamic selection of subframes*" in a given time window because paragraph 0039 mentions "this resource block allocation is valid for a *time window* and Node Bs can *allocate resources dynamically (e.g. even at a sub-frame level)* to their users."

In addition, Arundale highlights, in figure 3, subframes in windows being updated; along with figure 4 and column 8 lines 37-40 and 55-67 where they show "If it were possible to *dynamically allocate resources depending on the changing needs of the system over time throughout each phase… A sliding window is used to schedule reconfiguration* of a module to minimize impact to the overall system… *All windows beyond the committed window 340 can be both rescheduled and reallocated* to be a *different configuration* (e.g. systems information) than originally planned."

The examiner also considers the above functions/features "dynamic selection of subframes in given window used for transmitting system information."

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and *does not include knowledge gleaned only from the applicant's disclosure*, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xavier Szewai Wong whose telephone number is 571.270.1780. The examiner can normally be reached on Monday through Friday 11:30 am - 9:00 pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Un C. Cho can be reached on 571.272.7919. 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.

/Xavier Szewai Wong/
Primary Examiner, Art Unit 2413
1st August 2014

Advisory Action Before the Filing of an Appeal Brief	Application No. *12/664,347*	Applicant(s) DAHLMAN ET AL.	
	Examiner Xavier Szewai Wong	Art Unit 2413	AIA (First Inventor to File) Status No

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 21st July 2014 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☒ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:
   a) ☐ The period for reply expires ______months from the mailing date of the final rejection.
   b) ☒ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
   c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection. The current period for reply expires months from the mailing date of *the prior Advisory Action* or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.
   Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANT'S FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☐ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);
   b) ☐ They raise the issue of new matter (see NOTE below);
   c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.
   NOTE: _____. (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☒ For purposes of appeal, the proposed amendment(s): (a) ☐ will not be entered, or (b) ☒ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
9. ☐ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
10. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
11. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. ☐ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: _____.
13. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
14. ☐ Other: _____.

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:
    Claim(s) allowed: 26-32.
    Claim(s) objected to: .
    Claim(s) rejected: 1-13,15,16 and 18-25.
    Claim(s) withdrawn from consideration: .

/Xavier Szewai Wong/
Primary Examiner, Art Unit 2413

ENTER, /XSW/, 2014.08.01

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **Dahlman**	
Serial No.: **12/664,347**	
Filed: **December 11, 2009**	Examiner: Xavier S. Wong
For: **Transmission of System Information on a Downlink Shared Channel**	Group Art Unit: 2462
Docket No: **4015-6727**	Confirmation No.: 1464

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

AFTER FINAL RESPONSE

This paper is being filed in response to the Final Office Action mailed May 20, 2014. Reconsideration is respectfully requested in light of the amendments and remarks below. The Office is hereby authorized to charge any fees required for entry of this paper to Deposit Account 18-1167.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of **Dahlman**	
Serial No.: **12/664,347**	
Filed: **December 11, 2009**	Examiner: Xavier S. Wong
For: **Transmission of System Information on a Downlink Shared Channel**	Group Art Unit: 2462
Docket No: **4015-6727**	Confirmation No.: 1464

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

SUPPLEMENTAL AFTER-FINAL RESPONSE IN-RESPONSE TO ADVISORY ACTION

This paper is being filed in response to the Final Office Action mailed May 20, 2014. 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. (Currently amended) A method of transmitting system information on a downlink shared channel of a wireless communication network, comprising:

transmitting system information on the downlink shared channel in recurring time windows, each time window spanning a plurality of subframes;

dynamically selecting which subframes within a given time window are to be used for carrying the system information; and

including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information,

wherein the wireless communication network is configured for operation in accordance with 3GPP E-UTRA standards and wherein the indicator is a System information Radio Network Temporary Identifier (SI-RNTI).

2. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a contiguous set of subframes within the given time window.

3. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises selecting a non-contiguous set of subframes within the given time window.

4. (Original) The method of claim 1, wherein dynamically selecting which subframes within a given time window are to be used for carrying system information comprises

selecting which subframes to use for transmitting system information in view of competing transmission priorities associated with other control or data signaling.

5. (Canceled)

6. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using an end-of-system-information indicator in a last subframe of the given time window that carries system information.

7. (Original) The method of claim 1, further comprising varying window sizes of the recurring time windows.

8. (Original) The method of claim 1, further comprising dynamically configuring a window size for the recurring time windows.

