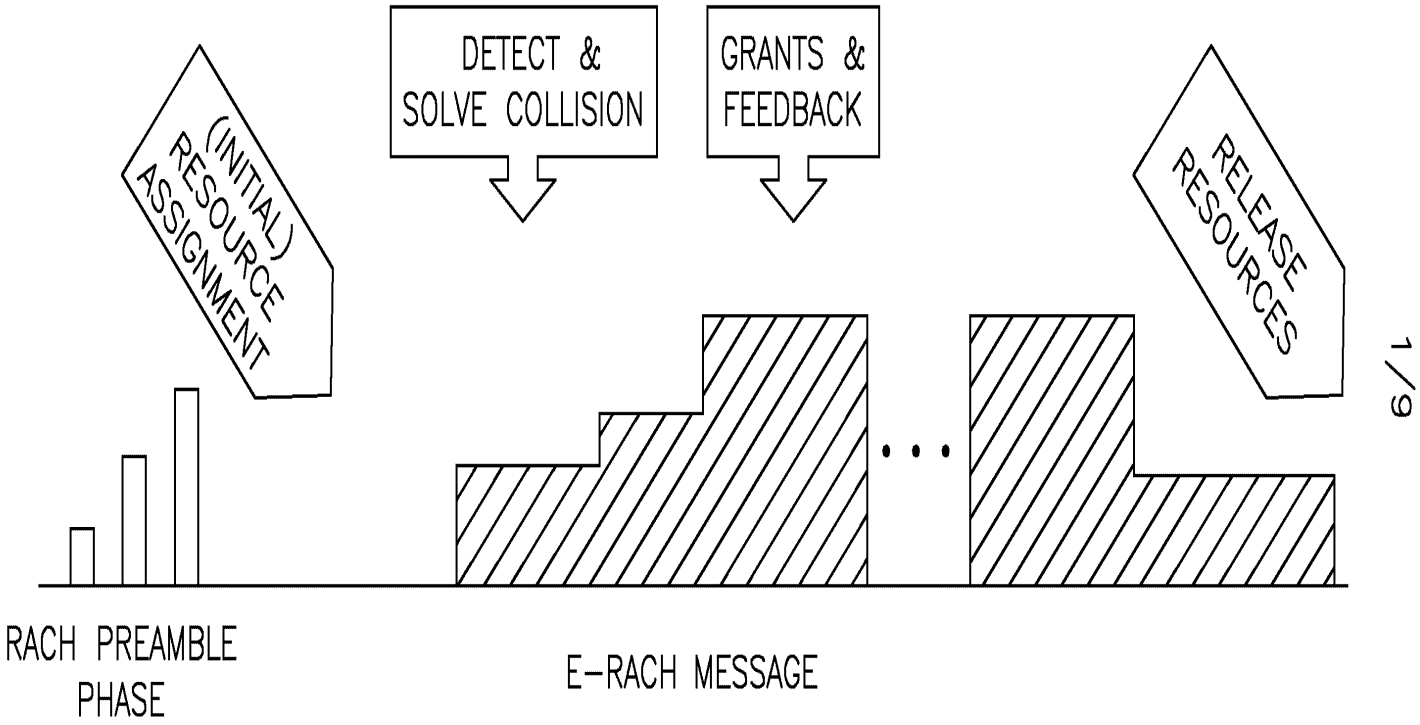


FIG. 1 (PRIOR ART)

LG Elecs. Ex. 1027
LG Elecs. v. Pantech Corp.
IPR2023-01267 Page 1

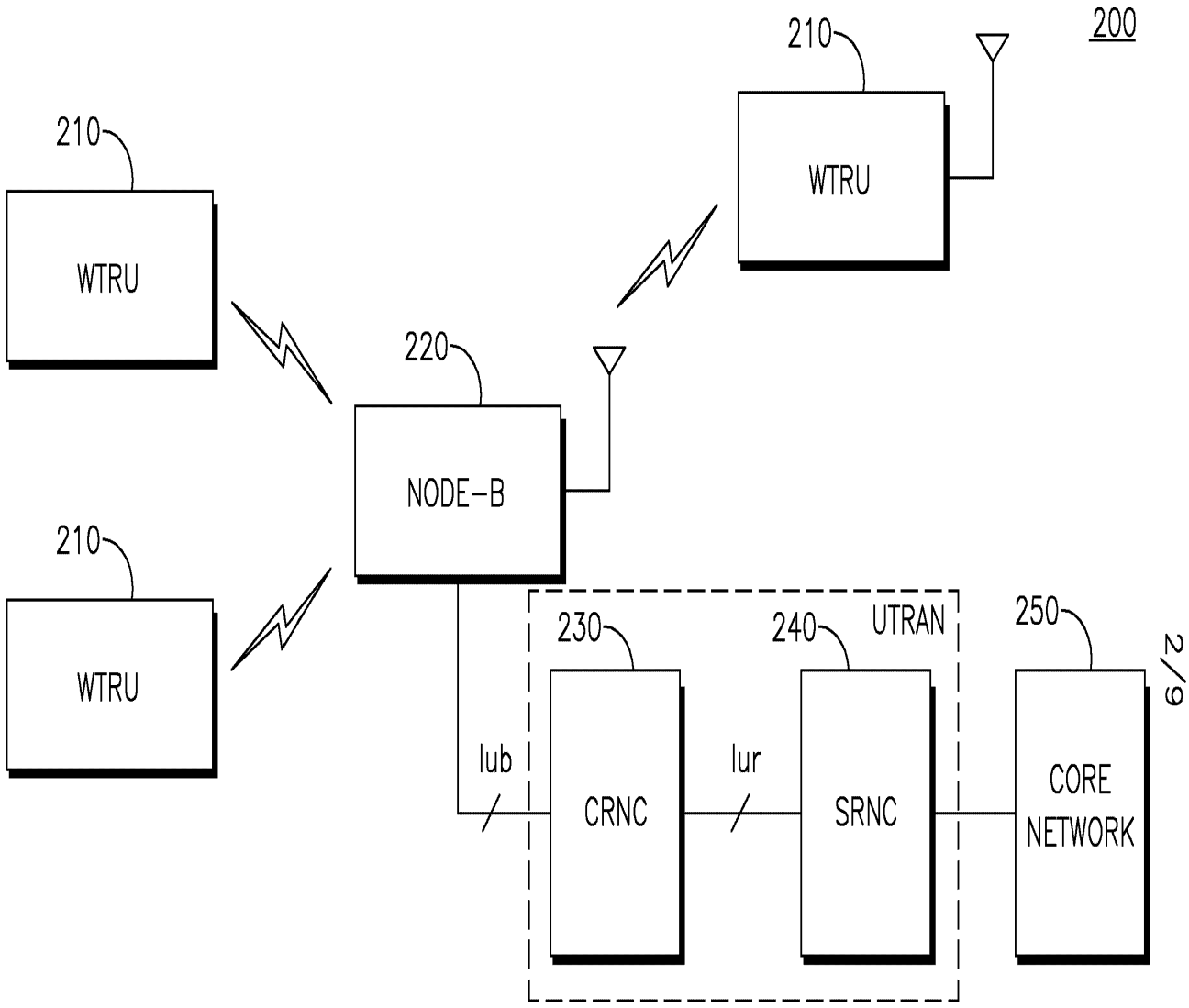

200
210
WTRU
210
WTRU
210
WTRU
220
NODE-B
230
CRNC
240
SRNC
UTRAN
250
CORE NETWORK
Iub
Iur
2/9

FIG. 2

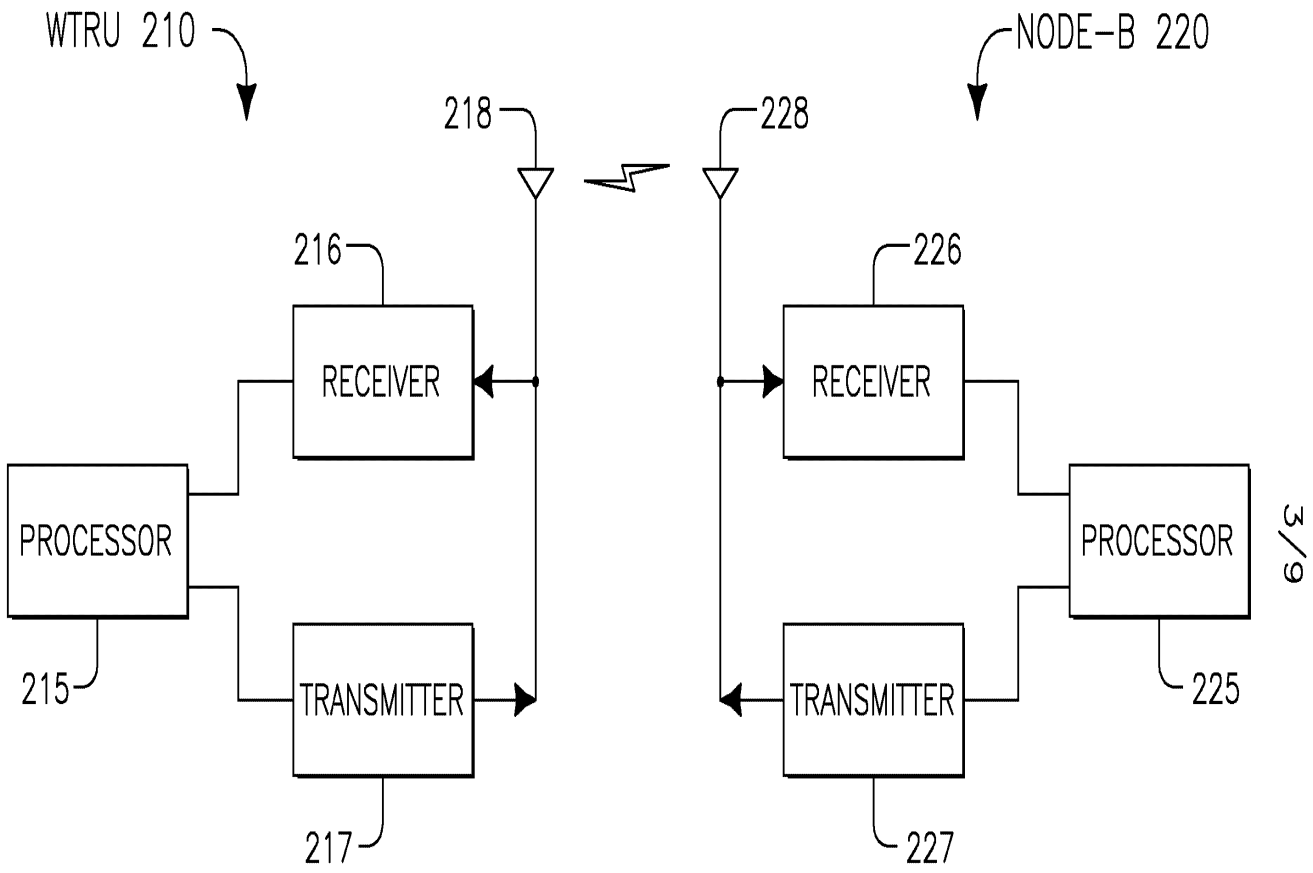

300
WTRU 210
NODE-B 220
218
228
216
226
RECEIVER
RECEIVER
PROCESSOR
PROCESSOR
215
TRANSMITTER
TRANSMITTER
225
217
227

FIG. 3

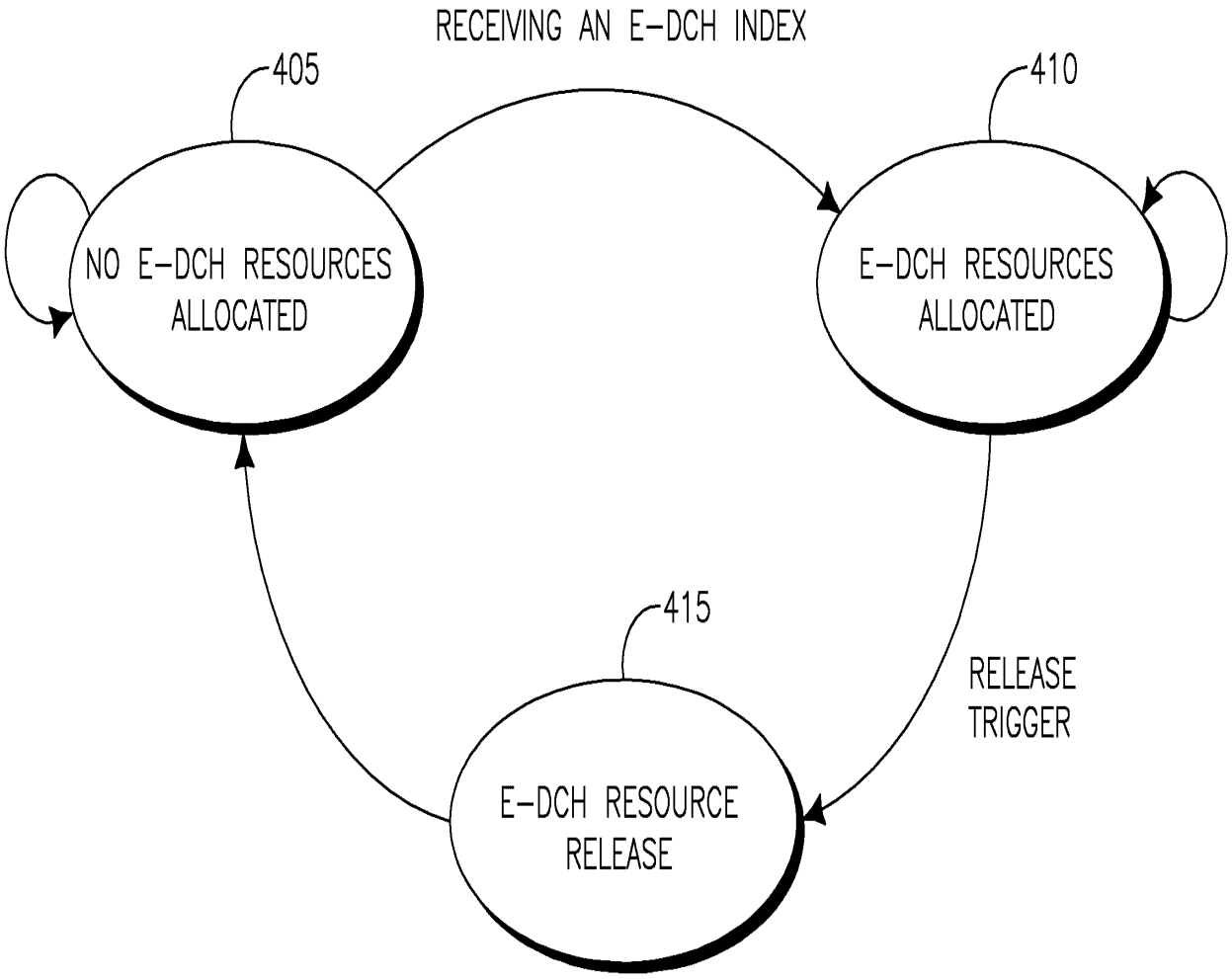

400
RECEIVING AN E-DCH INDEX
405
410
NO E-DCH RESOURCES ALLOCATED
E-DCH RESOURCES ALLOCATED
415
RELEASE TRIGGER
E-DCH RESOURCE RELEASE

FIG. 4

500

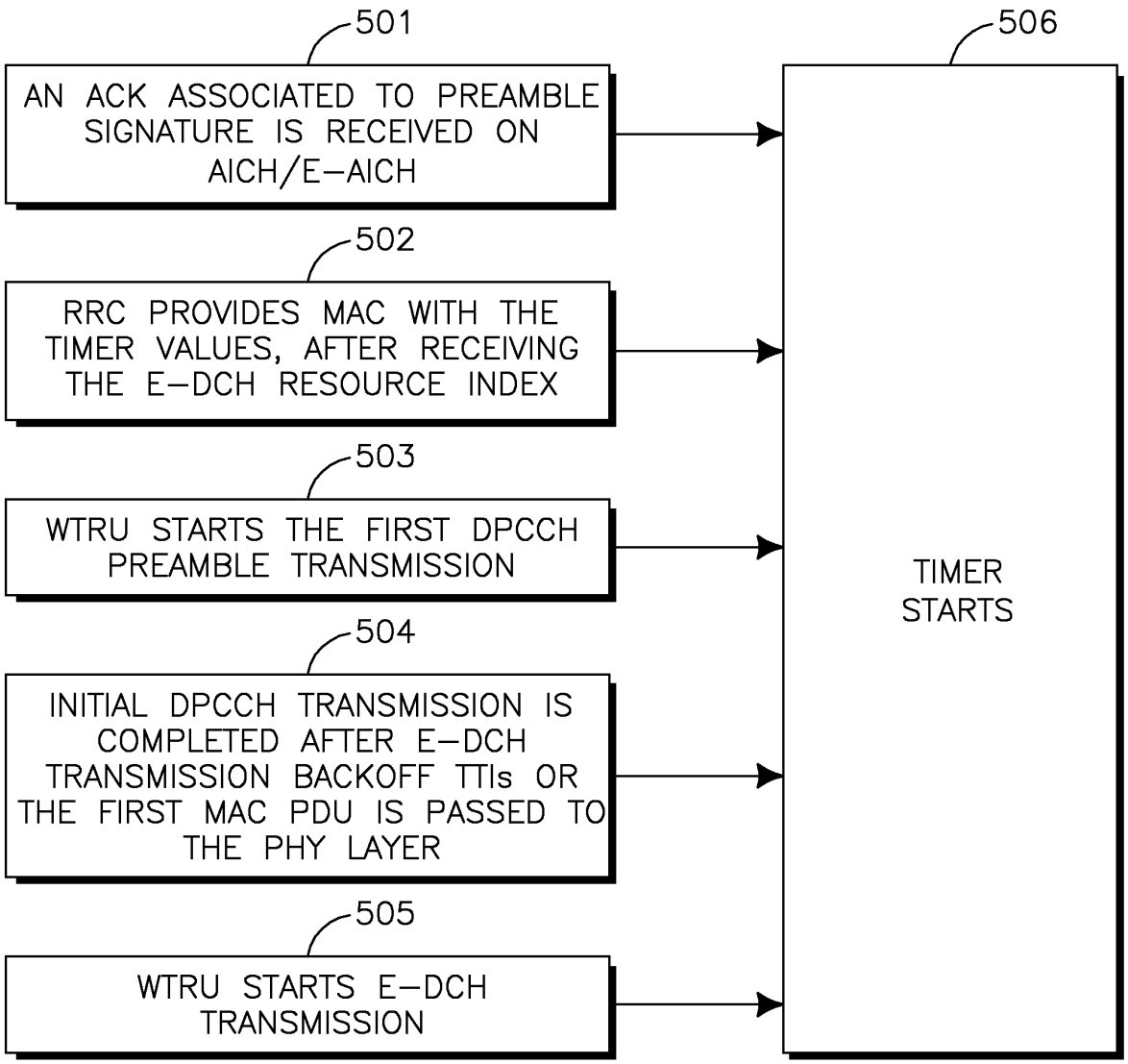

501
AN ACK ASSOCIATED TO PREAMBLE SIGNATURE IS RECEIVED ON AICH/E-AICH
502
RRC PROVIDES MAC WITH THE TIMER VALUES, AFTER RECEIVING THE E-DCH RESOURCE INDEX
503
WTRU STARTS THE FIRST DPCCH PREAMBLE TRANSMISSION
504
INITIAL DPCCH TRANSMISSION IS COMPLETED AFTER E-DCH TRANSMISSION BACKOFF TTIs OR THE FIRST MAC PDU IS PASSED TO THE PHY LAYER
505
WTRU STARTS E-DCH TRANSMISSION
506
TIMER STARTS

FIG. 5

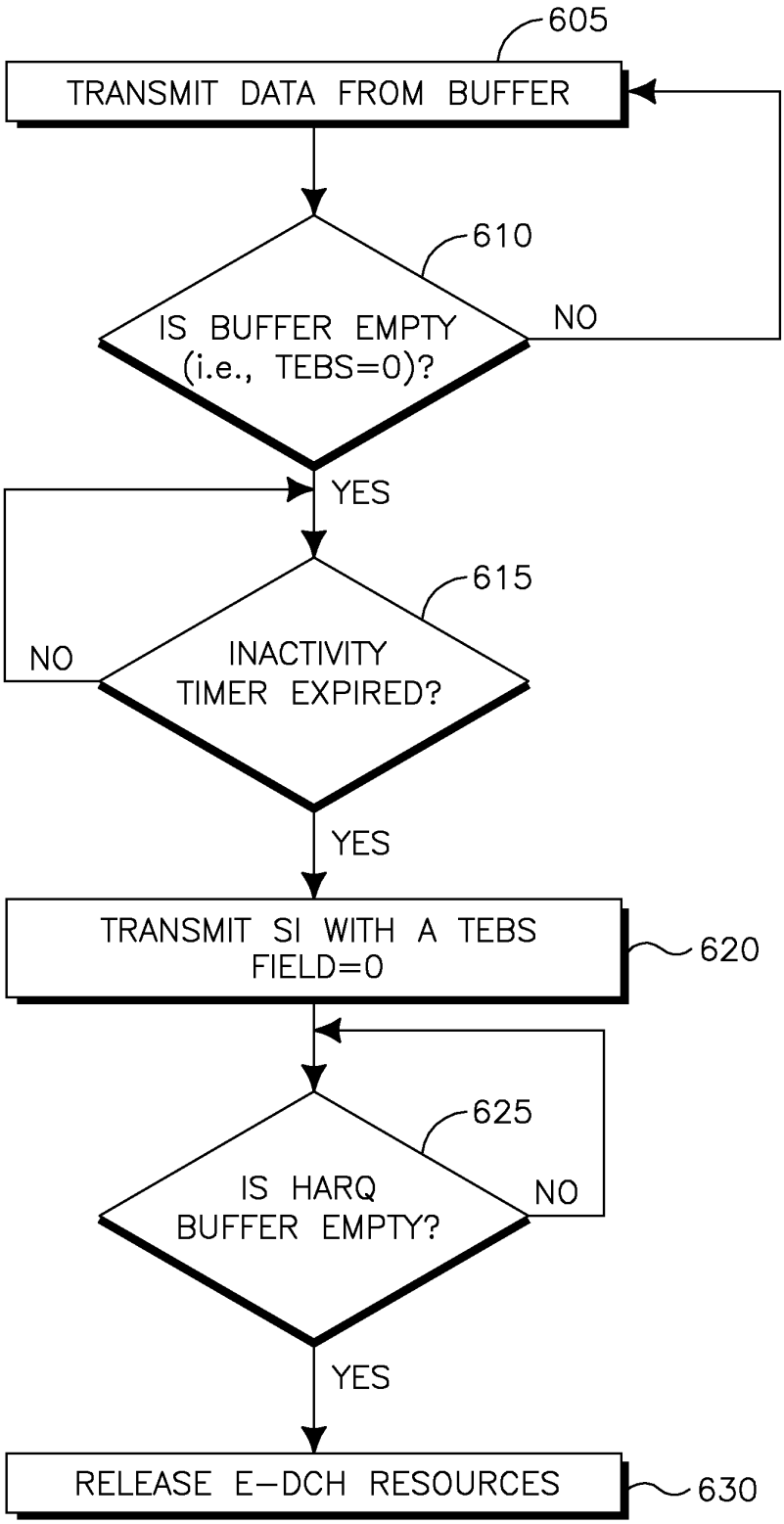

600
605
TRANSMIT DATA FROM BUFFER
610
IS BUFFER EMPTY (i.e., TEBS=0)?
NO
YES
615
INACTIVITY TIMER EXPIRED?
NO
YES
TRANSMIT SI WITH A TEBS FIELD=0
620
625
IS HARQ BUFFER EMPTY?
NO
YES
RELEASE E-DCH RESOURCES
630