9. (Original) The method of claim 1, wherein including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information includes using different indicators corresponding to different types of system information, such that the indicator used for a particular subframe indicates the type of system information carried in that subframe.

10. (Currently amended) A network transmitter for transmitting system information on a downlink shared channel in a wireless communications network, the network transmitter configured to transmit system information in recurring time windows, each time window spanning a plurality of subframes; the network transmitter comprising a baseband processor configured to:

dynamically select which subframes on the downlink shared channel within a given time window are to be used for carrying system information; and

include an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information,

wherein the wireless communication network is configured for operation in accordance with 3GPP E-UTRA standards and wherein the indicator is a System information Radio Network Temporary Identifier (SI-RNTI).

11. (Canceled)

12. (Currently amended) A method of transmitting system information on a downlink shared channel structured as successive subframes, the method comprising:

transmitting system information on the downlink shared channel in regularly occurring time windows, each time window spanning a plurality of successive subframes;

dynamically selecting which subframes within the time windows are to be used for carrying system information;

indicating to receiving user equipment which subframes within the time windows carry system information, by including an indicator in each subframe within the time windows that carries system information, wherein the wireless communication network is configured for operation in accordance with 3GPP E-UTRA standards and wherein the indicator is a System information Radio Network Temporary Identifier (SI-RNTI).

13. (Previously presented) The method of claim 12, wherein indicating to receiving user equipment which subframes within the time windows carry system information includes indicating the last subframe within each time window that carries system information, thereby allowing the receiving user equipment to cease monitoring for system information within each time window.

14. (Canceled)

15. (Currently amended) A method, in a mobile station, for receiving system information on a downlink shared channel from a network transmitter in a wireless communication network, the method comprising:

monitoring for the receipt of system information on the downlink shared channel in recurring time windows used for transmission of system information, each time window spanning a plurality of subframes, by monitoring, within each time window, each subframe for an indication indicating presence of system information in the subframe and reading system information from the subframe if such information is present; and

terminating monitoring at or before the end of the time window,

wherein the wireless communication network is configured for operation in accordance with 3GPP E-UTRA standards and wherein the indicator is a System information Radio Network Temporary Identifier (SI-RNTI).

16. (Currently amended) The method of claim 15, further comprising recognizing an end-of-system-information indicator in a subframe received within the time window and terminating monitoring for receipt of system information ~~with~~ within the time window in response.

17. (Canceled)

18. (Original) The method of claim 15, further comprising storing a default window size for monitoring for system information transmissions.

19. (Original) The method of claim 18, further comprising monitoring for system information transmissions based on a specified window size indicated in received information rather than the default window size.

20. (Previously presented) The method of claim 15, further comprising recognizing different types of system information based on recognizing different system information indicators in different subframes.

21. (Currently amended) A mobile station operative to receive system information on a downlink shared channel from a network transmitter in a wireless communications network, the mobile station comprising a baseband processor configured to:

monitor for the receipt of system information on the downlink shared channel in recurring time windows used for transmission of system information, each time window spanning a plurality of subframes, by monitoring within each time window, each subframe for an indication indicating presence of system information in the subframe and read system information from the subframe if such information is present; and

terminate monitoring at or before the end of the time window,

wherein the wireless communication network is configured for operation in accordance with 3GPP E-UTRA standards and wherein the indicator is a System information Radio Network Temporary Identifier (SI-RNTI).

22. (Previously presented) The mobile station of claim 21, wherein the baseband processor is configured to recognize an end-of-system-information indicator in a subframe received within the time window and terminate monitoring for receipt of system information within the time window in response.

23. (Previously presented) The mobile station of claim 21, wherein the baseband processor is configured to adapt to variable window sizes used for the time window.

24. (Previously presented) The mobile station of claim 21, wherein the baseband processor is configured to monitor for system information transmissions based on a specified window size indicated in received information rather than a default window size.

25. (Previously presented) The mobile station of claim 21, wherein the baseband processor is configured to recognize different types of system information based on different system information indicators detected in different subframes.

26. (Previously presented) A method of transmitting system information on a downlink shared channel of a wireless communication network comprising:

transmitting system information in recurring time windows, each time window spanning a plurality of subframes;

dynamically selecting which subframes within a given time window are to be used for carrying the system information; and

including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information;

wherein the dynamically selecting comprises dynamically selecting subframes such that the same system information is assigned for transmission to different subframes in first and second consecutive time windows, with the different subframes occupying differing respective positions within their corresponding frames.

27.-30. (Canceled)

31. (Currently amended) A method of transmitting system information on a downlink shared channel of a wireless communication network configured for operation in accordance with 3GPP E-UTRA standards, the system information having a fixed part and a dynamic part, the method comprising:

transmitting the dynamic part of the system information on the downlink shared channel in recurring time windows, each time window spanning a plurality of subframes, and each time window being a predetermined time interval in one or more corresponding frames;

dynamically selecting which subframes within a given time window are to be used for carrying the dynamic part of the system information; wherein the selecting is such that subframes carrying the dynamic part of the system information within a given frame are non-consecutive, such that a second subframe not carrying any of the system information is disposed between first and third subframes carrying the dynamic part of the system information;

including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

32. (Previously presented) A method of transmitting system information on a downlink shared channel of a wireless communication network configured for operation in accordance with 3GPP E-UTRA standards, the system information having a fixed part and a dynamic part, the method comprising:

transmitting the dynamic part of the system information in recurring time windows, each time window spanning a plurality of subframes, and each time window being a predetermined time interval in one or more corresponding frames;

dynamically selecting which subframes within the time windows are to be used for carrying the dynamic part of the system information; wherein the selecting is such that subframes carrying the dynamic part of the system information for a first time window begin at a first subframe for a first frame, and the subframes carrying the dynamic part of the system information for a second time window begin at a second subframe in a second frame, where the first and second subframes have different subframe indexes relative to their corresponding frame;

including an indicator in each of the selected subframes to indicate to receiving user equipment that the subframe carries system information.

REMARKS

Applicant appreciates the interview granted by the Examiner Xavier S. Wong on September 17, 2014. During the interview the amendment to claim 10 was discussed.

Independent claim 10 has been amended to incorporate limitations from allowable claim 27 and is therefore believed to be allowable for the same reasons as amended claim 1 (which incorporates allowable claim 27).

In response to the Final Office Action mailed May 20, 2014, Applicant amends independent claims 1, 12, 15 and 21 by incorporating the limitations of allowed claims 27, 28, 29 and 30 respectively. Accordingly it is believed that amended claims 1, 12, 15 and 21 are allowable.

Claims 16 and 31 have been amended to correct minor typographical errors.

Claims 5, 11 and 27-30 have been canceled.

It is respectfully urged that the present application is in condition for allowance and notice to such effect is respectfully requested. If additional fees are required please charge them to Deposit Account No. 18-1167.

Respectfully submitted,

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

David E. Bennett

Dated: September 18, 2014

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

Electronic Patent Application Fee Transmittal

Application Number:	12664347
Filing Date:	11-Dec-2009
Title of Invention:	Transmission of System Information on a Downlink Shared Channel
First Named Inventor/Applicant Name:	Erik Dahlman
Filer:	David E. Bennett/Donna Donovan
Attorney Docket Number:	4015-6727 / P24241-US2

Filed as Large Entity

U.S. National Stage under 35 USC 371 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:				
Extension - 1 month with $0 paid	1251	1	200	200

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
	Total in USD ($)			**200**

Electronic Acknowledgement Receipt

EFS ID:	20173009
Application Number:	12664347
International Application Number:	
Confirmation Number:	1464
Title of Invention:	Transmission of System Information on a Downlink Shared Channel
First Named Inventor/Applicant Name:	Erik Dahlman
Customer Number:	24112
Filer:	David E. Bennett/Donna Donovan
Filer Authorized By:	David E. Bennett
Attorney Docket Number:	4015-6727 / P24241-US2
Receipt Date:	18-SEP-2014
Filing Date:	11-DEC-2009
Time Stamp:	10:37:59
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	$200
RAM confirmation Number	7914
Deposit Account	
Authorized User	

File Listing:

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

1		Supplemental_After_Final_Response.pdf	43182 e89db5ce64e7eff2ba7107fc03968de986ba29c8	yes	10

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Supplemental Response or Supplemental Amendment	1	1
	Claims	2	9
	Applicant Arguments/Remarks Made in an Amendment	10	10

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30020 0bd7ec1db03f7fd0f158e9f4f4bcb4889074964b	no	2

Warnings:

Information:

Total Files Size (in bytes):	73202

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

PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number: 12/664,347
Filing Date: 12/11/2009
☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	NUMBER FILED (Column 1)	NUMBER EXTRA (Column 2)	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