FIG. 6

700

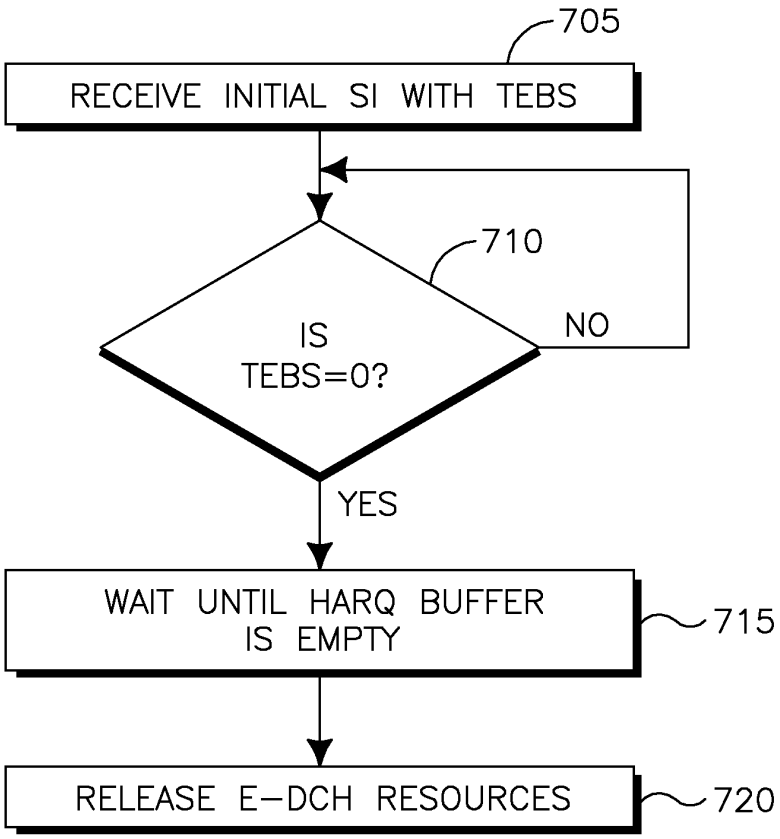

705
RECEIVE INITIAL SI WITH TEBS
710
IS
TEBS=0?
NO
YES
WAIT UNTIL HARQ BUFFER
IS EMPTY
715
RELEASE E-DCH RESOURCES
720

FIG. 7

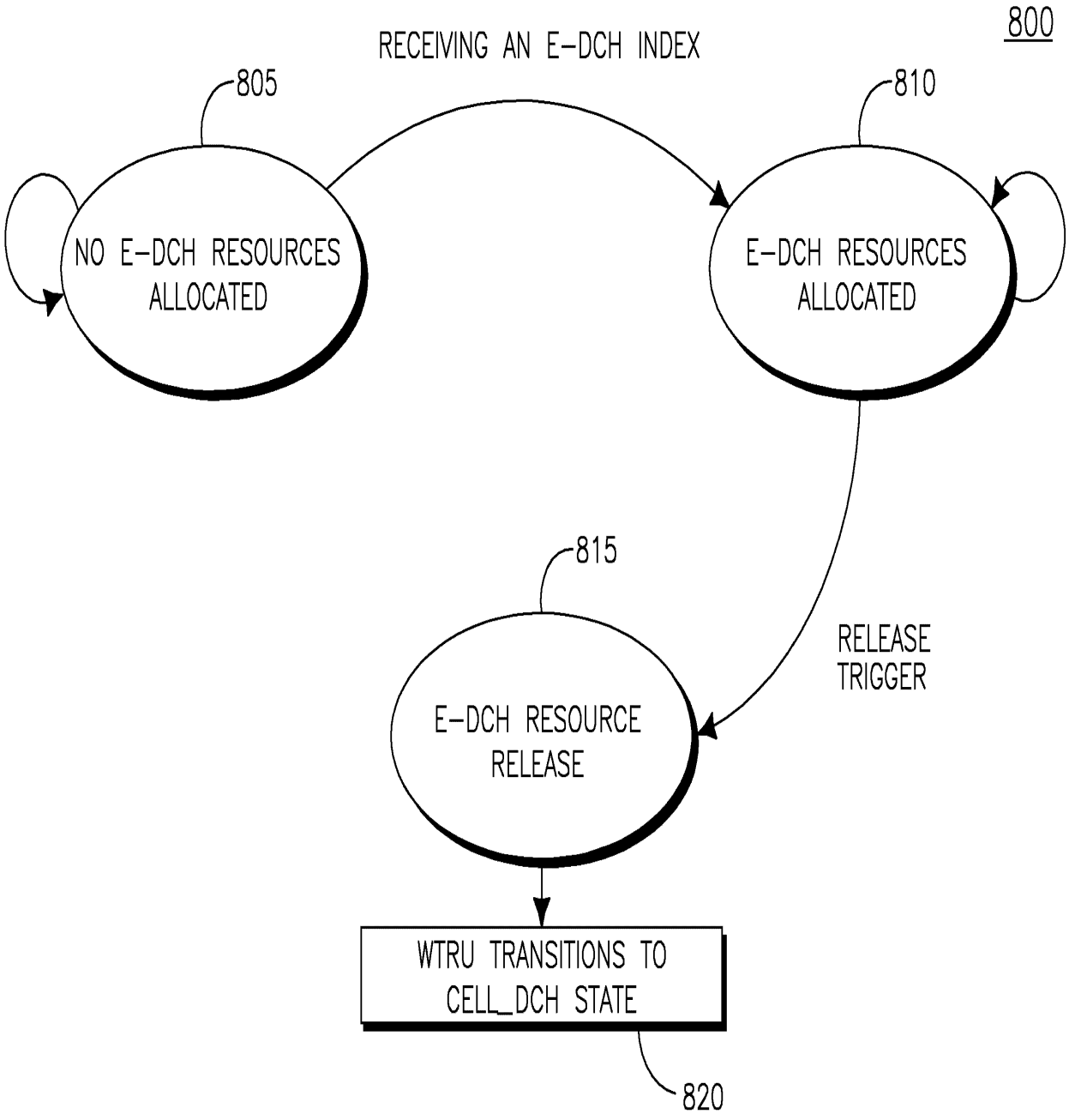

800
RECEIVING AN E-DCH INDEX
805
NO E-DCH RESOURCES ALLOCATED
810
E-DCH RESOURCES ALLOCATED
815
E-DCH RESOURCE RELEASE
RELEASE TRIGGER
WTRU TRANSITIONS TO CELL_DCH STATE
820

FIG. 8

900

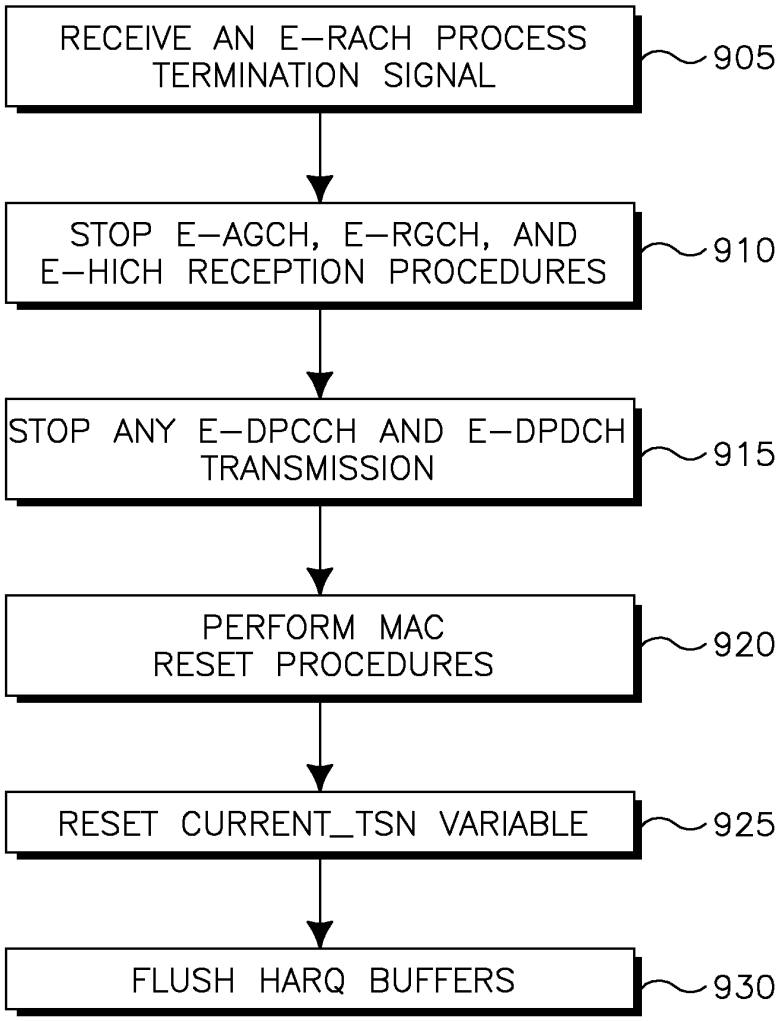

RECEIVE AN E-RACH PROCESS TERMINATION SIGNAL
905
STOP E-AGCH, E-RGCH, AND E-HICH RECEPTION PROCEDURES
910
STOP ANY E-DPCCH AND E-DPDCH TRANSMISSION
915
PERFORM MAC RESET PROCEDURES
920
RESET CURRENT_TSN VARIABLE
925
FLUSH HARQ BUFFERS
930

FIG. 9

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	IPH-2-1853.01.US
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1 Remove

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Benoit		Pelletier	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Roxboro	Country Of Residence[i]	CA
Citizenship under 37 CFR 1.41(b)[i]	CA		

Mailing Address of Applicant:

Address 1	11-13th Street		
Address 2			
City	Roxboro	State/Province	QC
Postal Code	H8Y 1L3	Country[i]	CA

Applicant 2 Remove

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Diana		Pani	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Montreal	Country Of Residence[i]	CA
Citizenship under 37 CFR 1.41(b)[i]	CA		

Mailing Address of Applicant:

Address 1	1950 Lincoln Avenue		
Address 2	Apartment 1812		
City	Montreal	State/Province	QC
Postal Code	H3H 2N8	Country[i]	CA

Applicant 3 Remove

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

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	Rocco		DiGirolamo	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Laval	Country Of Residence[i]	CA

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	Application Number	
Title of Invention	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL	

Citizenship under 37 CFR 1.41(b) i	CA			
Mailing Address of Applicant:				
Address 1	632 de Fribourg Street			
Address 2				
City	Laval	**State/Province**	QC	
Postal Code	H7K 3Y3	**Country**i	CA	

Applicant 4 Remove

Applicant Authority ◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118	
Prefix	**Given Name**	**Middle Name**	**Family Name**	**Suffix**
	Christopher	R.	Cave	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Verdun	**Country Of Residence**i	CA
Citizenship under 37 CFR 1.41(b) i	CA		

Mailing Address of Applicant:

Address 1	201 Chemin du Golf		
Address 2	Apartment 304		
City	Verdun	**State/Province**	QC
Postal Code	H3E 1Z4	**Country**i	CA

Applicant 5 Remove

Applicant Authority ◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118	
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	Vincent		Roy	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Montreal	**Country Of Residence**i	CA
Citizenship under 37 CFR 1.41(b) i	CA		

Mailing Address of Applicant:

Address 1	6254 De La Roche		
Address 2			
City	Montreal	**State/Province**	QC
Postal Code	H2S 2E1	**Country**i	CA

Applicant 6 Remove

Applicant Authority ◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118	
Prefix	**Given Name**	**Middle Name**	**Family Name**	**Suffix**
	Paul		Marinier	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Brossard	**Country Of Residence**i	CA
Citizenship under 37 CFR 1.41(b) i	CA		

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	IPH-2-1853.01.US
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL	

Mailing Address of Applicant:			
Address 1	1805 Stravinski		
Address 2			
City	Brossard	**State/Province**	QC
Postal Code	J4X 2J7	**Country**[i]	CA

Applicant 7 Remove

Applicant Authority (•) Inventor ( ) Legal Representative under 35 U.S.C. 117 ( ) Party of Interest under 35 U.S.C. 118

Prefix	**Given Name**	**Middle Name**	**Family Name**	**Suffix**
	Eldad	M.	Zeira	

Residence Information (Select One) ( ) US Residency (•) Non US Residency ( ) Active US Military Service

City	Huntington	**Country Of Residence**[i]	CA
Citizenship under 37 CFR 1.41(b) [i]	CA		

Mailing Address of Applicant:			
Address 1	106 East Neck		
Address 2			
City	Huntington	**State/Province**	NY
Postal Code	11743	**Country**[i]	US

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

Correspondence Information:

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For further information see 37 CFR 1.33(a).

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

Customer Number	24374		
Email Address	AMehta@volpe-koenig.com	Add Email	Remove Email

Application Information:

Title of the Invention	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL		
Attorney Docket Number	IPH-2-1853.01.US	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		**Sub Class (if any)**	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	9	**Suggested Figure for Publication (if any)**	6

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	IPH-2-1853.01.US
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL	

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S. C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

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Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	24374		

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This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	60975985	2007-09-28
Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	60982528	2007-10-25
Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61018999	2008-01-04
Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61025441	2008-02-01
Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61038576	2008-03-21
Prior Application Status	Pending		Remove

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	IPH-2-1853.01.US
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL	

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61074288	2008-06-20
Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61083409	2008-07-24
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.		Add	

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Remove

Application Number	Country [i]	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			○ Yes ◉ No

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Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Assignee 1 Remove

If the Assignee is an Organization check here. ☒

Organization Name	INTERDIGITAL PATENT HOLDINGS, INC.		
Mailing Address Information:			
Address 1	3411 Silverside Road, Concord Plaza		
Address 2	Suite 105, Hagley Building		
City	Wilmington	**State/Province**	DE
Country [i] US		Postal Code	19810
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the **Add** button. Add

Signature:

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

Signature	/Aneesh A. Mehta/			Date (YYYY-MM-DD)	2008-09-26
First Name	Aneesh A.	Last Name	Mehta	Registration Number	61937

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	IPH-2-1853.01.US
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The information provided by you in this form will be subject to the following routine uses:

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

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

[0001] METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL

[0002] CROSS REFERENCE TO RELATED APPLICATIONS

[0003] This application claims the benefit of U.S. Provisional Applications No. 60/975,985 filed on September 28, 2007; U.S. Provisional Applications No. 60/982,528 filed on October 25, 2007; U.S. Provisional Applications No. 61/018,999, filed on January 4, 2008; U.S. Provisional Applications No. 61/025,441 filed on February 1, 2008; U.S. Provisional Applications No. 61/038,576 filed on March 21, 2008; U.S. Provisional Applications No. 61/074,288 filed on June 20, 2008; and U.S. Provisional Application No. 61/083,409 filed on July 24, 2008, which is incorporated by reference as if fully set forth.

[0004] FIELD OF INVENTION

[0005] The present application is related to wireless communication.

[0006] BACKGROUND

[0007] In wireless communications systems, access to radio resources is controlled by a radio network. When a wireless transmit receive unit (WTRU) has data to transmit to the network, the WTRU requires access to the radio resources before transmitting its data payload. In a Third Generation Partnership Project (3GPP) network, the WTRU may transmit on the uplink using a contentious channel known as a random access channel (RACH). Because access to the RACH is contentious, a collision might occur when multiple WTRUs are accessing the resources simultaneously.

[0008] The current RACH access procedure in the 3GPP comprises a preamble phase with power ramp-up, followed by channel acquisition information and message transmission for random access. Because the RACH is a shared channel, in order to avoid WTRUs holding the shared radio resource for a long time, only relatively short message payloads are transmitted on the RACH; this leads to a relatively small data rate. The RACH is thus used for the transmission of short control messages. Typically,

the WTRUs demanding larger data rates may be configured by the network to use dedicated resources.

[0009] The data rate provided by the RACH is sufficient for the transmission of short control messages supporting mostly speech communications, however it may be inefficient for transmission of data messages associated to the new non real-time data services such as internet browsing, e-mail, etc. For such data services, the traffic is ruptured by nature and long periods of inactivity may exist between successive transmissions. For example, applications requiring frequent transmission of keep-alive messages, may result in an inefficient utilization of dedicated resources. In such cases, it may be advantageous for the network to use shared resources for data transmission instead. The difficulty however, resides in the low data rate offered by the RACH.

[0010] To overcome these difficulties, it was proposed to use the enhanced dedicated channel (E-DCH) in the CELL_FACH state to increase the data rate of the shared channel.

[0011] Figure 1 is a diagram of an enhanced RACH (E-RACH) access. The E-RACH procedure may include, a RACH preamble phase and an E-RACH message phase. During the initial RACH preamble phase, a WTRU transmits a RACH preamble, it continues transmitting the preamble while ramping up the power of the transmission until it receives an initial resource assignment. The WTRU may also perform collision detection and resolution, if other WTRUs are attempting to access the RACH during this time. Once the WTRU has received permission to access the RACH, the WTRU may transmit data until the resources are released or the WTRU transitions to another state.

[0012] As mentioned above, it was proposed to use the E-DCH in a CELL_FACH state to increase the data rate of the shared channel. However, in the current standard, there are no methods to terminate the E-RACH message phase. Accordingly, it would be beneficial to provide a method and apparatus to terminate an E-RACH message phase in an E-RACH.

[0013] SUMMARY

[0014] A method and an apparatus is provided for terminating an E-RACH message in an E-RACH transmission. Triggers for terminating the E-RACH message are also provided. The actions upon termination of the E-RACH messages or transition to CELL_DCH state are provided in order to release the shared E-DCH resources while in the CELL_FACH state.

[0015] A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission determining that a buffer is empty; triggering a transmission of a scheduling information (SI) with the value of total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero; determining last hybrid automatic repeat request (HARQ) data transmission; and releasing the E-DCH resources allocation is provided.

[0016] A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission where the network waits until a HARQ buffer is empty and when the SI with a value of zero is received, the resources are released.

[0017] BRIEF DESCRIPTION OF THE DRAWINGS

[0018] A more detailed understanding may be had from the following description, given by way of example and to be understood in conjunction with the accompanying drawings wherein:

[0019] Figure 1 is a diagram of an E-RACH access with an E-DCH;

[0020] Figure 2 shows a wireless communication system;

[0021] Figure 3 is a functional block diagram of a WTRU and the base station of the wireless communication system shown in Figure 2;

[0022] Figure 4 is a flow diagram of a E-DCH resource allocation and de-allocation;

[0023] Figure 5 is a diagram of triggers for starting the timer that the WTRU may initiate for the timers;

[0024] Figure 6 is a flow diagram of a method to release E-DCH resources based on the status of a WTRU's queue or buffer;

[0025] Figure 7 is a flow diagram of a network configured to determine termination of an E-RACH message transmission;

[0026] Figure 8 is a flow diagram of E-DCH resources release when the WTRU transitions from the CELL_FACH state to the CELL_DCH state; and

[0027] Figure 9 is a flow diagram for releasing the E-DCH resources while in the CELL_FACH state.

[0028] DETAILED DESCRIPTION

[0029] When referred to hereafter, the terminology "wireless transmit/receive unit (WTRU)" includes but is not limited to a user equipment (UE), a mobile station, a fixed or mobile subscriber unit, a pager, a cellular telephone, a personal digital assistant (PDA), a computer, or any other type of user device capable of operating in a wireless environment. When referred to hereafter, the terminology "base station" includes but is not limited to a Node-B, a site controller, an access point (AP), or any other type of interfacing device capable of operating in a wireless environment.

[0030] When referred to herein, the term RACH and E-RACH may be used to describe a resource that is selected by a WTRU for uplink contention based access. The term E-RACH resource may also indicate any combination of a scrambling code, a channelization code, a timeslot, an access opportunity, or a signature sequence that are associated to an E-RACH channel in a future system architecture. The term E-RACH may also indicate the use of the E-DCH in CELL_FACH, CELL_PCH, URA_PCH states or Idle mode.

[0031] When referred to hereafter, the term enhanced medium access control (MAC)-e/es entities may refer to the MAC entities used to perform E-DCH transmission in the CELL_FACH state, which in release 8 is referred to as MAC-i/is. MAC-e/es and MAC-i/is are the MAC entities that handle the transport channel such as the enhanced dedicated transport channel (E-DCH).

[0032] Figure 2 shows a wireless communication system 200 including a plurality of WTRUs 210, a base station 220, a CRNC 230, an SRNC 240, and a core network 250. As shown in Figure 2, the WTRUs 210 are in communication with the base station 220, which is in communication with the CRNC 230 and the SRNC 240. Although three WTRUs 210, one base station 220, one CRNC 230, and one SRNC 240 are shown in Figure 3, it should be noted that any combination of wireless and wired devices may be included in the wireless communication system 200.

[0033] Figure 3 is a functional block diagram 300 of a WTRU 210 and the base station 220 of the wireless communication system 200 of Figure 2. As shown in Figure 3, the WTRU 210 is in communication with the base station 220 and both are configured to perform a method to terminate transmission of a message in an E-RACH.

[0034] In addition to the components that may be found in a typical WTRU, the WTRU 210 includes a processor 215, a receiver 216, a transmitter 217, and an antenna 218. The processor 215 is configured to perform a method to terminate transmission of a message in an E-RACH. The receiver 216 and the transmitter 217 are in communication with the processor 215. The antenna 218 is in communication with both the receiver 216 and the transmitter 217 to facilitate the transmission and reception of wireless data.

[0035] In addition to the components that may be found in a typical base station, the base station 220 includes a processor 225, a receiver 226, a transmitter 227, and an antenna 228. The processor 225 is configured to perform a method to terminate transmission of a message in an E-RACH. The receiver 226 and the transmitter 227 are in communication with the processor 225. The antenna 228 is in communication with both the receiver 226 and the transmitter 227 to facilitate the transmission and reception of wireless data.

[0036] Figure 4 is a flow diagram of E-DCH resource allocation and de-allocation 400 using triggering for a WTRU. The first state corresponds to a WTRU 210 that operates with no E-DCH resources allocated to it 405. Once uplink (UL) data has to be transmitted, the WTRU 210 requests E-DCH resources from the network, by

transmitting a preamble and waiting for the response on the acquisition indication channel (AICH). In other words, the WTRU 210 may remain in this state until it receives a positive acknowledgement (ACK) on the AICH, or a negative acknowledgement (NACK) on the AICH followed by a resource assignment index over the E-AICH, which may also be referred to as the WTRU 210 receiving an E-DCH index. After receiving the E-DCH resource assignment, the WTRU may transition to the next state wherein E-DCH resources are allocated for enhanced uplink transmissions 410. The WTRU 210 may use these E-DCH resources for UL transmission until it receives a trigger, at which point the WTRU 210 will release the resources 415. After the WTRU 210 releases the resources, it returns to the initial state. As will be described in further detail hereafter, the trigger may be timer based, it may be based on the WTRU buffer status, or may be based on signaling from the RNC or the Node-B 220.

[0037] In one embodiment, the WTRU 210 may be configured to include a timer module. The timer module may include multiple timers, wherein a timer may be associated to each logical channel or each MAC-d flow. The timer module may be configured to indicate the maximum allowable transmission time for a logical channel (i.e., dedicated control channel (DCCH), dedicated traffic channel (DTCH), common control channel (CCCH), etc.). The values for the timer module may be preconfigured or signaled to the WTRU 210. The timers may be activated upon the WTRU's 210 first transmission, once an E-DCH resource index is received. The WTRU may be configured to release an E-DCH resource upon expiry of its associated timer. For example, the WTRU 210 may be configured to release a common E-DCH resource when the maximum common E-DCH resource allocation time for the CCCH has been reached. This embodiment would allow the flexibility to configure a smaller transmission time duration for a logical channel such as the CCCH.