09/18/2014	CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 24	Minus	** 28	= 0	X $0 =	0
Independent (37 CFR 1.16(h))	* 6	Minus	***6	= 0	X $0 =	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

	CLAIMS REMAINING AFTER AMENDMENT (Column 1)		HIGHEST NUMBER PREVIOUSLY PAID FOR (Column 2)	PRESENT EXTRA (Column 3)	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
/BONNIE COLE/

OK TO ENTER: /S.L./

11/18/2014

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of **Dahlman**

Serial No.: **12/664,347**

Filed: **December 11, 2009**

For: **Transmission of System Information on a Downlink Shared Channel**

Docket No: **4015-6727**

Examiner: Xavier S. Wong

Group Art Unit: 2462

Confirmation No.: 1464

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

SUPPLEMENTAL AFTER-FINAL RESPONSE IN-RESPONSE TO ADVISORY ACTION

This paper is being filed in response to the Final Office Action mailed May 20, 2014. 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.

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	59111	(370/311,328-334,468.ccls. or 455/422.1.ccls.)	US-PGPUB; USPAT	OR	OFF	2014/11/18 12:35
L2	22594	(370/311,328-334,468.ccls. or 455/422.1.ccls.) and @ad<"20070618"	US-PGPUB; USPAT	OR	OFF	2014/11/18 12:36
L4	30	L2 and RNTI same (schedul$5 SU SU$2) and (repeat$3 repetitive recurr$5 overlap$5)	US-PGPUB; USPAT	OR	OFF	2014/11/18 12:37
L5	0	L2 and RNTI and (window system information)	US-PGPUB; USPAT	ADJ	OFF	2014/11/18 12:38
L6	50	L2 and RNTI and (system information)	US-PGPUB; USPAT	ADJ	OFF	2014/11/18 12:38
L7	151	((Erik) near2 (Dahlman)).INV.	US-PGPUB; USPAT	OR	OFF	2014/11/18 12:39
L8	14	((Vera) near2 (Vukajlovic)).INV.	US-PGPUB; USPAT	OR	OFF	2014/11/18 12:39

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L9	65	((Erik) near2 (Dahlman)).INV.	USPAT; UPAD	OR	OFF	2014/11/18 12:39
L10	5	((Vera) near2 (Vukajlovic)).INV.	USPAT; UPAD	OR	OFF	2014/11/18 12:39
L12	0	(RNTI and windows near5 spanning).clm.	USPAT; UPAD	OR	OFF	2014/11/18 12:41
L14	13	(Radio Network Temporary identifier and window).clm.	USPAT; UPAD	ADJ	ON	2014/11/18 12:41

11/18/2014 12:42:44 PM

Index of Claims	Application/Control No. 12664347	Applicant(s)/Patent Under Reexamination DAHLMAN ET AL.
	Examiner SIMING LIU	Art Unit 2413

✓	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	11/18/2014								
1	1	=								
2	2	=								
3	3	=								
4	4	=								
-	5	-								
5	6	=								
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22	26	=								
-	27	-								
-	28	-								
-	29	-								
-	30	-								
23	31	=								
24	32	=								

Issue Classification

Application/Control No.	Applicant(s)/Patent Under Reexamination
12664347	DAHLMAN ET AL.
Examiner	**Art Unit**
SIMING LIU	2413

CPC

Symbol				Type	Version
H04L	1	/	08	F	2013-01-01
H04L	2001	/	0093	A	2013-01-01
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CPC Combination Sets

Symbol				Type	Set	Ranking	Version
		/					
		/					

/SIMING LIU/ Examiner.Art Unit 2413 (Assistant Examiner)	11/18/2014 (Date)	**Total Claims Allowed:** 24
/UN C CHO/ Supervisory Patent Examiner.Art Unit 2413 (Primary Examiner)	11/19/2014 (Date)	O.G. Print Claim(s): 1 / O.G. Print Figure: 5

Issue Classification	Application/Control No. 12664347	Applicant(s)/Patent Under Reexamination DAHLMAN ET AL.
	Examiner SIMING LIU	Art Unit 2413

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS
370	329

CROSS REFERENCE(S)

CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
370	311	330	332	334	469
455	422.1				

INTERNATIONAL CLASSIFICATION

CLAIMED					NON-CLAIMED
H	0	4	W	4 / 00 (2009.01.01)	

/SIMING LIU/ Examiner.Art Unit 2413 (Assistant Examiner)	11/18/2014 (Date)	Total Claims Allowed: 24
/UN C CHO/ Supervisory Patent Examiner.Art Unit 2413 (Primary Examiner)	11/19/2014 (Date)	O.G. Print Claim(s): 1 — O.G. Print Figure: 5

Issue Classification	Application/Control No. 12664347	Applicant(s)/Patent Under Reexamination DAHLMAN ET AL.
	Examiner SIMING LIU	Art Unit 2413

☐ 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												
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3	3	15	19												
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8	9	21	25												
9	10	22	26												
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10	12	-	28												
11	13	-	29												
-	14	-	30												
12	15	23	31												
13	16	24	32												

/SIMING LIU/ Examiner.Art Unit 2413 (Assistant Examiner)	11/18/2014 (Date)	**Total Claims Allowed:** 24	
/UN C CHO/ Supervisory Patent Examiner.Art Unit 2413 (Primary Examiner)	11/19/2014 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 5

Search Notes	Application/Control No. 12664347	Applicant(s)/Patent Under Reexamination DAHLMAN ET AL.
	Examiner Xavier Szewai Wong	Art Unit 2413

CPC- SEARCHED

Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED

Symbol	Date	Examiner

US CLASSIFICATION SEARCHED

Class	Subclass	Date	Examiner
370	311,328-334,468	11/18/2014	SL
455	422.1	11/18/2014	SL

SEARCH NOTES

Search Notes	Date	Examiner
EAST image, class and keyword search in USPAT, US-PGPUB, DERWENT, EPO, JPO, and IBM_TDB (please see search history)	2011.12.17	/XSW/
Inventor Name and Assignee search in PALM and EAST	2011.12.17	/XSW/
EAST combined subclass, image and text search: 370/311,328-334,468 and 455/422.1	2011.12.17	/XSW/
Updated Searches Above	2012.09.30	/XSW/
Updated Searches Above	2013.08.23	/XSW/
update: ABOVE	11/18/2014	SL

INTERFERENCE SEARCH

US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
see search printout		11/18/2014	SL

/SIMING LIU/ Examiner.Art Unit 2413	

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
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NOTICE OF ALLOWANCE AND FEE(S) DUE

24112 7590 11/25/2014

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

EXAMINER	
LIU, SIMING	
ART UNIT	PAPER NUMBER
2413	

DATE MAILED: 11/25/2014

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/664,347	12/11/2009	Erik Dahlman	4015-6727 / P24241-US2	1464

TITLE OF INVENTION: TRANSMISSION OF SYSTEM INFORMATION ON A DOWNLINK SHARED CHANNEL

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	02/25/2015

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.

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24112 7590 11/25/2014

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.
12/664,347	12/11/2009	Erik Dahlman	4015-6727 / P24241-US2	1464

TITLE OF INVENTION: TRANSMISSION OF SYSTEM INFORMATION ON A DOWNLINK SHARED CHANNEL

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	02/25/2015

EXAMINER	ART UNIT	CLASS-SUBCLASS
LIU, SIMING	2413	370-336000

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. ____________

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.
12/664,347	12/11/2009	Erik Dahlman	4015-6727 / P24241-US2	1464

24112 7590 11/25/2014

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

EXAMINER	
LIU, SIMING	
ART UNIT	**PAPER NUMBER**
2413	

DATE MAILED: 11/25/2014

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. 12/664,347	Applicant(s) DAHLMAN ET AL.	
	Examiner SIMING LIU	Art Unit 2413	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *09/19/2014*.
   ☐ 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 *1-4, 6-10, 12-13, 15-16, 18-26, 31-32*. 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 12/11/2009
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 _____.

/SIMING LIU/ Examiner, Art Unit 2413	/UN C. CHO/ Supervisory Patent Examiner, Art Unit 2413

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

DETAILED ACTION

Allowable Subject Matter

1. Claims 1-4, 6-10, 12-13, 15-16, 18-26, 31-32 are allowed.

2. The following is an examiner's statement of reasons for allowance:

With respect to claim 1, 10, 12, 15, 21, the prior art, either alone or in combination, fails to teach the feature of "transmitting system information on the downlink shared channel in recurring time windows, each time window spanning a plurality of subframes; including an indicator to indicate to receiving user equipment that the subframe carries system information and wherein the indicator is a System information Radio Network Temporary Identifier (SI-RNTI)".