[0038] The timer module may also be configured based on logical channel identity and the absence of an E-DCH radio network temporary identifier (E-RNTI). More specifically, a maximum E-DCH allocation time may be allocated to the CCCH

transmission when an E-RNTI is not present. If the timer expires, and the WTRU 210 that is performing a CCCH transmission does not have the E-RNTI present, the E-RACH access is terminated and the resources are released. If a CCCH transmission is occurring and an E-RNTI is present, (which may occur during period cell update procedure) then the WTRU 210 is not configured to have a maximum E-DCH allocation time and the timer will not affect the WTRU 210.

[0039] Alternatively, the network may configure the transmission duration timer based on the presence or absence of an E-RNTI. The WTRU 210 may be configured to have a maximum E-DCH allocation time if it has data (user plane or control plane) to transmit and no E-RNTI is present. Otherwise if an E-RNTI is present the WTRU 210 is not configured with a maximum E-DCH allocation time.

[0040] Figure 5 shows a diagram of triggers for starting the timer that the WTRU 210 may initiate for the timers T_1 and T_2 500. The timers such as collision resolution T_1 and CCCH timer T_2 are started according to one of the triggers 501 to 505. This embodiment may include any combination of at least one of the shown trigger 501-505 for starting the timer 506. The timer may start if an ACK associated to the preamble signature transmitted is received on the AICH or E-AICH 501. The timer may start as soon as the radio resource control (RRC) provides the MAC with the timer values, and after receiving the E-DCH resource index 502. The timer may start if the WTRU 210 starts the first dedicated physical control channel (DPCCH) preamble transmission 503. The timer may start when the initial DPCCH transmission is completed after E-DCH transmission backoff transmission time intervals (TTIs) or the first MAC protocol data unit (PDU) is passed to the physical layer 504. Or, the timer may start when the WTRU 210 starts the E-DCH transmission 505. In addition, the WTRU 210 may initiate the timer when the collision resolution E-DCH absolute grant channel (E-AGCH) carrying the WTRU 210 E-RNTI is received. Other triggers may also be used as designed.

[0041] Alternatively, the WTRU 210 timer module may be configured such that the length of time available to the WTRU 210 is based on the number of data bits that

need to be transmitted. The length of the time variable to the WTRU 210 may also be based on the number of radio link controller (RLC) or MAC PDUs. Additionally, it may also be based on the number of RLC service data units (SDUs).

[0042] Alternatively, the E-RACH message duration may be fixed at either 10 msec or 20 msec (as is specified in the current 3GPP standards). As a result, the E-RACH message phase may be active for a maximum number of frames or sub-frames. An E-RACH message duration information element (IE) may be broadcast as part of the system information broadcast (SIB), or may be included as part of L1 signaling. For example, the E-RACH message duration IE may be transmitted with the initial resource assignment or during the collision resolution phase. In addition, the E-RACH message duration may be linked to an access service class.

[0043] Alternatively, the WTRU 210 may count the number of transmissions and retransmissions and use the count as a trigger to stop the transmission of the E-RACH message phase. For example, if the WTRU 210 is configured for repeat automatic repeat request (ARQ) type of operation and transmission on consecutive TTIs, then the WTRU may be configured to terminate the transmission of the E-RACH message phase after K retransmissions. It is noted that the value of K may be preconfigured in the WTRU, broadcasted as part of the SIB, or signaled during the E-RACH allocation phase.

[0044] Figure 6 is a flow diagram of a method to release E-DCH resources based on the status of a WTRU's 210 queue or buffer. When the WTRU 210 has data in the transmit buffer, the WTRU 210 may transmit the data 605. After a transmission, the WTRUs 210 may check if the transmit buffer is empty 610. If the transmit buffer is not empty, then the WTRU 210 will transmit the data that is in the buffer 605. If the transmit buffer is empty 610 (i.e., the Total E-DCH Buffer Status (TEBS) is equal to zero), optionally it is checked if an inactivity timer has expired 615. If the inactivity timer has expired, then the WTRU 210 may be configured to transmit a special or reserved value of the SI where TEBS is set to zero 620. The WTRU 210 may be configured to release E-DCH resource 630 after the inactivity timer has expired 615,

wherein the inactivity timer is started once the TEBS is equal to zero. The WTRU 210 is considered to be inactive, if no UL or downlink (DL) traffic has been received. Alternatively, the implicit release timers (i.e., the inactivity timer) may be restarted based on a trigger mechanism when the WTRU 210 decodes its H-RNTI on the high speed shared control channel (HS-SCCH). Once the inactivity timer has expired, the WTRU 210 may be configured to transmit a special or reserved value of the SI 620. For example, the special or reserved value of the SI may comprise a TEBS with a value set to zero 620. The SI with the TEBS set to zero may be used to signal to the network for releasing the resources. After successfully transmitting the SI and emptying the HARQ buffers 625, the WTRU 210 releases the E-DCH resources 630.

[0045] Alternatively, the WTRU 210 may transmit a signal to the network indicating to release the resources. The signal may comprise a special combination of the SI and a Happy Bit, a new MAC signaling, where a special combination of MAC header fields may be re-interpreted. Alternatively, a field may be added in the enhanced MAC-e header or MAC-e trailer denoting a request to terminate transmission of the E-RACH message phase. For example, the WTRU 210 may transmit this signal to the network via a reserved data description indicator (DDI) combination. In another alternative, the signal may be a new RRC message; special value of the enhanced transport format combination index (E-TFCI) field in the E-DPCCH or a special combination of the E-DPCCH fields; or, a new L1 message. The final decision to release the resources may be determined by the network; which may indicate the release of resources back to the WTRU 210. Alternatively, the WTRU 210 may simply stop transmission of the E-DCH as a means to indicate the termination of the E-RACH message phase, at which point the network may release the radio resources.

[0046] Alternatively, the timer module may be configured to start when the WTRU 210 has transmitted all PDUs which were present when the E-RACH was initiated, or the buffer has passed a predetermined threshold level. The threshold level may be an absolute value or based on a relative measure using the initial queue size.

[0047] Releasing the resources upon the transmission of all PDUs in the buffer that pass a predetermined threshold level, may free up the E-RACH resources for other WTRUs 210. For example, the threshold levels may be set to allow the network to tradeoff fairness between WTRUs 210 and transmission delay. These levels may be configured through system information or they may be preconfigured in the WTRU 210.

[0048] In addition, there may be procedures for physical layer that may trigger a termination of the E-RACH message transmission. This includes cell reselection and measurements controlled by the FACH measurement occasions or detection of radio link (RL) failure.

[0049] Alternatively, the WTRU 210 may suspend all transmission during the measurement occasion. Also, the scheduler at the Node-B 220 may be aware of the measurement occasion and may also suspend any grant, ACK, or NACK downlink transmission. Upon resuming normal operation, the network may optionally transmit an initial grant so that the power control loop may be re-established. Or, the network may wait for an indication from the WTRU 210 using a preamble power ramp or similar procedure. Optionally, the WTRU 210 may indicate the reason for termination in the termination signal or the termination message. Reasons for E-RACH termination may include a RL failure and E-RACH transmission complete.

[0050] Figure 7 shows a flow diagram of a network configured to determine termination of an E-RACH message transmission 700. The termination of the E-RACH message phase may be established by the network based on the reception of the amount of data indicated in an initial SI 705 by the Universal Mobile Telecommunications System (UMTS) Terrestrial Radio Access Network (UTRAN). Alternatively, it may be established based on the UTRAN receiving the amount of data indicated in subsequent SIs or indicated using a different mechanism. The UTRAN may use the values of SI to determine when to terminate the message transmission. More specifically, an SI with TEBS set to zero 710 signals to the network that the WTRU 210 is releasing the resources once the transmission of data in the HARQ

buffers is completed. The UTRAN releases E-DCH resources 720 after SI with TEBS set to zero is received and there is no more HARQ transmission 715.

[0051] Alternatively, the UTRAN may simply turn off transmission of the associated F-DPCH and explicit additional signaling is not used. This approach may be used in the case where both the WTRU 210 and the network are aware that the transmission is to be terminated.

[0052] Alternatively, SI may be transmitted every time the buffer occupancy changes. Alternatively, an SI may be transmitted every time the buffer occupancy changes by a pre-defined or signaled amount (i.e., additional data is received in the buffer), even if the new data is not from higher priority logical channels. If the TEBS is equal to zero then the SI triggering mechanism may be modified to allow the SI to be transmitted. The SI with TEBS set to zero signals to the network that the WTRU is releasing the resources once the transmission of data in the HARQ buffers is completed and the UTRAN also releases the E-DCH resources. Alternatively, an SI may be transmitted in every HARQ transmission when the WTRU 210 is in CELL_FACH state or occupying E-RACH resources.

[0053] In another termination option, the UTRAN may explicitly signal the end of the E-RACH transmission. Once the UTRAN determines the end of the E-RACH message transmission, it signals to the WTRU 210 by transmitting a special value over the E-AGCH (e.g., a 0 grant). Or, the UTRAN signals to the WTRU 210 by transmitting an RRC message over the FACH or over the High Speed Downlink Shared channel (HS-DSCH) if the WTRU 210 is configured for HS-DSCH in CELL_FACH state. Alternatively, the network signals to the WTRU 210 by using L1 signaling. This may include stopping the fractional dedicated physical channel (F-DPCH) or transmitting a flag or combination of pre-determined fields on the HS-SCCH if the WTRU 210 is configured for HS-DSCH in CELL_FACH state, for example, using an HS-SCCH order.

[0054] Alternatively, the termination of the E-RACH message may be established based on a lack of activity on the enhanced dedicated physical data channel (E-DPDCH) or enhanced DPCCH (E-DPCCH) transmission.

[0055] The termination of the E-RACH part may also be established based on the status of the WTRU 210 scheduling requests. As an example, the UTRAN may monitor the received SI or Happy Bit status. If this information indicates low usage, the network may decide to terminate the current transmission of the E-RACH message so that the other WTRUs 210 may have an opportunity to access the resources. Alternatively, if this information indicates high usage and continued need with the Happy Bit set to unhappy, then the UTRAN may decide to transition the WTRU 210 to CELL_DCH state. As another alternative, the UTRAN may use the traffic volume measurement report (such as uplink RRC measurement report) to determine that the WTRU 210 does not have any further data or a small amount of data to transmit.

[0056] Alternatively, the UTRAN may implicitly signal the WTRU 210 to release the E-RACH resource by not transmitting predefined physical channels or signals for a predetermined amount of time. In other words, the WTRU 210 releases the E-RACH resources if it does not receive any transmission from the UTRAN on either channel E-AGCH destined to the WTRU 210, E-RGCH associated with E-RACH resource that is used by the WTRU 210, F-DPCH associated with the E-RACH resource that is used by the WTRU 210, and/or, HS-SCCH or high speed physical downlink shared channel (HS-PDSCH) that is destined to the WTRU 210.

[0057] Optionally, the UTRAN may indicate the reason for termination in the termination signal or termination message. Reasons for E-RACH termination may include, but are not limited to an RL failure, completion of the E-RACH transmission, and network congestion.

[0058] Figure 8 is a flow diagram of the E-DCH resources released when the WTRU 210 transitions from the CELL_FACH state to the CELL_DCH state. The WTRU 210 operates without any E-DCH resources allocated 805. Upon receiving an E-DCH resource assignment on the AICH or E-AICH or a NACK on the AICH followed by a resource assignment index over the E-AICH, which may also be referred to as the WTRU 210 receiving an E-DCH index, the WTRU 210 may access the E-DCH resources allocated to it in the CELL_FACH state 810. The WTRU 210 retains control of the E-

DCH resources until it receives a reconfiguration message, (e.g., via the FACH or the HS-DSCH), indicating that a switch to the CELL_DCH state may be performed. The E-DCH resources are then released 815. And, the WTRU 210 may transition to the CELL_DCH state 820. If the UTRAN reconfigures the WTRU 210 to the CELL_DCH state with dedicated E-DCH resources while the WTRU 210 is transmitting over the E-RACH, then the WTRU 210 may release the E-RACH resources at the activation time that is specified in the reconfiguration message in the case of synchronous reconfiguration. Alternatively, the WTRU 210 may release the E-RACH resources at a fixed delay prior to or after the activation time. Alternatively, the WTRU 210 may release the E-RACH resources immediately upon reception of the RRC reconfiguration message.

[0059] Additionally, the WTRU 210 may be configured to release the E-RACH resources at the same time as it configures itself for a transmission over the dedicated E-DCH resources. Alternatively, the WTRU 210 may release the E-RACH resources at a fixed delay prior to or after configuring itself for transmission using the dedicated E-DCH resources; or, release the E-RACH resources once the WTRU 210 is fully synchronized with the UTRAN with the dedicated E-DCH resources.

[0060] Figure 9 is a flow chart of a procedure for releasing the E-DCH resources while in the CELL_FACH state or idle mode, when the E-RACH termination triggers occur. The WTRU 210 begins the E-RACH termination process 905. The WTRU 210 may be configured to stop any E-AGCH, E-RGCH, and E-HICH reception procedures that are occurring 910. The WTRU 210 may be further configured to stop any E-DPCCH and E-DPDCH transmission procedures that are occurring 915. The WTRU 210 may then perform a MAC reset procedure 920 and release HARQ buffers 930. The enhanced MAC-e/es reset procedure may include flushing the HARQ processes, discarding any remaining segments in the segmentation entity of the enhanced MAC-e/es and resetting the CURRENT_transmission sequence number (TSN) value to zero. Alternatively, if the remaining segment is from a DTCH or a DCCH logical channel the WTRU 210 may resume transmission of the segment at a remaining process. An

indication may be transmitted to the SRNC 240 via Iub signaling to discard any stored segment and reset the TSN reordering numbers.

[0061] If the E-DCH has terminated and the DTCH or the DCCH transmission is active, the WTRU 210 may flush the HARQ processes 930 and discard any remaining segments in the segmentation entity of the MAC-i/is.

[0062] The other logical channels or queues of the MAC-i/is entity that do not correspond to the CCCH are not reset. The Node-B 220 may be configured to perform a reset of the MAC-is entity of the CCCH. In other words, any segment may be discarded and the expected TSN is set to its initial value. If the MAC-is entity is in the CRNC 230, Node-B 220 uses Iub signaling indicating to the MAC-is entity to perform a reset. In addition, the MAC-i entity associated to the E-DCH resource is reset (i.e., HARQ soft buffers are flushed).

[0063] When the WTRU 210 performs a full MAC-i/is reset, the MAC-is entity in the SRNC 240 may be notified via a new Iub/Iur signaling that E-RACH access has been terminated; thus MAC-is entity in the SRNC 240 may also perform a reset. More specifically, when the Node-B 220 terminates the E-DCH connection with the WTRU 210, it releases the E-DCH resources, flushes the HARQ buffers, and notifies the SRNC 240 or CRNC 230 that the connection has been terminated and thus the CRNC 230 or SRNC 240 also perform a reset of the MAC. The CRNC 230 or SRNC 240 is notified via Iub or Iur signaling. A new control bit may be introduced in the Iub or Iur frame format or a new frame format may be defined to signal to the SRNC 240 or CRNC 230 the release of the resources.

[0064] Also, optionally, the reset of the MAC-i/is or only discarding of the segments may be performed after a time interval (Tr) because the termination of the E-RACH resource. The timer is also initiated in the network side. Tr may be a system configured timer signaled to the WTRU 210 via RRC message, via system information block (SIB), or preconfigured in the WTRU 210. The timer is initiated as soon as the E-DCH resources are terminated in the WTRU 210.

[0065] The WTRU 210 may be configured to stop the timer if it is running and if the WTRU 210 attempts to perform E-RACH access. Also, the WTRU 210 may also stop the timer, if the WTRU 210 attempts the E-RACH access and obtains the E-DCH resources assigned, or the WTRU 210 obtains the E-DCH resources assigned and resolves the contention resolution phase.

[0066] Alternatively, the WTRU 210, the Node-B 220 and/or the RNCs may be configured with a TSN_RESET_TIMER, wherein the WTRU 210 is configured to perform a TSN reset when the timer expires. Optionally, the WTRU 210 may perform a full enhanced MAC-e/es reset procedure when the timer expires.

[0067] The E-DCH resources are released when a transition from CELL_FACH to CELL_DCH occurs.

[0068] The WTRU 210 and the RNC may reset the value of the last used TSN number (i.e., CURRENT_TSN) to the initial value upon the release of the E-DCH resource set being used by the WTRU 210. The WTRU 210 and the RNC may each include synchronized timers, wherein the expiry of the timer signals the release of the E-DCH resources. After the timer expires and the resources are released, the WTRU 210 may reset the TSN and optionally perform a full enhanced MAC-e/es reset procedure.

[0069] Alternatively, the UTRAN may order the release of the resources. The UTRAN may signal the WTRU indicating that the resources must be released. In this case, upon reception of the message, the WTRU 210 and UTRAN reset the TSN to an initial value.

[0070] Alternatively, the TSN number may be reset upon the expiration of an inactivity timer. In this case, an inactivity timer may be started in both the WTRU 210 and the network after the last MAC-e PDU is transmitted and received, respectively. If the timer expires, the WTRU 210 and the RNC resets the TSN to its initial value. Optionally, a full enhanced MAC-e/es reset procedure may be performed.

[0071] In another alternative, the TSN number may not reset. The last TSN values used are stored in memory and continuously incremented for each new

transmission, regardless of the E-DCH resource set being used or the time in which the transmission is taking place.

[0072] Alternatively, the TSN number may be set to its initial value and optionally a full enhanced MAC-e/es reset may take place when a cell reselection occurs. Resetting the TSN or the MAC-e/es may always occur after the WTRU 210 performs cell reselection. Alternatively, it may only occur when a serving radio network subsystem (SRNS) relocation occurs. The RNC may signal the TSN reset via an explicit enhanced MAC-e/es reset indicator or the WTRU 210 may implicitly detect that SRNS relocation has occurred due to the presence or the change of a new UTRAN RNTI (U-RNTI).

[0073] Although features and elements are described above in particular combinations, each feature or element may be used alone without the other features and elements or in various combinations with or without other features and elements. The methods or flow charts provided herein may be implemented in a computer program, software, or firmware tangibly embodied in a computer-readable storage medium for execution by a general purpose computer or a processor. Examples of computer-readable storage mediums include a read only memory (ROM), a random access memory (RAM), a register, cache memory, semiconductor memory devices, magnetic media such as internal hard disks and removable disks, magneto-optical media, and optical media such as CD-ROM disks, and digital versatile disks (DVDs).

[0074] Suitable processors include, by way of example, a general purpose processor, a special purpose processor, a conventional processor, a digital signal processor (DSP), a plurality of microprocessors, one or more microprocessors in association with a DSP core, a controller, a microcontroller, Application Specific Integrated Circuits (ASICs), Field Programmable Gate Arrays (FPGAs) circuits, any other type of integrated circuit (IC), and/or a state machine.

[0075] A processor in association with software may be used to implement a radio frequency transceiver for use in a wireless transmit receive unit (WTRU), user equipment (UE), terminal, base station, radio network controller (RNC), or any host

computer. The WTRU may be used in conjunction with modules, implemented in hardware and/or software, such as a camera, a video camera module, a videophone, a speakerphone, a vibration device, a speaker, a microphone, a television transceiver, a hands free headset, a keyboard, a Bluetooth® module, a frequency modulated (FM) radio unit, a liquid crystal display (LCD) display unit, an organic light-emitting diode (OLED) display unit, a digital music player, a media player, a video game player module, an Internet browser, and/or any wireless local area network (WLAN) or Ultra Wide Band (UWB) module.

* * *

CLAIMS

What is claimed is:

1. A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

determining that a buffer is empty;

triggering a transmission of scheduling information (SI) with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero;

determining a last hybrid automatic repeat request (HARQ) data transmission; and

releasing a E-DCH resource allocation.

2. The method as in claim 1, wherein an inactivity timer is started when the buffer is empty.

3. The method as in claim 2, wherein the transmission of the SI is triggered when the inactivity timer expires.

4. The method as in claim 2, wherein the inactivity timer is restarted upon reception of data.

5. The method as in claim 1, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

6. A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

receiving initial scheduling information (SI) with a total enhanced dedicated channel (E-DCH) buffer status (TEBS);

determining that the TEBS is equal to zero;

waiting until a hybrid automatic repeat request (HARQ) buffer is empty; and

releasing a E-DCH resource allocation.

7. The method as in claim 6, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

8. A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

releasing the E-RACH message during transition from cell forward access channel (CELL_FACH) state to cell dedicated channel (CELL_DCH) state.

9. The method as in claim 8, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

10. A wireless transmit receive unit (WTRU), comprising:

a receiver configured to receive enhanced dedicated channel (E-DCH) resources on an acquisition indication channel (AICH) and an E-DCH AICH (E-AICH); and

a processor configured to access the E-DCH resources in cell forward access channel (CELL_FACH) state, to receive a reconfiguration message indicating to switch to a cell dedicated channel (CELL_DCH) state, and to release the E-DCH resources based on switching to CELL_DCH state.

11. A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

receiving an explicit E-DCH termination signal; and

releasing a E-DCH resource.

12. The method as in claim 11, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

13. The method as in claim 11, wherein the explicit E-DCH termination signal comprises a special value signaled on an E-DCH absolute grant channel (E-AGCH).

14. A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

initiating a timer in response to a trigger; and

releasing resource allocation for common control channel (CCCH) when a maximum allowable transmission time for the CCCH has been reached.

15. The method as in claim 14, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

16. The method as in claim 14, wherein a maximum enhanced dedicated channel (E-DCH) allocation time is allocated to the CCCH transmission when an E-DCH radio network temporary identifier (E-RNTI) is not present.

17. The method as in claim 14, wherein the timer starts when a positive acknowledgement (ACK) associated with a transmitted preamble signature is received on an acquisition indication channel (AICH) or an enhanced dedicated channel (E-DCH) AICH (E-AICH).

18. The method as in claim 14, wherein the timer starts when radio resource control (RRC) provides timer values to medium access control (MAC), and after receiving resource index of an enhanced dedicated channel (E-DCH).

19. The method as in claim 14, wherein the timer starts when a wireless transmit receive unit (WTRU) starts first dedicated physical control channel (DPCCH)

preamble transmission.

20. The method as in claim 19, wherein the timer starts when the first DPCCH transmission is completed after an enhanced dedicated channel (E-DCH) transmission backoff transmission time intervals (TTIs) or a first medium access control (MAC) protocol data unit (PDU) is passed to a physical layer.

21. The method as in claim 14, wherein the timer starts when a wireless transmit receive unit (WTRU) starts an enhanced dedicated channel (E-DCH) transmission.

22. The method as in claim 14, wherein a wireless transmit receive unit (WTRU) may initiate the timer when a collision resolution an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH) carrying the WTRU E-DCH radio network temporary identifier (E-RNTI) is received.

23. A Node-B comprising:

a processor configured to determine an end of enhanced random access channel (E-RACH) message transmission; and

a transmitter connected to the processor, the transmitter configured to transmit a special value over an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH) indicating the end of transmission.

24. A method for releasing enhanced dedicated channel (E-DCH) resources while in cell forward access channel (CELL_FACH) state, the method comprising:

terminating reception procedures for an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH), an E-DCH relative grant channel (E-RGCH), and an E-DCH hybrid automatic repeat request (HARQ) indicator channel (E-HICH); and

terminating transmission procedures for an E-DCH dedicated physical control

channel (E-DPCCH) and an enhanced dedicated physical data channel (E-DPDCH); and

resetting the medium access control (MAC) entity.

25. The method as in claim 24, wherein the channels are terminated when an enhanced random access channel (E-RACH) transmission signal has been received.

26. The method as in claim 24, wherein the channels are terminated when a common control channel (CCCH) timer has expired.

27. The method as in claim 24, wherein the channels are terminated when the scheduling information (SI) is equal to zero.

28. The method as in claim 24, wherein the MAC reset procedures include flushing the hybrid automatic repeat request (HARQ) processes, discarding remaining segments in segmentation entity of the MAC entity, and resetting a transmission sequence number (TSN) value to zero.

29. The method as in claim 24, wherein the resources are released when an inactivity timer expires.

ABSTRACT

A method and an apparatus is provided for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission. Triggers for terminating the E-RACH message are provided. The actions upon termination of the E-RACH messages are provided to release enhanced dedicated channel (E-DCH) resources while in cell forward access channel (CELL_FACH) state or transition to cell dedicated channel (CELL_DCH) state.

Electronic Patent Application Fee Transmittal	
Application Number:	
Filing Date:	
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Filer:	Wesley T. McMichael/Dara Ewing
Attorney Docket Number:	IPH-2-1853.01.US
Filed as Large Entity	

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Claims in excess of 20	1202	9	50	450
Independent claims in excess of 3	1201	5	210	1050
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1500**

Electronic Acknowledgement Receipt	
EFS ID:	4011578
Application Number:	12238910
International Application Number:	
Confirmation Number:	2438
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Customer Number:	24374
Filer:	Wesley T. McMichael/Dara Ewing
Filer Authorized By:	Wesley T. McMichael
Attorney Docket Number:	IPH-2-1853.01.US
Receipt Date:	26-SEP-2008
Filing Date:	
Time Stamp:	14:52:17
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1500
RAM confirmation Number	686
Deposit Account	220493
Authorized User	MEHTA,ANEESH
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Drawings-only black and white line drawings	1853_01_US_Drawings_EFS.PDF	329097 4e624299faf36f33ec5484044fb11196e8468be9	no	9
Warnings:					
Information:					
2	Application Data Sheet	1853_01_US_ADS_EFS.pdf	1437528 1224144aca933169a427484ce9cf23aed7c5ece3	no	7
Warnings:					
Information:					
3		1853_01_US_Application_EFS.pdf	110365 7d19aed720314c87fe52fbcdeddf141166e30b0a	yes	23

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	17
Claims	18	22
Abstract	23	23

Warnings:					
Information:					
4	Fee Worksheet (PTO-06)	fee-info.pdf	31630 4b09f91d80e03892d86ff5edeac372a6d0285e3f	no	2
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			Total Files Size (in bytes):	1908620	

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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.

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

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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.

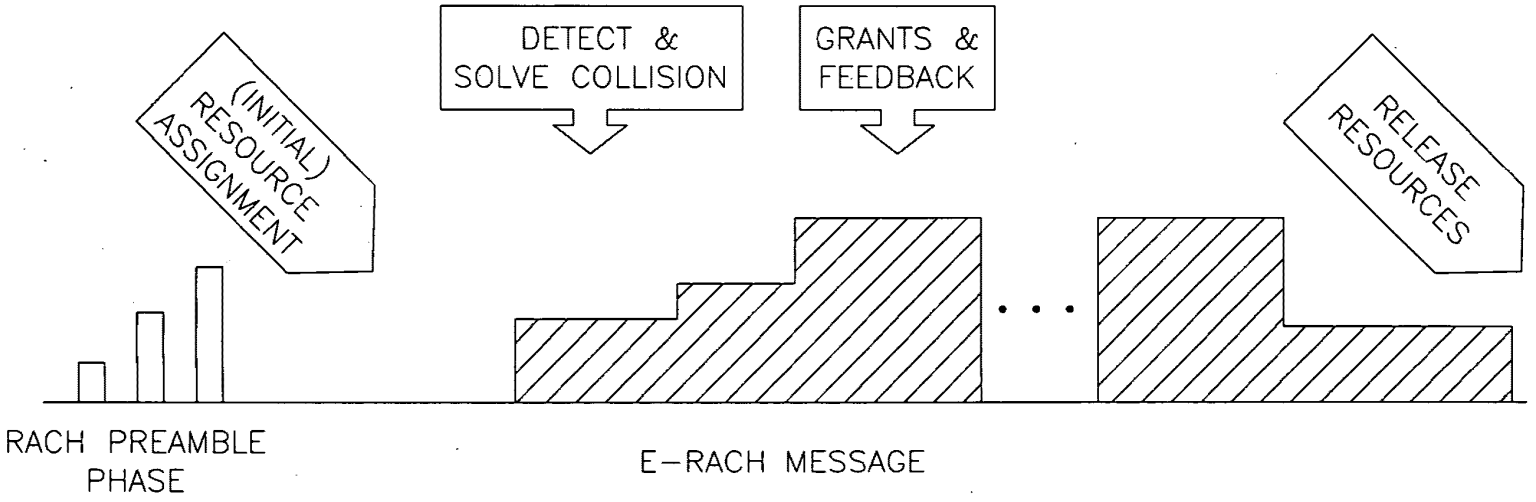


FIG. 1 (PRIOR ART)

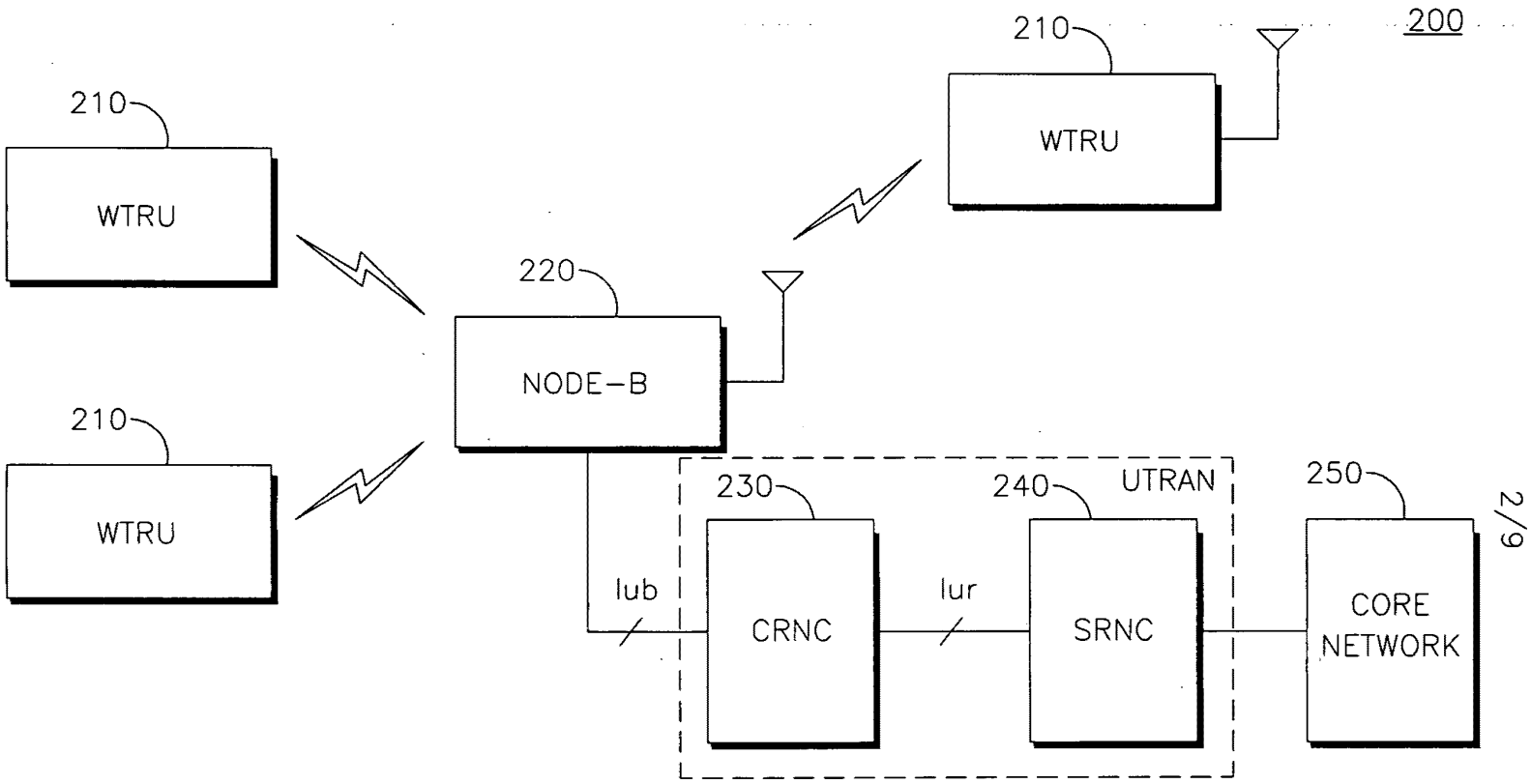

200
210
WTRU
210
WTRU
220
NODE-B
210
WTRU
230
CRNC
240
SRNC
UTRAN
250
CORE NETWORK
Iub
Iur

FIG. 2

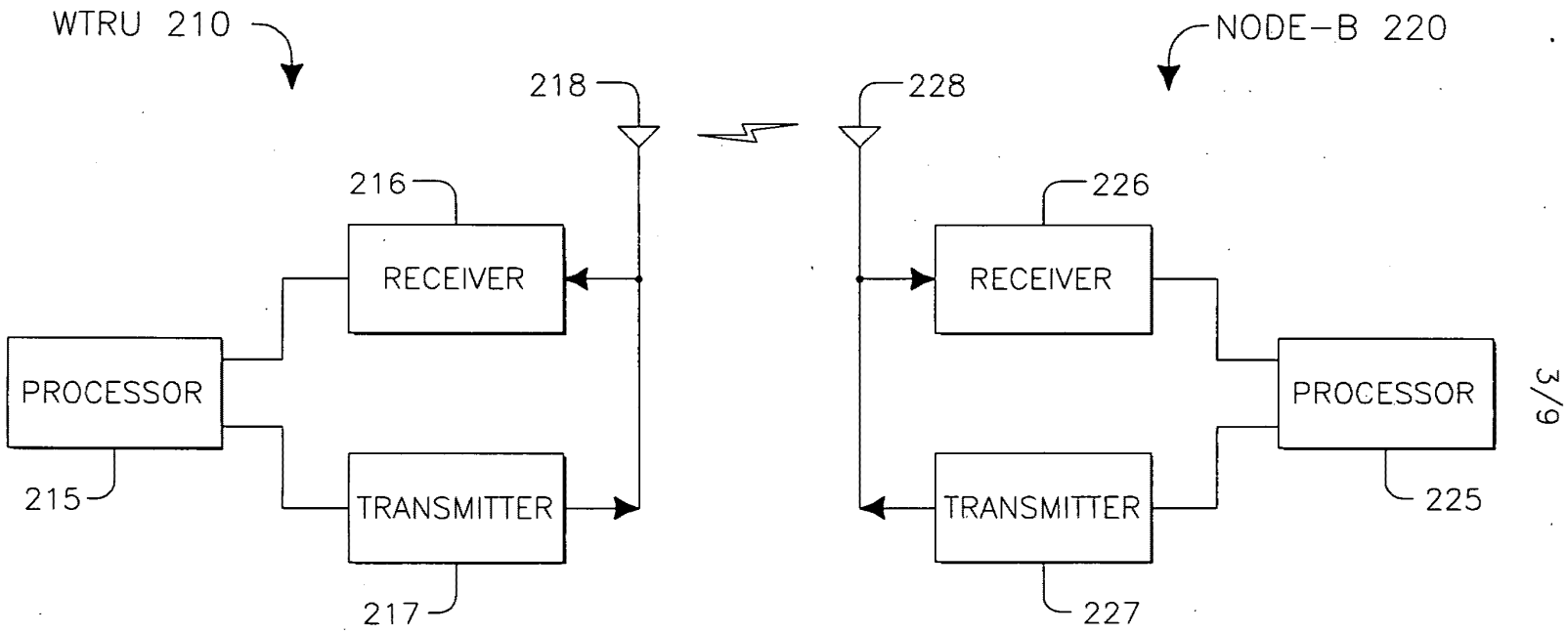


FIG. 3

IPR2023-01267 Page 47

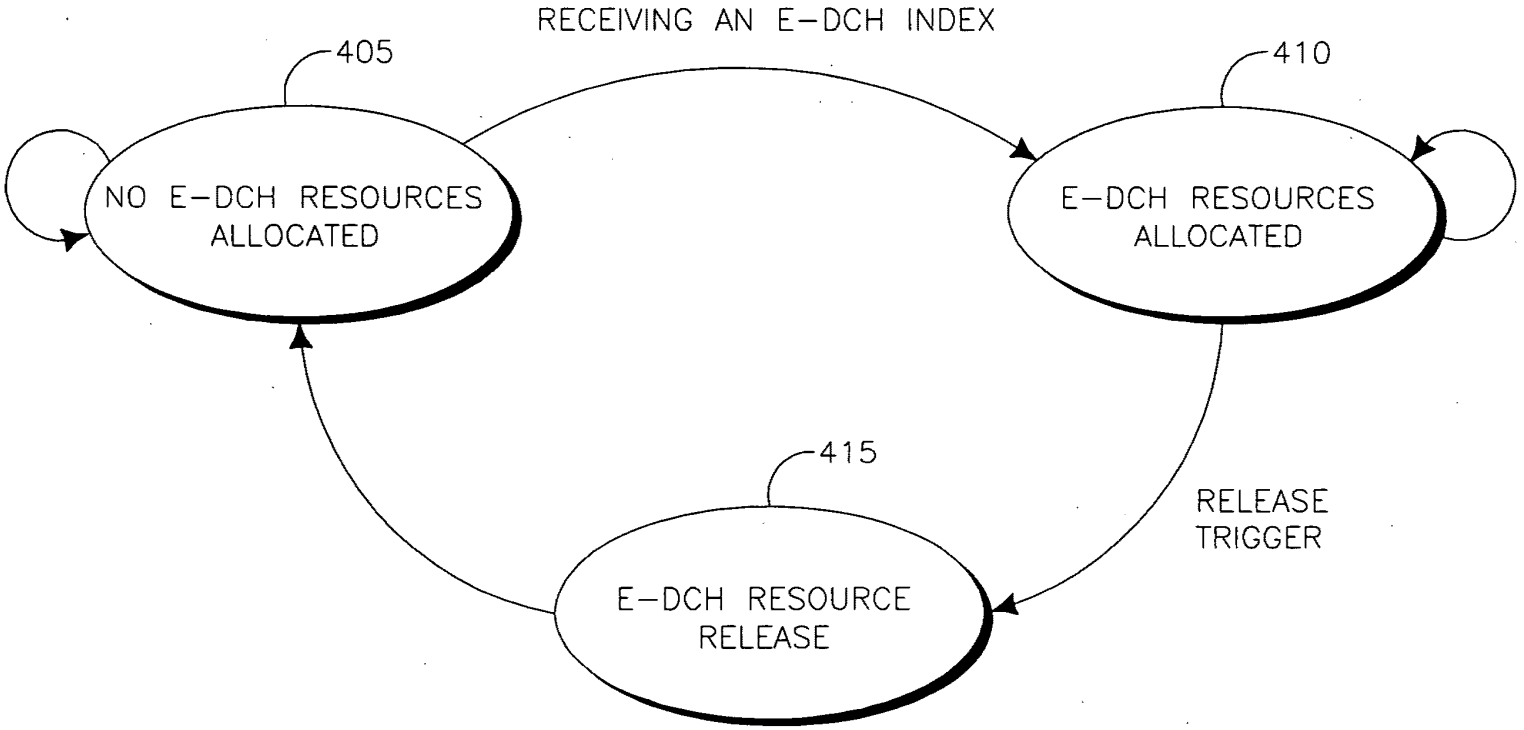


FIG. 4

IPR2023-01267 Page 48

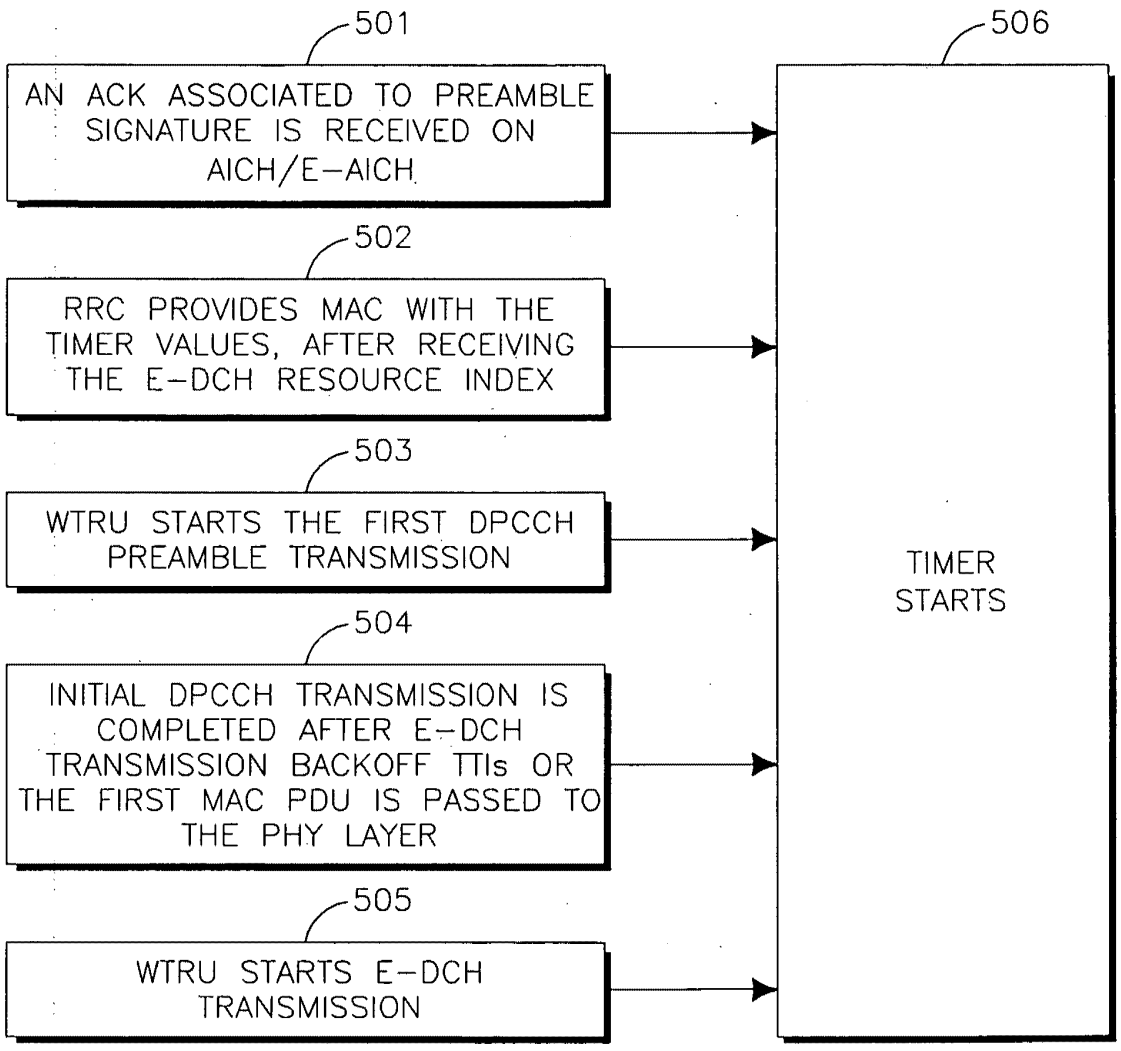

500
501
AN ACK ASSOCIATED TO PREAMBLE SIGNATURE IS RECEIVED ON AICH/E-AICH
502
RRC PROVIDES MAC WITH THE TIMER VALUES, AFTER RECEIVING THE E-DCH RESOURCE INDEX
503
WTRU STARTS THE FIRST DPCCH PREAMBLE TRANSMISSION
504
INITIAL DPCCH TRANSMISSION IS COMPLETED AFTER E-DCH TRANSMISSION BACKOFF TTIs OR THE FIRST MAC PDU IS PASSED TO THE PHY LAYER
505
WTRU STARTS E-DCH TRANSMISSION
506
TIMER STARTS

FIG. 5

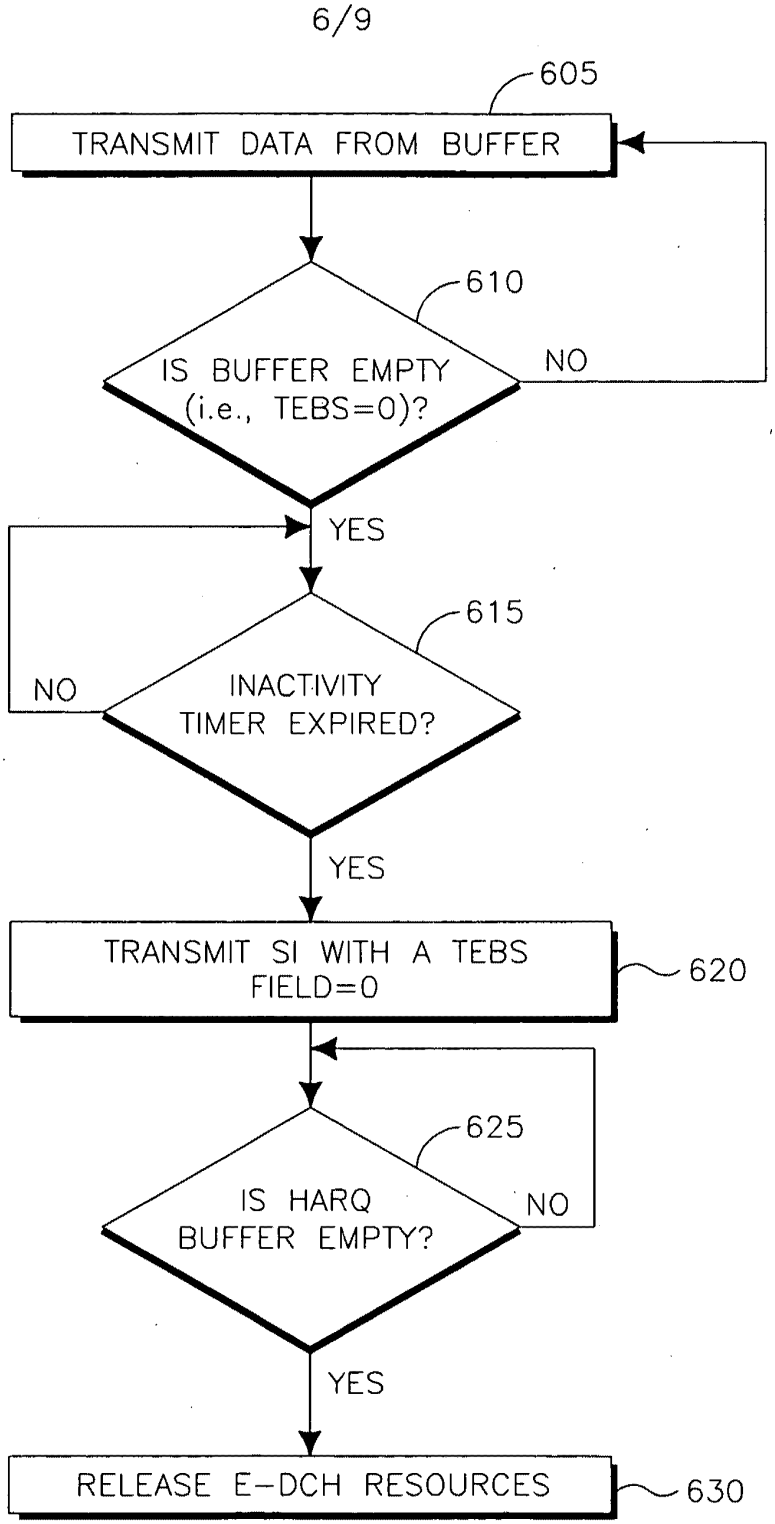

600
605
TRANSMIT DATA FROM BUFFER
610
IS BUFFER EMPTY (i.e., TEBS=0)?
NO
YES
615
INACTIVITY TIMER EXPIRED?
NO
YES
TRANSMIT SI WITH A TEBS FIELD=0
620
625
IS HARQ BUFFER EMPTY?
NO
YES
RELEASE E-DCH RESOURCES
630