3. 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 SIMING LIU whose telephone number is (571)270-3859. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Un Cho can be reached on (571)272-7919. 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.

/SIMING LIU/
Examiner, Art Unit 2413

/UN C. CHO/
Supervisory Patent Examiner, Art Unit 2413

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**		
	Application Number	
	Filing Date	
	First Named Inventor	Dahlman
	Art Unit	
	Examiner Name	
	Attorney Docket Number	4015-6727

U.S.PATENTS Remove

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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Examiner Initial*	Cite No	Foreign Document Number3	Country Code2 i	Kind Code4	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T5
	1	1799003	EP	A1	2007-06-20	Matsushita Electric Industrial Co., Ltd.		☐
	2	2007/052917	WO	A1	2007-05-10	LG Electronics, Inc.		☐

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /S.L./

Receipt date: 12/11/2009	Application Number	12664347 - GAU: 2413
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**	Filing Date	
	First Named Inventor	Dahlman
	Art Unit	
	Examiner Name	
	Attorney Docket Number	4015-6727

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	3RD GENERATION PARTNERSHIP PROJECT. "System Information Scheduling and Change Notification." 3GPP TSG-RAN2 Meeting #58, Tdoc R2-071912, Kobe, Japan, 7-11 May 2007.	☐
	2	3RD GENERATION PARTNERSHIP PROJECT. "Draft Text Proposal Capturing Agreements on System Information." 3GPP TSG-RAN2 Meeting #58, Tdoc R2-072205, Kobe, Japan, 7-11 May 2007.	☐
	3	3RD GENERATION PARTNERSHIP PROJECT. "Transmission of Dynamic System Information." 3GPP TSG-RAN2 Meeting #58bis, R2-072543, Orlando, FL, US, 25-29 June 2007.	☐
	4	3RD GENERATION PARTNERSHIP PROJECT. "Transmission of Dynamic System Information." 3GPP TSG-RAN2 Ad-hoc Meeting, Tdoc R2-075559, Vienna, Austria, 13-14 December 2007.	☐
	5	3RD GENERATION PARTNERSHIP PROJECT. 3GPP TS 36.300 V8.0.0 (2007-03). 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access network (E-UTAN); Overall description; Stage 2 (Release 8).	☐

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

EXAMINER SIGNATURE

Examiner Signature	/Siming Liu/	Date Considered	11/18/2014

*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. /S.L./

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 11/25/2014
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.
12/664,347	12/11/2009	Erik Dahlman	4015-6727 / P24241-US2	1464

TITLE OF INVENTION: TRANSMISSION OF SYSTEM INFORMATION ON A DOWNLINK SHARED CHANNEL

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	02/25/2015

EXAMINER	ART UNIT	CLASS-SUBCLASS
LIU, SIMING	2413	370-336000

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 and 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, SE

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
- ☐ Applicant asserting small entity status. See 37 CFR 1.27
- ☐ Applicant changing to regular undiscounted fee status.

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.

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.

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 David Bennett Date 2/19/2015

Typed or printed name David E. Bennett Registration No. 32,194

Electronic Patent Application Fee Transmittal

Application Number:	12664347
Filing Date:	11-Dec-2009
Title of Invention:	TRANSMISSION OF SYSTEM INFORMATION ON A DOWNLINK SHARED CHANNEL
First Named Inventor/Applicant Name:	Erik Dahlman
Filer:	David E. Bennett/Donna Donovan
Attorney Docket Number:	4015-6727 / P24241-US2

Filed as Large Entity

Filing Fees for **U.S. National Stage under 35 USC 371**

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:	21536878
Application Number:	12664347
International Application Number:	
Confirmation Number:	1464
Title of Invention:	TRANSMISSION OF SYSTEM INFORMATION ON A DOWNLINK SHARED CHANNEL
First Named Inventor/Applicant Name:	Erik Dahlman
Customer Number:	24112
Filer:	David E. Bennett/Donna Donovan
Filer Authorized By:	David E. Bennett
Attorney Docket Number:	4015-6727 / P24241-US2
Receipt Date:	19-FEB-2015
Filing Date:	11-DEC-2009
Time Stamp:	10:59:25
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	$960
RAM confirmation Number	19301
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)	Issue_Fee_Transmittal.pdf	545648 ffaf8cd100d778a8f06898e2e248822d6ef4be50	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30851 f5cdee2d9ec690656bfac5d28266956afcf04210	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	576499	

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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P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/664,347	03/31/2015	8995357	4015-6727 / P24241-US2	1464

24112 7590 03/11/2015

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 337 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):

Erik Dahlman, Bromma, SWEDEN;
Vera Vukajlovic, Stockholm, SWEDEN;

IR103 (Rev. 10/09)

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 8,995,357 B2

APPLICATION NO. : 12/664,347

ISSUE DATE : March 31, 2015

INVENTOR(S) : Dahlman, 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, Lines 10-11, delete “(E-Utra) and Evolved Universal Terrestrial Radio Access network (E-UTAN);” and insert - - (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); - -, therefor.