FIG. 6

700

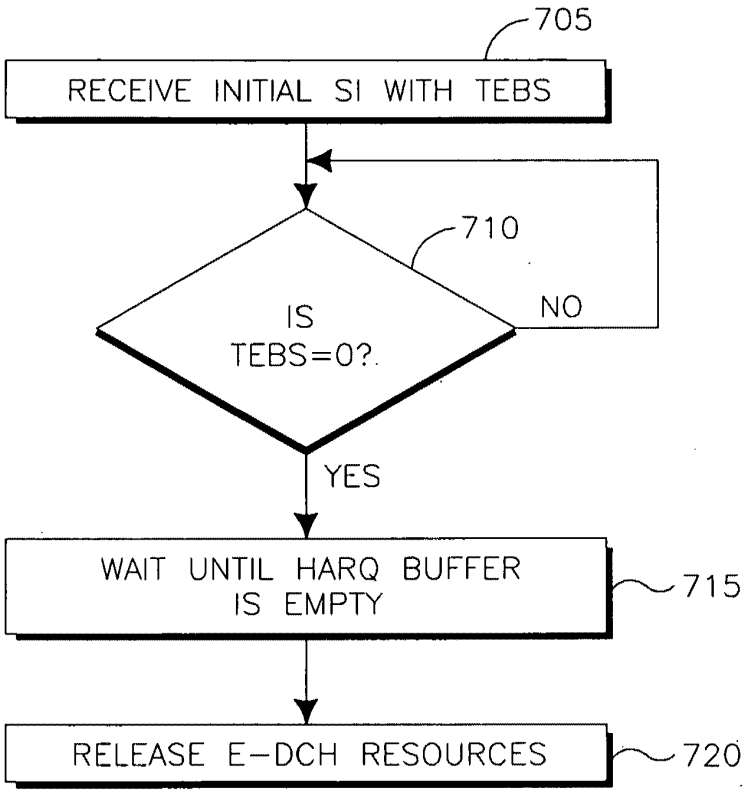

705
RECEIVE INITIAL SI WITH TEBS
710
IS
TEBS=0?
NO
YES
WAIT UNTIL HARQ BUFFER
IS EMPTY
715
RELEASE E-DCH RESOURCES
720

FIG. 7

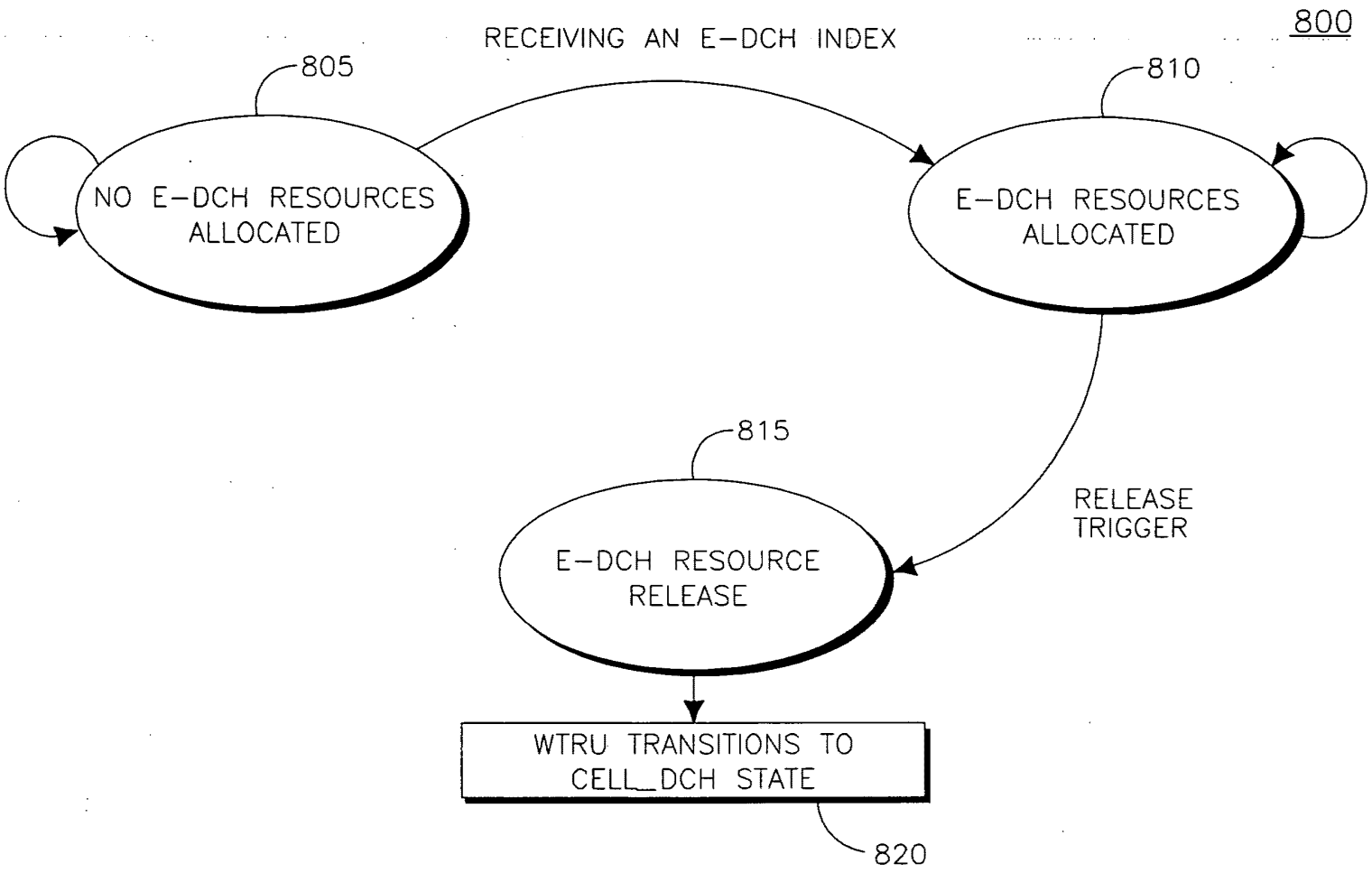


FIG. 8

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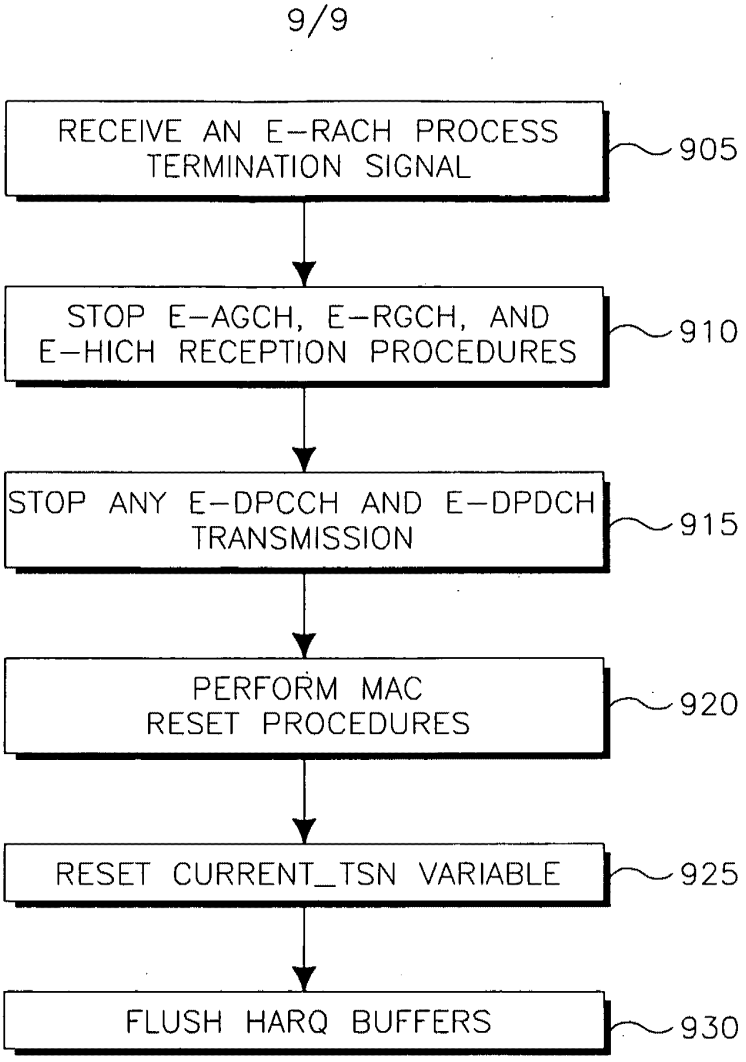

900
RECEIVE AN E-RACH PROCESS TERMINATION SIGNAL
905
STOP E-AGCH, E-RGCH, AND E-HICH RECEPTION PROCEDURES
910
STOP ANY E-DPCCH AND E-DPDCH TRANSMISSION
915
PERFORM MAC RESET PROCEDURES
920
RESET CURRENT_TSN VARIABLE
925
FLUSH HARQ BUFFERS
930

FIG. 9

PTO/SB/06 (12-04)

Filing Date: 9/26/2008

Approved for use through 7/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/238,910

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	310
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	510
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	210
TOTAL CLAIMS (37 CFR 1.16(i))	29 minus 20 =	9	X$ 25		OR	X$50	450
INDEPENDENT CLAIMS (37 CFR 1.16(h))	8 minus 3 =	* 5	X$105			X$210	1050
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $260 ($130 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))			185			370	
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	0		TOTAL	2530

APPLICATION AS AMENDED – PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	X =		OR	X =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X =		OR	X =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
						TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	X =		OR	X =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X =		OR	X =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
						TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

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9-26-08

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
10/09/2008 AGDITON 00000022 220493 12238910 01 FC:1011 310.00 DA 02 FC:1111 510.00 DA 03 FC:1311 210.00 DA **Title of Invention:**	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Filer:	Wesley T. McMichael/Dara Ewing
Attorney Docket Number:	IPH-2-1853.01.US
Filed as Large Entity	

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Claims in excess of 20	1202	9	50	450
Independent claims in excess of 3	1201	5	210	1050
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/238,910	09/26/2008	2617	2530	IPH-2-1853.01.US	29	8

CONFIRMATION NO. 2438

24374
VOLPE AND KOENIG, P.C.
DEPT. ICC
UNITED PLAZA, SUITE 1600
30 SOUTH 17TH STREET
PHILADELPHIA, PA 19103

FILING RECEIPT

OC000000032542303

Date Mailed: 10/14/2008

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)

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Christopher R. Cave, Verdun, CANADA;
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Paul Marinier, Brossard, CANADA;
Eldad M. Zeira, Huntington, CANADA;

Assignment For Published Patent Application

INTERDIGITAL PATENT HOLDINGS, INC., Wilmington, DE

Power of Attorney: None

Domestic Priority data as claimed by applicant

This appln claims benefit of 60/975,985 09/28/2007
and claims benefit of 60/982,528 10/25/2007
and claims benefit of 61/018,999 01/04/2008
and claims benefit of 61/025,441 02/01/2008
and claims benefit of 61/038,576 03/21/2008
and claims benefit of 61/074,288 06/20/2008
and claims benefit of 61/083,409 07/24/2008

Foreign Applications

If Required, Foreign Filing License Granted: 10/09/2008

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/238,910**

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

Non-Publication Request: No

Early Publication Request: No

Title

METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL

Preliminary Class

455

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/238,910	09/26/2008	Benoit Pelletier	IPH-2-1853.01.US

CONFIRMATION NO. 2438

24374
VOLPE AND KOENIG, P.C.
DEPT. ICC
UNITED PLAZA, SUITE 1600
30 SOUTH 17TH STREET
PHILADELPHIA, PA 19103

FORMALITIES LETTER

OC000000032542304

Date Mailed: 10/14/2008

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FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

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

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

The applicant needs to satisfy supplemental fees problems indicated below.

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

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

SUMMARY OF FEES DUE:

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

Replies should be mailed to:

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

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

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

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

/bzewdie/

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

PTO/SB/08a (07-09)
Approved for use through 07/31/2009. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
OIPE IAP40 OCT 16 2008 PATENT & TRADEMARK OFFICE

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. IPH-2-1853.01.US	SERIAL NO. 12/238,910
	APPLICANT Pelletier et al.	
	FILING DATE September 26, 2008	GROUP 2617

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
							YES	NO

OTHER DOCUMENTS

EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Physical Channels And Mapping Of Transport Channels Onto Physical Channels (FDD) (Release 7)", 3GPP TS 25.211 V7.2.0, (May 2007).
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Physical Channels And Mapping Of Transport Channels Onto Physical Channels (FDD) (Release 7)", 3GPP TS 25.211 V7.3.0, (September 2007).
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Physical Channels And Mapping Of Transport Channels Onto Physical Channels (FDD) (Release 8)", 3GPP TS 25.211 V8.2.0, (September 2008).
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Medium Access Control (MAC) Protocol Spcification (Release 7)", 3GPP TS 25.321 V7.5.0, (June 2007).
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Medium Access Control (MAC) Protocol Spcification (Release 8)", 3GPP TS 25.321 V8.3.0, (September 2008).
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Enhanced Uplink; Overall Description Stage 2 (Release 7)", 3GPP TS 25.319 V7.2.0 (March 2007).
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Enhanced Uplink; Overall Description Stage 2 (Release 8)", 3GPP TS 25.319 V8.3.0 (September 2008).
		NSN ET AL., "Further Discussion On Enhanded CELL_FACH In REL8", 3GPP TSG-RAN WG2 Meeting #59, R2-073254, (Athens, Greece, August 20-24, 2007).

EXAMINER	DATE CONSIDERED

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

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. IPH-2-1853.01.US	SERIAL NO. 12/238,910
	APPLICANT Pelletier et al.	
	FILING DATE September 26, 2008	GROUP 2617

EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
		NOKIA SIEMENS NETWORKS ET AL., " Enhanced Uplink For CELL_FACH State In FDD", TSG-RAN #37 Meeting, RP-070677, (Riga, Latvia, September 11-14, 2007).

EXAMINER	DATE CONSIDERED

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

IFW

PTO IAP40
OCT 16 2008
PATENT & TRADEMARK OFFICE

PTO/SB/21 (09-04)
Approved for use through 07/31/2006.
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	12/238,910
Filing Date	September 26, 2008
First Named Inventor	Pelletier et al.
Art Unit	2617
Examiner Name	Not Yet Known
Attorney Docket Number	IPH-2-1853.01.US

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☒ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☒ Other Enclosure(s) (please Identify below):

Form PTO-1449; and
Nine (9) References.

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	VOLPE AND KOENIG, P.C.		
Signature			
Printed name	Aneesh Mehta		
Date	October 14, 2008	Reg. No.	61,937

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name	Aneesh Mehta	Date	October 14, 2008

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

IFW IAP40
OCT 16 2008
PATENT & TRADEMARK OFFICE

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
	Pelletier et al.
Application No.:	12/238,910
Confirmation No.:	2438
Filed:	September 26, 2008
For: METHOD AND APPARATUS FOR TERMINATING TRANSMISION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL	
Group:	2617
Examiner:	Not Yet Known

Our File:	IPH-2-1853.01.US
Date:	October 14, 2008

INFORMATION DISCLOSURE STATEMENT

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

Sir:

Further to Applicants' Duty of Disclosure pursuant to 37 C.F.R. §1.56, Applicants wish to bring to the Examiner's attention the material cited on the enclosed Form PTO-1449.

It is respectfully requested that the Examiner consider these documents and return an initialed copy of the Form PTO-1449 indicating his consideration of the cited materials.

Respectfully submitted,

Pelletier et al.

By _____
Aneesh Mehta
Registration No. 61,937
(215) 568-6400

Volpe and Koenig, P.C.
United Plaza, Suite 1600
30 South 17th Street
Philadelphia, PA 19103

AAM/dcb
Enclosures (10)

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:			
	Pelletier et al.		
Application No.:	12/238,910		
Confirmation No.:	2438	Our File:	IPH-2-1853.01.US
Filed:	September 26, 2008	Date:	December 11, 2008
For:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL		
Group:	2617		
Examiner:	Not Yet Known		

COMMUNICATION IN RESPONSE TO NOTICE OF MISSING PARTS OF NONPROVISIONAL APPLICATION

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

Sir:

In response to the Notice to File Missing Parts of Nonprovisional Application mailed from the Office on October 14, 2008, the following are enclosed:

1. Fully executed Declaration and Power of Attorney to Customer No. 24374; and
2. Request for Corrected Filing Receipt with Marked-Up Copy of Filing Receipt and Supplemental Application Data Sheet.

Please charge the surcharge fee of $ 130.00 to the Deposit Account of InterDigital Communications Corporation, Deposit Account No. 09-0435 as indicated on the Fee Transmittal Sheet.

Early examination and allowance of the application is respectfully requested.

Respectfully submitted,

Pelletier et al.

By /John C. Donch Jr./
John C. Donch Jr.
Registration No. 43,593
(215) 568-6400

Volpe and Koenig, P.C.
United Plaza, Suite 1600
30 South 17th Street
Philadelphia, PA 19103

JCD/cd
Enclosures (2)

Please type a plus sign (+) inside this box → [+]

PTO/SB/01 (12-97)
Approved for use through 9/30/00.
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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

☐ Declaration Submitted with Initial Filing **OR** ☒ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number	IPH-2-1853.01.US
First Named Inventor	Pelletier et al.
COMPLETE IF KNOWN	
Application Number	12/238,910
Filing Date	September 26, 2008
Group Art Unit	2617
Examiner Name	Not Yet Known

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL

(Title of the Invention)

the specification of which
☐ is attached hereto
OR
☒ was filed on (MM/DD/YYYY) 09/26/2008 as United States Application Number or PCT International Application Number 12/238,910 and was amended on (MM/DD/YYYY) _____ (if applicable).

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

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	NO
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐
			☐	☐	☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)
60/975,985	09/28/2007
60/982,528	10/25/2007
61/018,999	01/04/2008
61/025,441	02/01/2008
61/038,576	03/21/2008
61/074,288	06/20/2008
61/083,409	07/24/2008

☐ Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

Burden Hour Statement: This form is estimated to take 0.4 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. 1450, Alexandria, VA 22313-1450.

Please type a plus sign (+) inside this box → [+]

PTO/SB/01 (12-97)
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Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

DECLARATION — Utility or Design Patent Application

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number *(if applicable)*

☐ Additional U.S. or PCT international application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: ☒ Customer Number 24374 → *Place Customer Number Bar Code Label here*
OR
☐ Registered practitioner(s) name/registration number listed below

Name	Registration Number	Name	Registration Number
Namely, the Attorneys of Volpe and Koenig, P.C.			

☐ Additional registered practitioner(s) named on supplemental Registered Practitioner Information sheet PTO/SB/02C attached hereto.

Direct all correspondence to: ☒ Customer Number or Bar Code Label 24374 *OR* ☐ Correspondence address below

Name	VOLPE AND KOENIG, P.C. DEPT ICC				
Address					
Address					
City		**State**		**ZIP**	
Country		**Telephone**		**Fax**	

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 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any])	Family Name or Surname
Benoit	Pelletier

Inventor's Signature						**Date**	December 5, 2002
Residence: City	Roxboro	**State**	QC	**Country**	CA	**Citizenship**	CA
Post Office Address	11-13th Street						
Post Office Address							
City	Roxboro	**State**	QC	**ZIP**	H8Y 1L3	**Country**	CA

☒ Additional inventors are being named on the 2 supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto

Attny. Docket No. IPH-2-1853.01.US

Please type a plus sign (+) inside this box → [+]

PTO/SB/02A (11-00)
Approved for use through 10/31/2002.
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DECLARATION

ADDITIONAL INVENTOR(S)
Supplemental Sheet
Page 3 of 4

Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor		
Given Name (first and middle [if any])	Family Name or Surname		
Diana	Pani		
Inventor's Signature			**Date** December 5, 2008
Residence: City Montreal	**State** QC	**Country** CA	**Citizenship** CA
Mailing Address 1950 Lincoln Avenue, Apartment #1812			
Mailing Address			
City Montreal	**State** QC	**ZIP** H3H 2N8	**Country** CA

Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor		
Given Name (first and middle [if any])	Family Name or Surname		
Rocco	DiGirolamo		
Inventor's Signature			**Date** December 5, 2008
Residence: City Laval	**State** QC	**Country** CA	**Citizenship** CA
Mailing Address 632 de Fribourg Street			
Mailing Address			
City Laval	**State** QC	**ZIP** H7K 3Y3	**Country** CA

Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor		
Given Name (first and middle [if any])	Family Name or Surname		
Christopher R.	Cave		
Inventor's Signature			**Date** December 5, 2008
Residence: City Verdun	**State** QC	**Country** CA	**Citizenship** CA
Mailing Address 201 chemin du Golf, Apartment 304			
Mailing Address			
City Verdun	**State** QC	**ZIP** H3H 1Z4	**Country** CA

Burden Hour Statement: This form is estimated to take 21 minutes to complete. Time will vary depending upon the needs of the individual case.

Attny. Docket No. IPH-2-1853.01.US

Please type a plus sign (+) inside this box → [+]

PTO/SB/02A (11-00)
Approved for use through 10/31/2002.
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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DECLARATION

ADDITIONAL INVENTOR(S)
Supplemental Sheet
Page 4 of 4

Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor		
Given Name (first and middle [if any])	Family Name or Surname		
Vincent	Roy		
Inventor's Signature		**Date** December 5, 2008	
Residence: City Montreal	**State** QC	**Country** CA	**Citizenship** CA
Mailing Address 6254 De La Roche			
Mailing Address			
City Montreal	**State** QC	**ZIP** H2S 2E1	**Country** CA

Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor		
Given Name (first and middle [if any])	Family Name or Surname		
Paul	Marinier		
Inventor's Signature		**Date** December 5, 2008	
Residence: City Brossard	**State** QC	**Country** CA	**Citizenship** CA
Mailing Address 1805 Stravinski			
Mailing Address			
City Brossard	**State** QC	**ZIP** J4X 2J7	**Country** CA

Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor		
Given Name (first and middle [if any])	Family Name or Surname		
Eldad M.	Zeira		
Inventor's Signature		**Date**	
Residence: City Huntington	**State** NY	**Country** US	**Citizenship** US
Mailing Address 106 East Neck Road			
Mailing Address			
City Huntington	**State** NY	**ZIP** 11743	**Country** US

Burden Hour Statement: This form is estimated to take 21 minutes to complete. Time will vary depending upon the needs of the individual case.

Attny. Docket No. IPH-2-1853.01.US

Please type a plus sign (+) inside this box → [+]

PTO/SB/02A (11-00)
Approved for use through 10/31/2002.
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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DECLARATION

ADDITIONAL INVENTOR(S)
Supplemental Sheet
Page 4 of 4

Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor
Given Name (first and middle [if any])	Family Name or Surname
Vincent	Roy
Inventor's Signature	**Date**
Residence: City Montreal	**State** QC **Country** CA **Citizenship** CA
Mailing Address 6254 De La Roche	
Mailing Address	
City Montreal	**State** QC **ZIP** H2S 2E1 **Country** CA

Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor
Given Name (first and middle [if any])	Family Name or Surname
Paul	Marinier
Inventor's Signature	**Date**
Residence: City Brossard	**State** QC **Country** CA **Citizenship** CA
Mailing Address 1805 Stravinski	
Mailing Address	
City Brossard	**State** QC **ZIP** J4X 2J7 **Country** CA

Name of Additional Joint Inventor, if any:	☐ A petition has been filed for this unsigned inventor
Given Name (first and middle [if any])	Family Name or Surname
Eldad M.	Zeira
Inventor's Signature	**Date** 24 November 2008
Residence: City Huntington	**State** NY **Country** US **Citizenship** US
Mailing Address 106 East Neck Road	
Mailing Address	
City Huntington	**State** NY **ZIP** 11743 **Country** US

Burden Hour Statement: This form is estimated to take 21 minutes to complete. Time will vary depending upon the needs of the individual case.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
Pelletier et al.	Our File: IPH-2-1853.01.US
Application No.: 12/238,910	Date: December 11, 2008
Confirmation No.: 2438	
Filed: September 26, 2008	
For: METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL	
Group: 2617	
Examiner: Not Yet Known	

REQUEST FOR CORRECTED FILING RECEIPT

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

Sir:

Enclosed is a marked-up copy of the filing receipt for the above-identified patent application. Upon proofing, it was noted that the filing receipt is incorrect. There is one change that needs to be made.

With respect to Eldad M. Zeira, please delete "CANADA" and insert therefor --NY--.

A Supplemental Application Data Sheet is submitted herewith in support of this request.

Applicants respectfully request that a corrected Filing Receipt be issued.

Respectfully submitted,

Pelletier et al.

By /John C. Donch Jr./
John C. Donch Jr.
Registration No. 43593
(215) 568-6400

Volpe and Koenig, P.C.
United Plaza, Suite 1600
30 South 17th Street
Philadelphia, PA 19103

JCD/cd
Enclosure

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
12/238,910	09/26/2008	2617	2530	IPH-2-1853.01.US	29	8

CONFIRMATION NO. 2438

FILING RECEIPT

24374
VOLPE AND KOENIG, P.C.
DEPT. ICC
UNITED PLAZA, SUITE 1600
30 SOUTH 17TH STREET
PHILADELPHIA, PA 19103

Volpe & Koenig, P.C.
Received via mail
OCT 17 2008



Date Mailed: 10/14/2008

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)

Benoit Pelletier, Roxboro, CANADA;
Diana Pani, Montreal, CANADA;
Rocco DiGirolamo, Laval, CANADA;
Christopher R. Cave, Verdun, CANADA;
Vincent Roy, Montreal, CANADA;
Paul Marinier, Brossard, CANADA;
Eldad M. Zeira, Huntington, ~~CANADA;~~ NY

Assignment For Published Patent Application

INTERDIGITAL PATENT HOLDINGS, INC., Wilmington, DE

Power of Attorney: None

Domestic Priority data as claimed by applicant

This appln claims benefit of 60/975,985 09/28/2007
and claims benefit of 60/982,528 10/25/2007
and claims benefit of 61/018,999 01/04/2008
and claims benefit of 61/025,441 02/01/2008
and claims benefit of 61/038,576 03/21/2008
and claims benefit of 61/074,288 06/20/2008
and claims benefit of 61/083,409 07/24/2008

Foreign Applications

If Required, Foreign Filing License Granted: 10/09/2008

☐ Previously Docketed ☐ Docketing Not Req'd

Docketed by EM Atty/Para DLT
Docketed for 12/14/08 - Req. For Corr. Filing Rec.

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/238,910**

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

Non-Publication Request: No

Early Publication Request: No

Title

METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL

Preliminary Class

455

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).

PTO/SB/14 (07-07)
Approved for use through 06/30/2010. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	IPH-2-1853.01.US
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1

Applicant Authority	◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Benoit		Pelletier	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Roxboro	Country Of Residence[i]	CA
Citizenship under 37 CFR 1.41(b)[i]	CA		

Mailing Address of Applicant:

Address 1	11-13th Street		
Address 2			
City	Roxboro	State/Province	QC
Postal Code	H8Y 1L3	Country[i]	CA

Applicant 2

Applicant Authority	◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Diana		Pani	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Montreal	Country Of Residence[i]	CA
Citizenship under 37 CFR 1.41(b)[i]	CA		

Mailing Address of Applicant:

Address 1	1950 Lincoln Avenue		
Address 2	Apartment 1812		
City	Montreal	State/Province	QC
Postal Code	H3H 2N8	Country[i]	CA

Applicant 3

Applicant Authority	◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Rocco		DiGirolamo	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Laval	Country Of Residence[i]	CA

PTO/SB/14 (07-07)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	IPH-2-1853.01.US
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL	

Citizenship under 37 CFR 1.41(b) i	CA		
Mailing Address of Applicant:			
Address 1	632 de Fribourg Street		
Address 2			
City	Laval	**State/Province**	QC
Postal Code	H7K 3Y3	**Country**i	CA

Applicant 4

Applicant Authority ◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118		
Prefix	**Given Name**	**Middle Name**	**Family Name**	**Suffix**
	Christopher	R.	Cave	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service			
City	Verdun	**Country Of Residence**i	CA
Citizenship under 37 CFR 1.41(b) i	CA		
Mailing Address of Applicant:			
Address 1	201 Chemin du Golf		
Address 2	Apartment 304		
City	Verdun	**State/Province**	QC
Postal Code	H3E 1Z4	**Country**i	CA

Applicant 5

Applicant Authority ◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118		
Prefix	**Given Name**	**Middle Name**	**Family Name**	**Suffix**
	Vincent		Roy	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service			
City	Montreal	**Country Of Residence**i	CA
Citizenship under 37 CFR 1.41(b) i	CA		
Mailing Address of Applicant:			
Address 1	6254 De La Roche		
Address 2			
City	Montreal	**State/Province**	QC
Postal Code	H2S 2E1	**Country**i	CA

Applicant 6

Applicant Authority ◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118		
Prefix	**Given Name**	**Middle Name**	**Family Name**	**Suffix**
	Paul		Marinier	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service			
City	Brossard	**Country Of Residence**i	CA
Citizenship under 37 CFR 1.41(b) i	CA		

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	IPH-2-1853.01.US
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL	

Mailing Address of Applicant:			
Address 1	1805 Stravinski		
Address 2			
City	Brossard	**State/Province**	QC
Postal Code	J4X 2J7	**Country**[i]	CA

Applicant 7

Applicant Authority (•) Inventor ( ) Legal Representative under 35 U.S.C. 117 ( ) Party of Interest under 35 U.S.C. 118

Prefix	**Given Name**	**Middle Name**	**Family Name**	**Suffix**
	Eldad	M.	Zeira	

Residence Information (Select One) (•) US Residency ( ) Non US Residency ( ) Active US Military Service

City	Huntington	**State/Province**	NY	**Country of Residence** [i]	US
Citizenship under 37 CFR 1.41(b) [i]	US				

Mailing Address of Applicant:			
Address 1	106 East Neck Road		
Address 2			
City	Huntington	**State/Province**	NY
Postal Code	11743	**Country**[i]	US

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

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

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

Customer Number	24374		
Email Address	JDonch@volpe-koenig.com	Add Email	Remove Email

Application Information:

Title of the Invention	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL		
Attorney Docket Number	IPH-2-1853.01.US	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		**Sub Class (if any)**	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	9	**Suggested Figure for Publication (if any)**	6

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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	IPH-2-1853.01.US
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL	

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S. C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	24374		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	60975985	2007-09-28
Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	60982528	2007-10-25
Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61018999	2008-01-04
Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61025441	2008-02-01
Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61038576	2008-03-21
Prior Application Status	Pending		Remove

PTO/SB/14 (07-07)
Approved for use through 06/30/2010. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	IPH-2-1853.01.US
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL	

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61074288	2008-06-20
Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61083409	2008-07-24

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

Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

Remove

Application Number	Country [i]	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			○ Yes ◉ No

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Assignee 1

If the Assignee is an Organization check here. ☒

Organization Name	INTERDIGITAL PATENT HOLDINGS, INC.		
Mailing Address Information:			
Address 1	3411 Silverside Road, Concord Plaza		
Address 2	Suite 105, Hagley Building		
City	Wilmington	**State/Province**	DE
Country [i]	US	Postal Code	19810
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the **Add** button.

Signature:

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

Signature	/John C. Donch Jr./			Date (YYYY-MM-DD)	2008-12-11
First Name	John C.	Last Name	Donch Jr.	Registration Number	43593

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	IPH-2-1853.01.US
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

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

Electronic Patent Application Fee Transmittal

Application Number:	12238910
Filing Date:	26-Sep-2008
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Filer:	Aneesh A. Mehta/Chie Duncan
Attorney Docket Number:	IPH-2-1853.01.US

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

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

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

Electronic Acknowledgement Receipt	
EFS ID:	4436287
Application Number:	12238910
International Application Number:	
Confirmation Number:	2438
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Customer Number:	24374
Filer:	Aneesh A. Mehta/Chie Duncan
Filer Authorized By:	Aneesh A. Mehta
Attorney Docket Number:	IPH-2-1853.01.US
Receipt Date:	11-DEC-2008
Filing Date:	26-SEP-2008
Time Stamp:	16:22:57
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$130
RAM confirmation Number	1844
Deposit Account	090435
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Response to Pre-Exam Formalities Notice	1853_01_US_ResponseToMissingParts_EFS.pdf	61890 44b0193d28e2a83216871cc3ab1b69017598b7be	no	2
Warnings:					
Information:					
2	Oath or Declaration filed	1853_01_US_ExecutedDeclaration_EFS.pdf	293801 8ab78117a15ce0d0746da38b0def18a627fc7982	no	5
Warnings:					
Information:					
3	Request for Corrected Filing Receipt	1853_01_US_CorrectedFilingReceipt_EFS.pdf	729957 44a02bb5c9609291a5b02dbda61517f26812fa34	no	12
Warnings:					
Information:					
4	Fee Worksheet (PTO-06)	fee-info.pdf	30084 6c854ae7d0e41673d271ef2492d3631f23f9cb79	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1115732		

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.

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
12/238,910	09/26/2008	2617	2660	IPH-2-1853.01.US	29	8

CONFIRMATION NO. 2438

UPDATED FILING RECEIPT

24374
VOLPE AND KOENIG, P.C.
DEPT. ICC
UNITED PLAZA, SUITE 1600
30 SOUTH 17TH STREET
PHILADELPHIA, PA 19103

OC000000033663273

Date Mailed: 12/19/2008

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Title

METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL

Preliminary Class

455

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EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO
	*	06/043782	04/2006	WO				
	*	07/078155	07/2007	WO				

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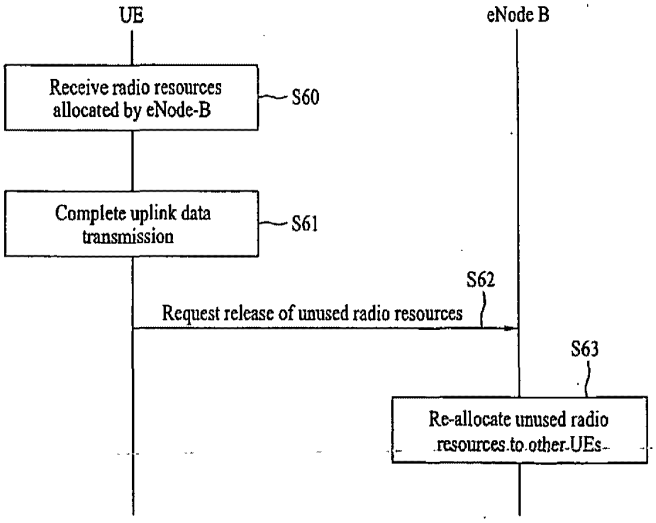
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[Continued on next page]

(54) Title: METHOD FOR SCHEDULING RADIO RESOURCES IN MOBILE COMMUNICATION SYSTEM



(57) Abstract: A method for scheduling radio resources in a mobile communication system is disclosed. The method includes allocating radio resources to a specific User Equipment (UE), receiving a release request message of the allocated radio resources from the specific UE and re-allocating unused radio resources to other UEs other than the specific UE. The method according to the present invention can re-allocate unused radio resources to other UEs using a control signal received from a specific UE such that wasted radio resources are minimized and efficiency of data communication in a mobile communication system may be enhanced.

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METHOD FOR SCHEDULING RADIO RESOURCES IN MOBILE COMMUNICATION SYSTEM

TECHNICAL FIELD

The present invention is directed to a mobile communication system, and, specifically, to a method for scheduling radio resources in a mobile communication system.

BACKGROUND ART

FIG. 1 is a structural diagram illustrating a Long Term Evolution (LTE) system which is a mobile communication system. The LTE system is an evolved version of a conventional UMTS system and has been standardized by the 3GPP (3rd Generation Partnership Project).

The LTE network may be generally classified into an Evolved UMTS Terrestrial Radio Access Network (E-UTRAN) and a Core Network (CN). The E-UTRAN includes at least one eNode-B serving as a base station and an Access Gateway (AG) located at the end of the network so that it is connected to an external network.

The AG may be classified into a portion that handles user traffic and a portion that handles control traffic. A first AG that handles user traffic may communicate with a second AG that handles control traffic via a new interface. A single eNode-B may include at least one cell.

A first interface for transmitting user traffic or a second interface for transmitting control traffic may be located between several eNode-Bs. The CN includes the AG and a plurality of nodes for registering users of User Equipment (UEs). If required, another interface for discriminating between the E-UTRAN and the CN may also be used for the LTE network.

FIG. 2 is a conceptual diagram illustrating a control plane of a radio interface protocol

structure between the UE and the UTRAN (UMTS Terrestrial Radio Access Network) based on the 3GPP radio access network standard. The radio interface protocol horizontally includes a physical layer, a data link layer and a network layer. The radio interface protocol vertically includes a User Plane for transmitting data and a Control Plane for transmitting a control signaling.

The protocol layers shown in FIG. 2 may be classified into the first layer (L1), the second layer (L2), and the third layer (L3) on the basis of three lower layers of an Open System Interconnection (OSI) reference model that is well known in the art.

The physical layer which is as the first layer (L1) provides an Information Transfer Service over a physical channel. A radio resource control (RRC) layer located at the third layer (L3) controls radio resources between the UE and the network.

The RRC layer exchanges RRC messages between the UE and the network for this purpose. The RRC layer may be distributed to a plurality of network nodes, such as eNode-B and AG, and may also be located at the eNode-B or the AG.

A radio protocol control plane will be described with reference to FIG. 2. The radio protocol control plane includes a physical layer, a Medium Access Control (MAC) layer, a Radio Link Control (RLC) layer and a Radio Resource Control (RRC) layer.

The physical layer transmits an Information Transfer Service to an upper layer over a physical channel while acting as the first layer (L1). The physical layer is connected to a Medium Access Control (MAC) layer located thereabove via a transport channel.

The MAC layer communicates with the physical layer over the transport channel such that data is transferred between the MAC layer and the physical layer. Data is transferred between respectively different physical layers, such as between a first physical layer of a transmitting side and a second physical layer of a receiving side.

The MAC layer of the second layer (L2) provides services to the RLC (Radio Link

Control) layer, located thereabove via a logical channel. The RLC layer of the second layer (L2) supports transmission of data with reliability It should be noted that the RLC layer 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 RRC (Radio Resource Control) layer located at the lowermost part of the third layer (L3) is only defined in the control plane. The RRC layer handles the control of logical channels, transport channels and physical channels in relation to configuration, reconfiguration and release of Radio Bearers (RBs). An RB refers to a service that is provided by the second layer (L2) for data transfer between the UE and the E-UTRAN.

FIG. 3 is a conceptual diagram illustrating a User Plane of a radio interface protocol structure between the UE and the UTRAN according to the 3GPP radio access network standard. The radio protocol user plane includes the physical layer, the MAC layer, the RLC layer and the PDCP layer.

The physical layer of the first layer (L1) and the MAC and RLC layers of the second layer (L2) are the same as those illustrated in FIG. 2. A PDCP layer of the second layer (L2) performs header compression to reduce the size of a relatively-large IP packet header containing unnecessary control information in order to effectively transmit IP packets, such as IPv4 or IPv6, within a radio-communication period having a narrow bandwidth.

Uplink and downlink channels for transmitting data between the network and the UE will hereinafter be described in detail. Downlink channels transmit data from the network to the UE. Uplink channels transmit data from the UE to the network.

Examples of downlink channels are a Broadcast Channel (BCH) for transmitting system information and a downlink Shared Channel (SCH) and a Shared Control Channel (SCCH) for transmitting user traffic or control messages. The user traffic or control messages of a downlink multicast service or broadcast service may be transmitted over the

downlink shared channel (SCH) or may be transmitted over an additional multicast channel (MCH).

Examples of uplink channels are a Random Access Channel (RACH) and an uplink shared channel (SCH) and a shared control channel (SCCH) for transmitting user traffic or control messages.

An orthogonal frequency division multiplexing (OFDM) scheme for use in the physical layer which is the first layer will hereinafter be described in detail. The OFDM scheme divides a high-speed data stream into several low-speed data streams and simultaneously transmits the low-speed data streams over a plurality of carriers. Here, each of the plurality of carriers is a subcarrier.

The OFDM scheme has orthogonality between several subcarriers. Therefore, the frequency components of the subcarriers can be detected at the receiving side although frequency components of the subcarriers overlap each other.

The high-rate data stream is converted into several low-speed data streams by a serial/parallel converter, which is also called a "serial to parallel converter." Each of the subcarriers is multiplied by the parallel data streams generated by the serial/parallel converter and the resultant data streams are summed such that the sum of the data streams is transmitted to the receiving side.

The parallel data streams generated by the serial/parallel converter may be transmitted to a destination over a plurality of subcarriers according to an Inverse Discrete Fourier Transform (IDFT) scheme. The IDFT may be effectively implemented by an Inverse Fast Fourier Transform (IFFT) scheme.

Temporal signal dispersion generated by the multi-path delay spreading, such as relative signal dispersion in time, decreases as symbol duration of the low-speed subcarrier increases. A guard interval longer than a channel delay dispersion interval is inserted

between OFDM symbols such that inter-symbol interference may be reduced. If the OFDM symbols can be cyclically extended, a duplicate of some parts of the OFDM signal is arranged at the guard interval, thereby resulting in the protection of the symbols.

A conventional Orthogonal Frequency Division Multiple Access (OFDMA) scheme will hereinafter be described in detail. The OFDMA scheme transmits some parts of subcarriers available for a system based on OFDM modulation to individual users such that a multiple access function may be implemented for the users.

The OFDMA scheme transmits frequency resources called subcarriers to the users. The frequency resources are transmitted to the users independent of each other such that they do not overlap each other. As a result, the frequency resources are exclusively allocated to the users such that there is no overlapping.

FIG. 4 is a block diagram illustrating a transmitter based on a Discrete Fourier Transform Single-Orthogonal Frequency Division Multiple (DFT-S-OFDM) scheme, hereinafter referred to as a "DFT-S-OFDM transmitter." A conventional DFT-S-OFDM scheme will be described with reference to FIG. 4.

For the convenience of description, a plurality of variables will be defined. Variable "N" is indicative of the number of subcarriers over which OFDM signals are transmitted. Variable "Nb" is indicative of the number of subcarriers for a specific user. Variable "F" is indicative of a Discrete Fourier Transform (DFT) matrix. Variable "s" is indicative of a data-symbol vector. Variable "x" is indicative of a vector generated by data dispersion within a frequency domain. Variable "y" is indicative of an OFDM-symbol vector.

A Single Carrie-Frequency Division Multiple Access (SC-FDMA) system converts the data symbol(s) into a parallel signal using the serial/parallel converter 410 and performs dispersion of the data symbol(s) using a DFT matrix prior to the transmission of the data symbol(s) by the DFT dispersion module 420 the data symbols. Dispersion of is represented

by Equation 1:

[Equation 1] $x = F_{Nb \times Nb} s$

With reference to Equation 1, $F_{Nb \times Nb}$ indicates an Nb-sized DFT matrix used for dispersion of the data symbol(s). The subcarrier mapping unit 430 performs subcarrier mapping of the dispersed vector (x) using a specific subcarrier allocation technique.

The IFDT module 440 receives the mapped signal from the subcarrier mapping unit 430 and converts the received signal into a time-domain signal to generate a target signal that is received at the receiving side via the parallel/serial converter 450. The target signal transmitted to the receiving side can be represented by Equation 2:

[Equation 2] $y = F_{N \times N}^{-1} x$

With reference to Equation 2, $F_{N \times N}^{-1}$ indicates an N-sized IDFT matrix required for converting a frequency-domain signal to a time-domain signal. The cyclic prefix insertion unit 460 inserts a cyclic prefix into the OFDM-symbol vector (y) such that the resultant "y" signal including the cyclic prefix is transmitted to a destination.

A method for generating a transmission signal and transmitting the signal to the receiving side according to the above-mentioned scheme is referred to as an SC-FDMA method. The size of the DFT matrix can be controlled in various ways to implement a specific object.

FIG. 5 is a conceptual diagram illustrating a hybrid ARQ (HARQ) scheme. A method for implementing HARQ in the downlink physical layer of a radio packet communication system will be described with reference to FIG. 5.

Referring to FIG. 5, the eNode-B determines a UE that is to receive packets and information of the type of packet that is to be transmitted to the UE, such as a code rate, a modulation scheme and an amount of data. The eNode-B informs the UE of the determined information over an HS-SCCH (High-Speed Downlink Shared Control Channel) and

transmits a corresponding data packet (HS-DSCH) at a time associated with the transmission of the information over the HS-SCCH.

The UE receives information of the packet over the HS-SCCH. The UE then recognizes the type and transmission point of the packet and receives the corresponding packet.

The UE transmits a negative acknowledgement (NACK) signal to the eNode-B if the UE fails to decode a specific packet, such as data1. The eNode-B recognizes that packet transmission has failed and re-transmits the same data, such as data1, using the same packet format or a new packet format at a suitable time point. The UE combines the re-transmitted packet, such as data1, and a previously-received packet for which packet decoding failed and re-attempts packet decoding.

The UE transmits an acknowledgement (ACK) signal to the eNode-B if the packet is received and decoded successfully. The eNode-B recognizes successful packet transmission and performs transmission of the next packet, such as data2.

Some parts of the radio resources are allocated according to scheduling of the upper layer in order to allow a plurality of eNode-Bs to communicate with a plurality of UEs over limited radio resources using a mobile communication system. The scheduling is generally executed by the eNode-B(s), which communicate with the UEs using the allocated radio resources.

The eNode-B allocates radio resources to the UE upon receiving a request from the UE. The eNode-B may also allocate the radio resources to the UE if there is a need to allocate radio resources to the UE in the absence of a request from the UE. The radio resources are also allocated to the UE if there is a need to pre-allocate the radio resources to the UE.

The UEs transmit data or control signals using prescribed radio resources allocated by the eNode-B. The radio resources allocated by the eNode-B in an uplink transmission are

prescribed for specific UEs.

Therefore, the radio resources may be unnecessarily wasted if the specific UEs do not use the radio resources allocated by the eNode-B. In other words, it is difficult to re-allocate radio resources that were pre-allocated to specific UEs to other UEs, thereby resulting in ineffective use of radio resources.

Disclosure of invention

Accordingly, the present invention is directed to a method for scheduling radio resources of a mobile communication system that substantially obviates one or more problems due to limitations and disadvantages of the related art. An object of the present invention is to provide a radio-resource scheduling method for improving efficiency of radio resources available for a mobile communication system, thereby facilitating more efficient communication between the UE and an eNode-B. Another object of the present invention is to provide a radio-resource scheduling method for reducing an amount of wasted radio resources. Still another object of the present invention is to provide a radio-resource scheduling method for effectively allocating radio resources using a message received from a UE during an uplink transmission by the UE.