In Column 6, Line 23, delete “RNTI1.” and insert - - RNTI1, - -, 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:	12664347
Filing Date:	11-Dec-2009
Title of Invention:	TRANSMISSION OF SYSTEM INFORMATION ON A DOWNLINK SHARED CHANNEL
First Named Inventor/Applicant Name:	Erik Dahlman
Filer:	Roger Scott Burleigh/Amber Rodgers
Attorney Docket Number:	4015-6727 / P24241-US2

Filed as Large Entity

Filing Fees for **U.S. National Stage under 35 USC 371**

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	150	150

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**150**

Electronic Acknowledgement Receipt

EFS ID:	33396507
Application Number:	12664347
International Application Number:	
Confirmation Number:	1464
Title of Invention:	TRANSMISSION OF SYSTEM INFORMATION ON A DOWNLINK SHARED CHANNEL
First Named Inventor/Applicant Name:	Erik Dahlman
Customer Number:	24112
Filer:	Roger Scott Burleigh/Amber Rodgers
Filer Authorized By:	Roger Scott Burleigh
Attorney Docket Number:	4015-6727 / P24241-US2
Receipt Date:	07-AUG-2018
Filing Date:	11-DEC-2009
Time Stamp:	13:51:05
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$150
RAM confirmation Number	080818INTEFSW00000099501379
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	Transmittal Letter	P24241-US2_2018-08-07_CoC_Request_Letter.pdf	143113 2ac03a454b615273bdd4b16112f55938906c881c	no	3
Warnings:					
Information:					
2	Request for Certificate of Correction	P24241-US2_2018-08-07_CoC_PTO-1050.pdf	107647 75037b7e50318de42f9d7813f7a5688e10ce7ffb	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30679 66dc4e2c4ac86cb2ee192f68bf426725fcd4f698	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	281439		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF: U.S. Patent No. 8,995,357

USPTO CONFIRMATION CODE: 1464

APPLICATION NO.: 12/664,347

PCT FILED: April 10, 2008

U.S. FILED: December 11, 2009

EXAMINER: Un C Cho

GROUP ART UNIT: 2413

FOR: TRANSMISSION OF SYSTEM INFORMATION ON A DOWNLINK SHARED CHANNEL

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 12/664,347, now Patent Number 8,995,357.

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 **$150.00** 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, Lines 10-11, delete "(E-Utra) and Evolved Universal Terrestrial Radio Access network (E-UTAN);" and insert - - (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); - -, therefor.
(LIST OF REFERENCES CITED BY APPLICANT AND CONSIDERED BY EXAMINER DATED DECEMBER 20, 2011, SHEET 2 (PAGE 248 OF FW), UNDER "NON-PATENT LITERATURE DOCUMENTS", ENTRY 5, LINES 2-3)

In Column 6, Line 23, delete "RNTI1." and insert - - RNTI1, - -, therefor.
(ORIGINALLY FILED SPECIFICATION DATED DECEMBER 11, 2009, PAGE 7 (PAGE 356 OF FW), LINE 8)

The requested corrections are attached on Form PTO 1050.

Respectfully Submitted

, 2018

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. : 8,995,357 B2
APPLICATION NO. : 12/664347
DATED : March 31, 2015
INVENTOR(S) : Dahlman 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, in Item (56), under "OTHER PUBLICATIONS", in Column 2, Lines 10-11, delete "(E-Utra) and Evolved Universal Terrestrial Radio Access network (E-UTAN);" and insert -- (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); --, therefor.

In the Specification

In Column 6, Line 23, delete "RNTI1." and insert -- RNTI1, --, therefor.

Signed and Sealed this
Twentieth Day of November, 2018

Andrei Iancu

Andrei Iancu
Director of the United States Patent and Trademark Office