In one aspect of the present invention, a method for scheduling radio resources in a mobile communication system is provided. The method includes receiving an indication of allocated radio resources, transmitting information using the allocated radio resources, either transmitting an indication that the radio resources are no longer needed or receiving an indication that the radio resources are no longer allocated and no longer transmitting information using the radio resources.

It is contemplated that the method further includes receiving an indication that the resources are no longer allocated after transmitting the indication that radio resources are no

longer needed. It is further contemplated that the indication that the resources are no longer allocated includes a message between a second protocol layer and a first protocol layer.

It is contemplated that transmitting the indication that the radio resources are no longer needed includes transmitting either an uplink control signal or a preamble over a random access channel (RACH). It is further contemplated that the indication that the radio resources are no longer needed includes an indication that there is no data left for transmission over an uplink path.

In another aspect of the present invention, a method for scheduling radio resources in a mobile communication system is provided. The method includes allocating radio resources to a first mobile communication terminal, determining that the allocated radio resources are no longer needed and re-allocating the radio resources to a second mobile communication terminal.

It is contemplated that determining that the allocated radio resources are no longer needed includes receiving an indication that the radio resources are no longer needed. It is further contemplated that receiving the indication that the radio resources are no longer needed includes receiving either an uplink control signal or a preamble over a random access channel (RACH).

It is contemplated that the indication that the radio resources are no longer needed includes an indication that there is no data left for transmission over an uplink path. It is further contemplated that determining that the allocated radio resources are no longer needed includes determining that the first mobile communication terminal has no additional information to transmit

It is contemplated that the method further includes transmitting an indication to the first mobile communication terminal that the resources are no longer allocated. It is further contemplated that the indication that the resources are no longer allocated includes a message

between a second protocol layer and a first protocol layer.

In another aspect of the present invention, a method for scheduling radio resources in a mobile communication system is provided. The method includes a network allocating radio resources to a first mobile communication terminal, the first mobile communication terminal transmitting information using the allocated radio resources, determining that the allocated radio resources are no longer needed, the network re-allocating the radio resources to a second mobile communication terminal and the first mobile communication terminal no longer transmitting information using the radio resources.

It is contemplated that determining that the allocated radio resources are no longer needed includes the first mobile communication terminal transmitting an indication that the radio resources are no longer needed. It is further contemplated that the first mobile communication terminal transmits the indication that the radio resources are no longer needed in either an uplink control signal or a preamble over a random access channel (RACH).

It is contemplated that the method further includes the network transmitting an indication to the first mobile communication terminal that the resources are no longer allocated. It is further contemplated that the indication that the resources are no longer allocated includes a message between a second protocol layer and a first protocol layer.

It is contemplated that determining that the allocated radio resources are no longer needed includes the network determining that the first mobile communication terminal has no additional information to transmit. It is further contemplated that the method further includes the network transmitting an indication to the first mobile communication terminal that the resources are no longer allocated. Preferably, the indication that the resources are no longer allocated includes a message between a second protocol layer and a first protocol layer.

Additional features and advantages of the invention will be set forth in the description which follows, and in part will be apparent from the description, or may be learned by

practice of the invention. It is to be understood that both the foregoing general description and the following detailed description of the present invention are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

These and other embodiments will also become readily apparent to those skilled in the art from the following detailed description of the embodiments having reference to the attached figures, the invention not being limited to any particular embodiments disclosed.

Brief Description of Drawings

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention. Features, elements, and aspects of the invention that are referenced by the same numerals in different figures represent the same, equivalent, or similar features, elements, or aspects in accordance with one or more embodiments.

FIG. 1 is a structural diagram illustrating a conventional Long Term Evolution (LTE) system which is a mobile communication system.

FIG. 2 is a conceptual diagram illustrating a Control Plane of a conventional radio interface protocol structure between a UE and a UTRAN based on a 3GPP radio access network standard.

FIG. 3 is a conceptual diagram illustrating a User Plane of a conventional radio interface protocol structure between a UE and a UTRAN based on a 3GPP radio access network standard.

FIG. 4 is a block diagram illustrating a conventional transmitter based on a DFT-S-OFDM scheme.

FIG. 5 is a conceptual diagram illustrating a conventional hybrid ARQ (HARQ) scheme.

FIG. 6 is a flow chart illustrating a method for scheduling radio resources of a mobile communication system according to a one embodiment of the present invention.

FIG. 7 is a flow chart illustrating a method for scheduling radio resources of a mobile communication system according to another embodiment of the present invention.

5

best mode for carrying out the inventionReference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts. A method for scheduling radio 10 resources of a mobile communication system according to the present invention will hereinafter be described with reference to the accompanying drawings.

For the convenience of description and better understanding of the present invention, "terminal" is used to refer to a transmitter of an uplink signal and "base station" is used as a receiver of the uplink signal. However, it should be noted that the scope of "terminal" and 15 "base station" is not limited to the above-mentioned terms and "terminal" and "base station" may also be used to refer to, respectively, a UE and Node-B or eNode-B.

The following preferred embodiments of the present invention are implemented when the present invention is applied to an OFDM-based LTE system. The OFDM system allocates a single resource block (RB) composed of both a specific subframe and specific 20 subcarrier when the eNode-B performs scheduling of uplink or downlink radio resources from the eNode-B to the UE. This is unlike a Code Division Multiple Access (CDMA) system. The UE or the eNode-B can perform transmission/reception of data using the allocated RBs.

FIG. 6 is a flow chart illustrating a method for scheduling radio resources of a mobile 25 communication system according to one embodiment of the present invention. The

scheduling of data transmission or reception may also be executed by entities other than the eNode-B as necessary. For convenience of description and better understanding of the present invention, it is assumed that the scheduling process is executed by only the eNode-B.

The eNode-B allocates radio resources for data communication to individual UEs connected to the eNode-B. As previously stated, the radio resources are indicative of RBs.

The radio resources may be allocated to the UEs upon receiving requests from the UEs. The eNode-B may also pre-allocate the radio resources to the UEs as necessary in the absence of requests from the UEs.

The UE radio resource request process is executed according to RACH, CQI, ACK/NACK and data types of a second layer. Each UE receives uplink radio resources allocated by the eNode-B (step S60).

Each UE completes uplink data transmission using the allocated radio resources in an uplink transmission path in which the UE is a transmitter (Step S61). Uplink radio resources may be left after the UE completes the data transmission using the radio resources.

For example, it is assumed that the eNode-B allocates 100 RBs as uplink radio resources of a specific UE. If the radio resources used for the uplink data transmission by the UE are only 80 RBs, 20 RBs may be left in the UE.

The specific UE transmits a message including a specific information to the eNode-B in order to inform the eNode-B of remaining radio resources (step S62) if there are remaining radio resources after the specific UE completes uplink data transmission. Preferably, the specific information is included in a "Request for de-allocation of the allocated uplink radio resource" message, hereinafter referred to as a "radio resource allocation release request message", for requesting the eNode-B to release the allocated radio resources.

The radio-resource allocation release request message may be transmitted to a destination according to data types of the second layer illustrated in FIG. 3 or may be

transmitted to the destination over a specific physical channel. A representative example of a method for transmitting a message including information of the allocated radio resource according to the data types of the second layer will hereinafter be described in detail.

For example, the above-mentioned radio resource allocation release request message may be contained in a Protocol Data Unit (PDU) of the MAC layer (hereinafter referred to as a "MAC PDU") and transmitted to the eNode-B. The radio resource allocation release request message may employ a 1-bit indicator if the radio resource allocation release request message is contained in the MAC PDU such that the MAC PDU including the radio resource allocation release request message is transmitted to a destination.

The 1-bit indicator is set to "1" to indicate that data for transmission for an uplink remains in a buffer of the specific UE. The 1-bit indicator is set to "0" to indicate that there is no more data for transmission left in the buffer of the specific UE.

The eNode-B recognizes the completion of uplink data transmission of the specific UE if the 1-bit indicator set to "0" is received. Otherwise, the eNode-B recognizes that data remains to be transmitted for the uplink in the specific UE if the 1-bit indicator set to "1" is received.

In another example, the RACH which is a representative transport channel may be used for transmitting the radio resource allocation release request message. The RACH represents a channel for transmitting an initial control message from the UE to the network.

Generally, the RACH is adapted to synchronize between the UE and the network. Furthermore, the UE can acquire necessary radio resources using the RACH if there is no more data left for transmission in a UE that desires to transmit data in an uplink direction.

The specific UE transmits a radio resource allocation release request message to the eNode-B over the RACH. A specific indicator may be contained in a preamble of the RACH.

In another example, an uplink control signal may be used for transmitting the radio

resource allocation release request message. The uplink control signal may also be transmitted to a destination along with other uplink control signals if required. There are a variety of uplink control signals, such as CQI and ACK/NACK.

The information of the release request is contained in the CQI or ACK/NACK signal such that the UE can inform the eNode-B of the completion of data transmission if the UE transmits the CQI or ACK/NACK signal. The UE may also transmit the information of the release request to the eNode-B using the 1-bit indicator.

In another example, a dedicated physical channel may be used for transmitting the radio resource allocation release request message. The eNode-B recognizes the presence of unused radio resources when it receives the radio resource allocation release request message. The eNode-B then re-allocates the unused radio resources, such as radio resources released by a specific UE, to other UEs (step S63).

The eNode-B may re-allocate the unused radio resources to the specific UE. The eNode-B may allocate the released radio resources to the UEs if it receives radio resource request messages from other UEs.

The eNode-B may allocate the released radio resources to the other UEs in the absence of a request from the other UEs, if required. The radio resource requests of the other UEs may be executed according to random access channel (RACH), CQI, ACK/NACK, and data types of the second layer.

FIG. 7 is a flow chart illustrating a method for scheduling radio resources of a mobile communication system according to another embodiment of the present invention. As illustrate in FIG. 7, the process for controlling the eNode-B to allocate some radio resources to the specific UE and a process for controlling the specific UE to transmit/receive data at steps S70 and S71 are identical to steps S60 and S61 illustrated FIG. 6. Furthermore, the method for transmitting the radio resource allocation release request message at step S72 of

FIG. 7 is identical to step S62 illustrated FIG. 6 if radio resources are left in the UE after uplink data transmission is completed.

The radio resource allocation release request message may be transmitted according to data types of the second layer, may be transmitted over the RACH, or may be transmitted at a transmission time of the control signals, such as CQI and ACK/NACK. The 1-bit indicator is used as the radio resource allocation release request message.

Setting the 1-bit indicator to "1" indicates that the buffer of the UE still has data to be transmitted. Setting the 1-bit indicator to "0" indicates that there is no more data for transmission left in the buffer of the UE. In this way, the UE can inform the eNode-B of information regarding the state of the buffer.

The eNode-B transmits a radio resource allocation release completion message to the specific UE (step S73) upon receiving the radio resource allocation release request message from a specific UE. The eNode-B can prevent the specific UE from re-using the radio resources if the eNode-B re-allocates the radio resources to other UEs after transmitting the radio resource allocation release completion message, thereby preventing a collision between the specific UE and the other UEs from being generated.

The radio-resource allocation release completion message may be transmitted via a control signal of the first or second layer. The radio-resource allocation release completion message may also be transmitted over a downlink shared channel (DL-SCH).

The eNode-B re-allocates released radio resources to other UEs when it receives the radio resource allocation release request message from the specific UE after transmitting the radio resource allocation release completion message. The radio resource allocation request messages may be received from other UEs such that the released radio resources can be allocated to the other UEs. The eNode-B may also allocate the released radio resources to the other UEs in the absence of radio resource allocation request messages from the other UEs.

The method for scheduling radio resources of a mobile communication system according to the present invention can re-allocate radio resources to other UEs using a message received from a specific UE such that wasted radio resources are minimized when allocated radio resources remain in the specific UE after it completes uplink data transmission. In this way, efficiency of data communication in a mobile communication system may be enhanced.

It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the inventions. Therefore, it is intended that the present invention covers the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

As the present invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, it should also be understood that the above-described embodiments are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should be construed broadly within its spirit and scope as defined in the appended claims. Therefore, all changes and modifications that fall within the metes and bounds of the claims, or equivalence of such metes and bounds are intended to be embraced by the appended claims.

The foregoing embodiments and advantages are merely exemplary and are not to be construed as limiting the present invention. The present teaching can be readily applied to other types of apparatuses.

The description of the present invention is intended to be illustrative, and not to limit the scope of the claims. Many alternatives, modifications, and variations will be apparent to those skilled in the art. In the claims, means-plus-function clauses are intended to cover the structure described herein as performing the recited function and not only structural

equivalents but also equivalent structures.

INDUSTRIAL APPLICABILITY

The present invention can be applied to a mobile communication system.

What is claimed is:

1. A method for scheduling radio resources in a mobile communication system, the method comprising:

receiving an indication of allocated radio resources;

transmitting information using the allocated radio resources;

one of transmitting an indication that the radio resources are no longer needed and receiving an indication that the radio resources are no longer allocated; and

no longer transmitting information using the radio resources.

2. The method according to claim 1, further comprising:

receiving an indication that the resources are no longer allocated after transmitting the indication that radio resources are no longer needed.

3. The method according to claim 1, wherein the indication that the resources are no longer allocated comprises a message between a second protocol layer and a first protocol layer.

4. The method according to claim 1, wherein transmitting the indication that the radio resources are no longer needed comprises transmitting one of an uplink control signal and a preamble over a random access channel (RACH).

5. The method according to claim 1, wherein the indication that the radio resources are no longer needed comprises an indication that there is no data left for transmission over an uplink path.

6. A method for scheduling radio resources in a mobile communication system,

the method comprising:

allocating radio resources to a first mobile communication terminal;

determining that the allocated radio resources are no longer needed; and

re-allocating the radio resources to a second mobile communication terminal.

7. The method according to claim 6, wherein determining that the allocated radio resources are no longer needed comprises receiving an indication that the radio resources are no longer needed.

8. The method according to claim 7, wherein receiving the indication that the radio resources are no longer needed comprises receiving one of an uplink control signal and a preamble over a random access channel (RACH).

9. The method according to claim 7, wherein the indication that the radio resources are no longer needed comprises an indication that there is no data left for transmission over an uplink path.

10. The method according to claim 6, wherein determining that the allocated radio resources are no longer needed comprises determining that the first mobile communication terminal has no additional information to transmit.

11. The method according to claim 10, further comprising:

transmitting an indication to the first mobile communication terminal that the resources are no longer allocated.

12. The method according to claim 11, wherein the indication that the resources are no longer allocated comprises a message between a second protocol layer and a first protocol layer.

13. A method for scheduling radio resources in a mobile communication system, the method comprising:

a network allocating radio resources to a first mobile communication terminal;

the first mobile communication terminal transmitting information using the allocated radio resources;

determining that the allocated radio resources are no longer needed;

the network re-allocating the radio resources to a second mobile communication terminal; and

the first mobile communication terminal no longer transmitting information using the radio resources.

14. The method according to claim 13, wherein determining that the allocated radio resources are no longer needed comprises the first mobile communication terminal transmitting an indication that the radio resources are no longer needed.

15. The method according to claim 14, wherein the first mobile communication terminal transmits the indication that the radio resources are no longer needed in one of an uplink control signal and a preamble over a random access channel (RACH).

16. The method according to claim 14, further comprising:

the network transmitting an indication to the first mobile communication terminal that the resources are no longer allocated.

17. The method according to claim 16, wherein the indication that the resources are no longer allocated comprises a message between a second protocol layer and a first protocol layer.

18. The method according to claim 13, wherein determining that the allocated radio resources are no longer needed comprises the network determining that the first mobile communication terminal has no additional information to transmit.

19. The method according to claim 18, further comprising:

the network transmitting an indication to the first mobile communication terminal that the resources are no longer allocated.

20. The method according to claim 19, wherein the indication that the resources are no longer allocated comprises a message between a second protocol layer and a first protocol layer.

FIG. 1

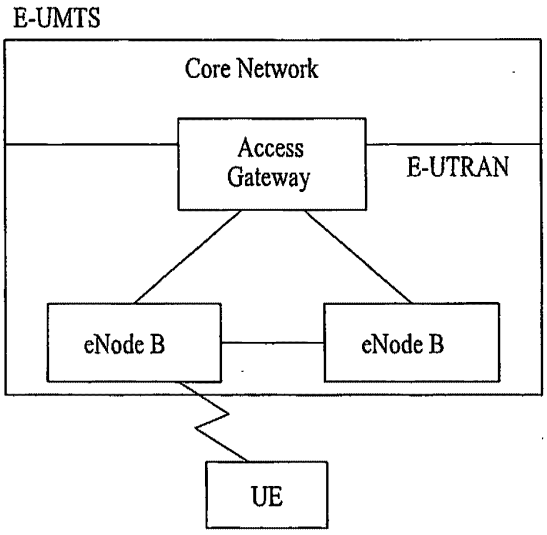


FIG. 2

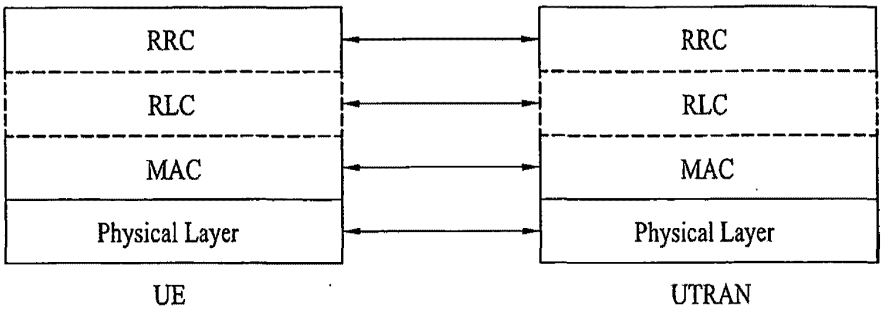

RRC
RLC
MAC
Physical Layer
UE
RRC
RLC
MAC
Physical Layer
UTRAN

FIG. 3

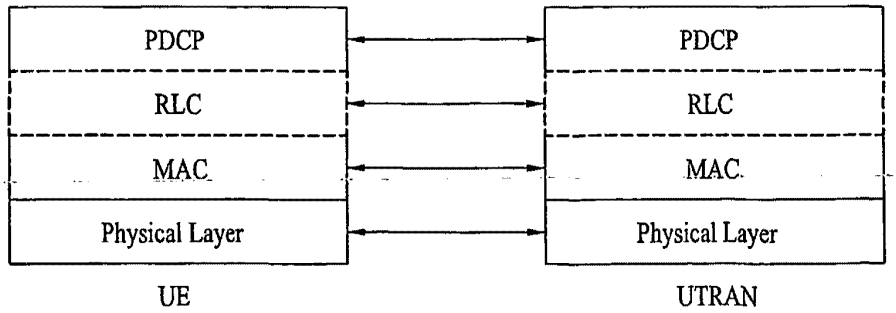

PDCP
RLC
MAC
Physical Layer
UE
PDCP
RLC
MAC
Physical Layer
UTRAN

FIG. 4

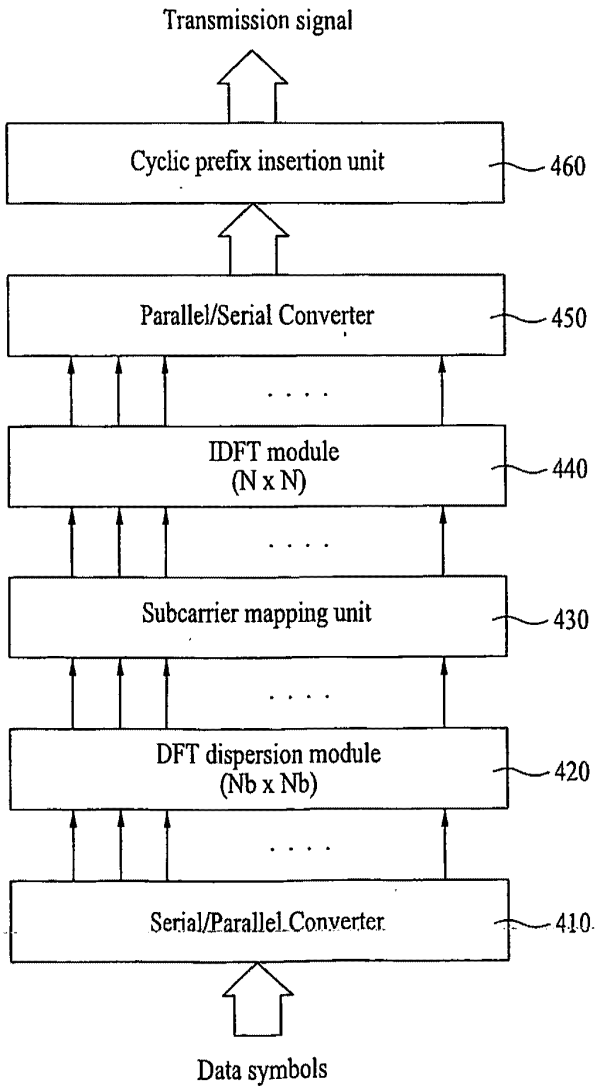

Transmission signal
Cyclic prefix insertion unit
460
Parallel/Serial Converter
450
IDFT module
(N x N)
440
Subcarrier mapping unit
430
DFT dispersion module
(Nb x Nb)
420
Serial/Parallel Converter
410
Data symbols

FIG. 5

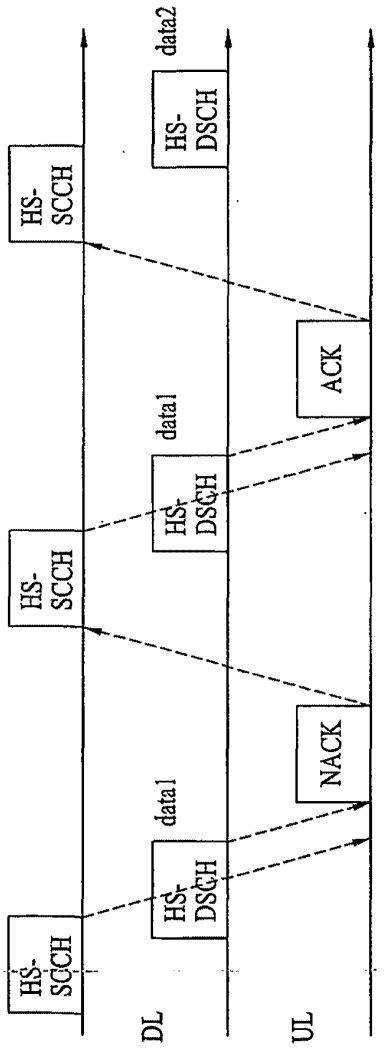

HS-SCCH
HS-DSCH
data1
NACK
HS-SCCH
HS-DSCH
data1
ACK
HS-SCCH
HS-DSCH
data2
DL
UL

FIG. 6

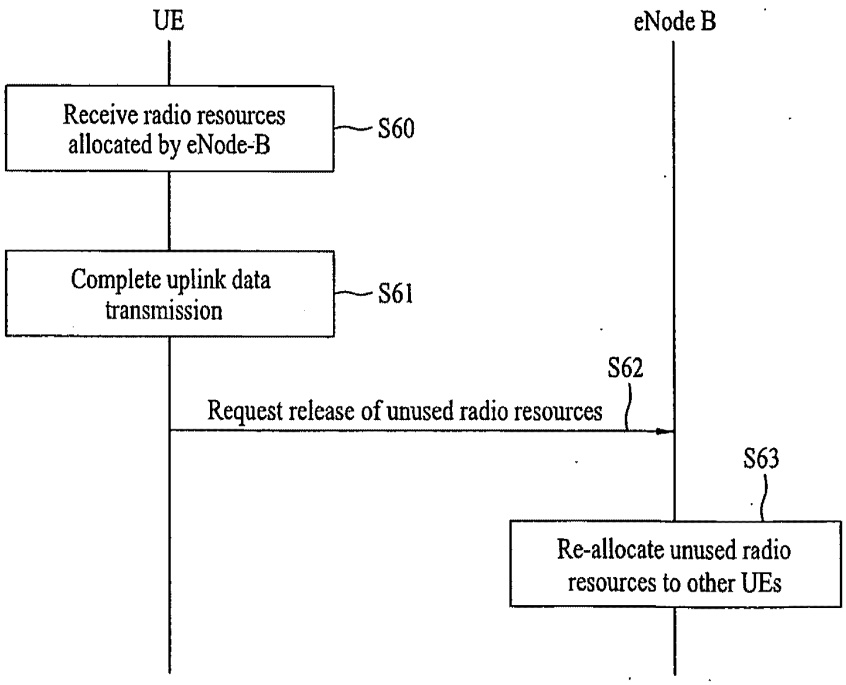
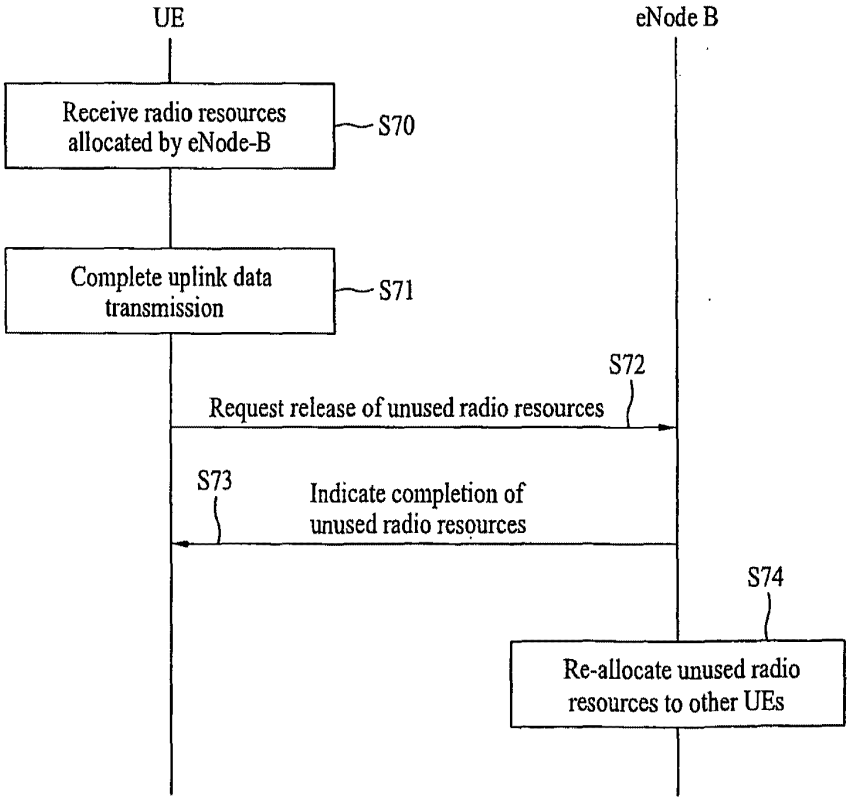

UE
eNode B
Receive radio resources allocated by eNode-B
S60
Complete uplink data transmission
S61
S62
Request release of unused radio resources
S63
Re-allocate unused radio resources to other UEs

FIG. 7


UE
eNode B
Receive radio resources allocated by eNode-B
S70
Complete uplink data transmission
S71
S72
Request release of unused radio resources
S73
Indicate completion of unused radio resources
S74
Re-allocate unused radio resources to other UEs

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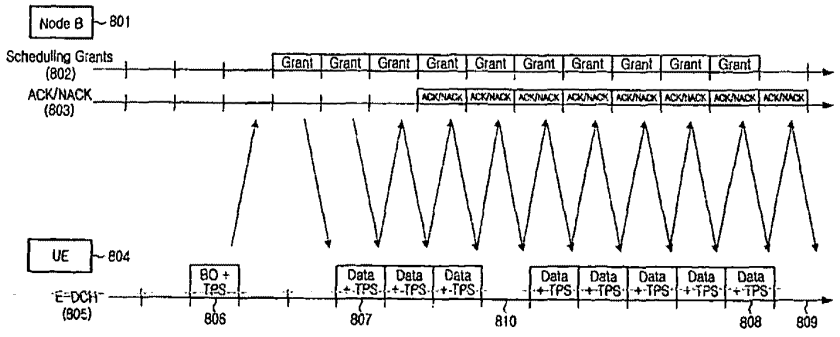
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(54) Title: METHOD AND APPARATUS FOR SIGNALING USER EQUIPMENT STATUS INFORMATION FOR UPLINK DATA TRANSMISSION IN A MOBILE COMMUNICATION SYSTEM



(57) Abstract: A method and apparatus for increasing the scheduling performance of a system supporting an uplink data service and total system stability by effectively UE status information to a Node B in a mobile communication system supporting the uplink data service are provided. UE status information including buffer occupancy information and transmit power status information is transmitted to a Node B periodically or upon generation of an event, irrespective of the presence or absence of uplink data to be transmitted. Since the buffer occupancy information and the transmit power status information are transmitted to the Node B by MAC-e signaling, physical channel resources are saved and E-DCH performance is improved.

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METHOD AND APPARATUS FOR SIGNALING USER EQUIPMENT STATUS INFORMATION FOR UPLINK DATA TRANSMISSION IN A MOBILE COMMUNICATION SYSTEM

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates generally to asynchronous Wideband Code Division Multiple Access (WCDMA) communications. In particular, the present invention relates to a method and apparatus for signaling the transmit power status (TPS), that is, uplink channel status of a User Equipment (UE) for use in uplink packet transmission scheduling.

Description of the Related Art

A 3rd generation mobile communication system using WCDMA based on the European Global System for Mobile communications (GSM) system, Universal Mobile Telecommunication Service (UMTS) provides mobile subscribers or computer users with a uniform service of transmitting packet-based text, digitized voice, and video and multimedia data at or above 2Mbps irrespective of their locations around the world. With the introduction of the concept of virtual access, the UMTS system allows access to any end point within a network at all times. The virtual access refers to packet-switched access using a packet protocol like Internet Protocol (IP).

FIG. 1 illustrates the configuration of the UMTS Terrestrial Radio Access Network (UTRAN) of a conventional UMTS system.

Referring to FIG. 1, a UTRAN 12 includes Radio Network Controllers (RNCs) 16a and 16b and Node Bs 18a to 18d and connects a UE 20 to a Core Network (CN) 10. A plurality of cells may underlie the Node Bs 18a to 18d. Each RNC 16a or 16b controls its underlying Node Bs and each Node B controls its underlying cells. An RNC, and Node Bs and cells under the control of the RNC collectively form a Radio Network Subsystem (RNS) 14a or 14b.

The RNCs 16a and 16b each allocate or manage radio resources to the Node Bs 18a to 18d under their control and the Node Bs 18a to 18d function to actually provide

the radio resources. The radio resources are configured on a cell basis and the radio resources provided by the Node Bs 18a to 18d refer to radio resources of the cells that they manage. The UE establishes a radio channel using radio resources provided by a particular cell under a particular Node B, for communications. From the UE's point of view, a distinction between the Node Bs 18a to 18d and their controlled cells is meaningless and the UE 20 deals only with a physical layer configured on a cell basis. Therefore, the terms "Node B" and "cell" are interchangeably used herein.

A Uu interface is defined between a UE and an RNC. The hierarchical protocol architecture of the Uu interface is illustrated in detail in FIG. 2. This interface is divided into a control plane (C-plane) 30 for exchanging control signals between the UE and the RNC and a user plane (U-plane) 32 for transmitting actual data.

Referring to FIG. 2, a Radio Resource Control (RRC) layer 32, a Radio Link Control (RLC) layer 40, a Medium Access Control (MAC) layer 42, and a physical (PHY) layer 44 are defined on the C-plane 30. A Packet Data Control Protocol (PDCP) layer 36, a Broadcast/Multicast Control (BMC) layer 38, the RLC layer 40, the MAC layer 42, and the PHY layer 44 are defined on the U-plane 32. The PHY layer 44 resides in each cell and the MAC layer 42 through the RRC layer 34 are configured usually in each RNC.

The PHY layer 44 provides an information delivery service by a radio transfer technology, corresponding to Layer 1 (L1) in an Open System Interconnection (OSI) model. The PHY layer 44 is connected to the MAC layer 42 via transport channels. The mapping relationship between the transport channels and physical channels is determined according to how data is processed in the PHY layer 44.

The MAC layer 42 is connected to the RLC layer 40 via logical channels. The MAC layer 42 delivers data received from the RLC layer 40 on the logical channels to the PHY layer 44 on appropriate transport channels, and delivers data received from the PHY layer 44 on the transport channels to the RLC layer 40 on appropriate logical channels. The MAC layer 42 inserts additional information or interprets inserted data in data received on the logical channels and controls random access. A U-plane-related part is called MAC-data (MAC-d) and a C-plane-related part is called MAC-control (MAC-c) in the MAC layer 42.

The RLC layer 40 controls the establishment and release of the logical channels.

The RLC layer 40 operates in one of an Acknowledged Mode (AM), an Unacknowledged Mode (UM) and a Transparent Mode (TM) and provides different functionalities in those modes. Typically, the RLC layer 40 segments or concatenates Service Data Units (SDUs) received form an upper layer to an appropriate size and correct errors.

The PDCP layer 36 resides above the RLC layer 40 in the U-plane 32. The PDCP layer 36 is responsible for compression and decompression of the header of data carried in the form of an IP packet and data delivery with integrity in the case where a serving RNC is changed due to the UE's mobility.

The characteristics of the transport channels that connect the PHY layer 44 to the upper layers depend on Transport Format (TF) that defines PHY layer processes including convolutional channel encoding, interleaving, and service-specific rate matching.

Particularly, the UMTS system uses an Enhanced Uplink Dedicated CHannel (E-DCH) with the aim to further improve packet transmission performance on the uplink from UEs to a Node B. To support more stable high-speed data transmission, the E-DCH utilizes Hybrid Automatic Retransmission request (HARQ) and Node B-controlled scheduling.

FIG. 3 illustrates data transmission on the E-DCH via typical radio links. Reference numeral 100 denotes a Node B supporting the E-DCH 111 to 114 and reference numerals 101 to 104 denote UEs that transmit the E-DCH 111 to 114.

Referring to FIG. 3, the Node B 100 evaluates the channel statuses of the UEs 101 to 104 and schedules their uplink data transmissions based on the channel statues. The scheduling is performed such that a noise rise measurement does not exceed a target noise rise in the Node B 100 in order to increase total system performance. Therefore, the Node B 100 allocates a low data rate to a remote UE 104 and a high data rate to a nearby UE 101.

FIG. 4 is a diagram illustrating a typical signal flow for message transmission on the E-DCH.

Referring to FIG. 4, a Node B and a UE establish an E-DCH in step 202. Step 202 involves message transmission on dedicated transport channels. The UE transmits its UE status information to the Node B in step 204. The UE status information may

contain information about the transmit power and power margin of the UE and the amount of buffered data to be transmitted to the Node B.

In step 206, the Node B monitors UE status information from a plurality of UEs to schedule uplink data transmissions for the individual UEs. The Node B decides to approve an uplink packet transmission from the UE and transmits scheduling assignment information to the UE in step 208. The scheduling assignment information includes an allowed data rate and an allowed timing.

In step 210, the UE determines the TF of the E-DCH based on the scheduling assignment information. The UE then transmits to the Node B TF information, that is, a Transport Format Resource Indicator (TFRI) and uplink packet data on the E-DCH at the same time in steps 212 and 214. The Node B determines whether the TFRI and the uplink packet data have errors in step 216. In the presence of errors in either of the TFRI and the uplink packet data, the Node B transmits an ACKnowledgement (ACK) signal to the UE, whereas in the absence of errors in both, the Node B transmits Non-ACKnowledgement (NACK) signal to the UE in step 218.

In the former case, the packet data transmission is completed and the UE transmits new packet data to the Node B on the E-DCH. On the other hand, in the latter case, the UE retransmits the same packet data to the Node B on the E-DCH.

As described above, the UE needs to transmit its UE status information to the Node B, to assist E-DCH scheduling. Particularly, the uplink transmit power information included in the UE status information is a significant factor in scheduling. Accordingly, a need exists for specifying how the uplink transmit power information is to be transmitted for efficient E-DCH transmission.

SUMMARY OF THE INVENTION

An object of the present invention is to address at least the above problems and/or disadvantages. Accordingly, an object of the present invention is to provide a method and apparatus for transmitting information about the uplink transmit power of a UE to a Node B for use in uplink data transmission scheduling in the Node B.

Another object of the present invention is to provide a method and apparatus for transmitting information about the uplink transmit power of a UE to a Node B by

transport channel data of an E-DCH.

The above exemplary objects of the present invention are achieved by providing an apparatus and method of transmitting UE status information for uplink data transmission in a mobile communication system.

According to one exemplary aspect of the present invention, in a method of transmitting UE status information for uplink data transmission in a mobile communication system, buffer occupancy (BO) information is generated by monitoring the amount of uplink data to be transmitted and transit power status (TPS) information is generated by monitoring uplink transmit power status. It is determined whether the BO information is to be transmitted in a current time interval. If the BO information is to be transmitted in the current time interval, it is determined whether the TPS information is to be transmitted in the current time interval according to a TPS period. If the TPS information is to be transmitted in the current time interval, a PDU including the BO information and the TPS information is generated and transmitted after coding and modulation.

According to another exemplary aspect of the present invention, in an apparatus for transmitting UE status information for uplink data transmission in a mobile communication system, a buffer buffers uplink data and generates BO information by monitoring the amount of the uplink data. A TPS information manager generates TPS information by monitoring uplink transmit power status. A UE status information generator determines whether the BO information is to be transmitted in a current time interval, determines whether the TPS information is to be transmitted in the current time interval, if the BO information is to be transmitted in the current time interval according to a TPS period, and generates UE status information including the BO information and the TPS information if the TPS information is to be transmitted in the current time interval. A PDU generator generates a PDU including the UE status information and a transmitter transmits the PDU after coding and modulation.

According to a further exemplary aspect of the present invention, in a method of transmitting UE status information for uplink data transmission in a mobile communication system, BO information is generated by monitoring the amount of uplink data to be transmitted, and TPS information is generated by monitoring uplink transmit power status. It is determined whether the BO information is to be transmitted

in a current time interval. If the BO information is to be transmitted in the current time interval, it is determined whether a TPS information transmission event has occurred. If the TPS information transmission event has occurred, a PDU including the BO information and the TPS information is generated and transmitted after coding and modulation.

According to still another exemplary aspect of the present invention, in an apparatus for transmitting UE status information for uplink data transmission in a mobile communication system, a buffer buffers uplink data to be transmitted and generates BO information by monitoring the amount of the uplink data. A TPS information manager generates TPS information by monitoring uplink transmit power status. A UE status information generator determines whether the BO information is to be transmitted in a current time interval, determines whether a TPS information transmission event has occurred, if the BO information is to be transmitted in the current time interval, and generates UE status information including the BO information and the TPS information if the TPS information transmission event has occurred. A PDU generator generates a PDU including the UE status information, and a transmitter transmits the PDU after coding and modulation.

According to yet another exemplary aspect of the present invention, in a method of transmitting UE status information for uplink data transmission in a mobile communication system, BO information is generated by monitoring the amount of uplink data to be transmitted and TPS information is generated by monitoring uplink transmit power status. It is determined whether a current time interval is a BO transmission interval in which the BO information is to be transmitted. If the current time interval is the BO transmission interval, a PDU including the BO information and the TPS information is generated and transmitted after coding and modulation.

According to yet further exemplary aspect of the present invention, in an apparatus for transmitting UE status information for uplink data transmission in a mobile communication system, a buffer buffers uplink data to be transmitted and generates BO information by monitoring the amount of the uplink data. A TPS information manager generates TPS information by monitoring uplink transmit power status. A UE status information generator determines whether a current time interval is a BO transmission interval in which the BO information is to be transmitted, and generates UE status

information including the BO information and the TPS information, if the current time interval is the BO transmission interval. A PDU generator generates a PDU including the UE status information, and a transmitter transmits the PDU after coding and modulation.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and advantages of the present invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings in which like reference symbols indicate the same or similar components, wherein:

FIG. 1 illustrates the configuration of a UTRAN in a typical UMTS system;

FIG. 2 illustrates the hierarchical architecture of an interface defined between a UE and an RNC;

FIG. 3 illustrates a conventional E-DCH transmission via a radio link;

FIG. 4 is a diagram illustrating a conventional signal flow for message transmission/reception on an E-DCH;

FIG. 5 illustrates the structure of a MAC-e Packet Data Unit (PDU);

FIG. 6 illustrates the configuration of MAC and PHY layers in relation to E-DCH transmission in a UE;

FIG. 7 illustrates the configuration of MAC and PHY layers in relation to E-DCH reception in a Node B;

FIG. 8 illustrates TPS transmission according to an exemplary embodiment of the present invention;

FIG. 9 illustrates TPS transmission according to another exemplary embodiment of the present invention;

FIG. 10 illustrates TPS transmission according to a third exemplary embodiment of the present invention;

FIG. 11 illustrates TPS transmission according to a fourth exemplary embodiment of the present invention;

FIG. 12 illustrates TPS transmission according to a fifth exemplary embodiment of the present invention;

FIG. 13 is a flowchart illustrating TPS transmission from a UE according to the

fourth exemplary embodiment of the present invention;

FIG. 14 is a flowchart illustrating TPS transmission from a UE according to the fifth exemplary embodiment of the present invention; and

FIG. 15 is a block diagram of a UE for TPS transmission according to an exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

Exemplary embodiments of the present invention will be described herein below with reference to the accompanying drawings. In the following description, well-known functions or constructions are not described in detail for conciseness.

An exemplary object of the present invention is to transmit the TPS of a UE to a Node B. The TPS is expressed as the maximum transmit power of the UE or the transmit power of a control channel alone from the UE. Alternatively, TPS is expressed as a maximum data rate available to the UE or a TF. Alternatively, the uplink transmit power information can be the ratio of the maximum transmit power to the transmit power of the control channel, that is, the power margin of the UE. In this context, the TPS represents the uplink channel status of the UE.

The TPS is transmitted to the Node B by MAC information in the exemplary embodiments of the present invention. As implied from its appellation, the MAC layer is responsible for medium access control between the RLC layer and the PHY layer. With the introduction of the E-DCH, the MAC layer configuration illustrated in FIG. 2 has been modified so that for the E-DCH functionality, a MAC-e entity is newly defined to work in conjunction with the existing MAC-d entity configured for a Dedicated CHannel (DCH). The MAC-e entity exists between the MAC-d entity and the PHY layer. As data is processed in the MAC layer, its format is changed as illustrated in FIG. 5.

Referring to FIG. 5, an RLC PDU 501 is data delivered from the RLC layer to the MAC layer. The MAC layer creates a MAC PDU by adding a MAC header to the RLC PDU 501 and provides the MAC PDU to the PHY layer. In the case of using the E-DCH, the MAC layer is divided into a MAC-d entity and a MAC-e entity and the MAC header attachment is carried out in the following two stages.

First, the MAC-d entity creates a MAC-d SDU 502 with one or more RLC

PDUs 501 received from the RLC layer and adds a MAC-d header 503 to the MAC-d SDU 502, thus creating a MAC-d PDU 505. The MAC-d header 503 includes multiplexing information indicating a source (that is, RLC entity) from which the one or more RLC PDUs 501 were generated.

The MAC-d PDU 505 is delivered to the MAC-e entity. The MAC-e entity forms a MAC-e SDU 504 with one or more MAC-d PDUs 505 and adds a MAC-e header 506 to the MAC-e SDU 504, thus creating a MAC-e PDU 507. The MAC-e header 506 contains information about the one or more MAC-e SDUs 504 included in the MAC-e PDU 507. While the MAC-e header 506 is placed before the MAC-e SDU 504 in FIG. 5, it is to be understood that the MAC-e header 506 actually covers all information added by the MAC-e entity, other than the MAC-d PDU. The MAC-e PDU 507 is carried in the form of a transport block to the PHY layer and subject to transport channel processing including Cyclic Redundancy Check (CRC) attachment, channel coding, and rate matching, prior to transmission to a receiver.

With reference to FIG. 6, a UE operation for generating data in the procedure illustrated in FIG. 5 will be described below.

Referring to FIG. 6, upon receipt of an RLC PDU 601, a MAC-d entity 602 generates a MAC-d PDU by adding a MAC-d header to the RLC PDU 601. A MAC-e entity 603 creates a MAC-e PDU by adding a MAC-e header to the MAC-d PDU. The MAC-e PDU is delivered to a PHY layer 604, is subject to transport channel processing including an HARQ operation, and is mapped to a PHY channel. The PHY channel is then transmitted as indicated by reference numeral 605. All this procedure illustrated in FIG. 6 is carried out in one UE 610.

Now a description will be made of exemplary E-DCH data reception with reference to FIG. 7. Referring to FIG. 7, a Node B 701 includes a PHY layer 703 and a MAC-e entity 704. An RNC 709 includes a MAC-es entity 706, a MAC-d entity 707, and upper layers (not shown). The MAC-es entity 706 performs E-DCH-related signaling.

The Node B 701 receives a PHY channel to which the E-DCH is mapped, an Enhanced Dedicated Physical CHannel (E-DPCH) 702, and performs transport channel processing including an HARQ operation on the received signal in the PHY layer 703. The resulting transport block is provided to the MAC-e entity 704. The MAC-e entity

704 extracts a MAC-e header, including necessary information for the Node B 701, from the transport block and interprets the MAC-e header. The output of the MAC-e entity 704 is provided to the MAC-es entity 706 of the RNC 709 via an Iub interface 705.

As illustrated in FIG. 7, the MAC-e exists separately in the Node B 701 and the RNC 709 because the information of the MAC-e header can be divided into information needed for the Node B 701 and information needed for the RNC 709. Therefore, the data fed to the MAC-es entity 706 via the Iub interface 705 is a MAC-e PDU with the entire MAC-e header or a MAC-e PDU with only the information needed for the RNC 709 except for the information needed for the Node B 701.

The MAC-es entity 706 extracts the MAC-e header from the received MAC-e PDU and outputs the resulting MAC-d PDU. The MAC-d entity 707 extracts a MAC-d header from the MAC-d PDU, interprets the MAC-d header, and outputs the resulting RLC PDU 708. The RLC PDU 708 is appropriately processed in the upper layers (not shown) including the RLC layer.

The information needed for the Node B 701 set in the MAC-e header contains UE status information. The UE status information has buffer information indicating the amount of uplink data to be transmitted (hereinafter, referred to as BO short for Buffer Occupancy), and uplink channel status information (hereinafter, referred to as TPS short for Transmit Power Status). Transmission of the BO is periodic or event-triggered. Events that trigger the BO transmission include input of new data in an E-DCH buffer and the amount of buffered data exceeding a threshold. It is assumed herein that a BO transmission method is predetermined.

The UE uses a MAC-e PDU to transmit the TPS. Specifically, the UE transmits the TPS in the MAC-e header 506 on the E-DCH.

Besides the BO, the TPS is required for Node B-controlled scheduling, as stated before. The Node B interprets a TPS set in the MAC-e header of a received MAC-e PDU and transmits a MAC-e PDU with the TPS or a MAC-e PDU free of the TPS (i.e. a MAC-es PDU) to the MAC-es entity of the RNC. Transmission of control information like the BO or the TPS by a MAC-e header is called MAC-e signaling in the present invention.

Alternatively, the UE can transmit a TPS by a MAC-e control PDU, specifically in the MAC-e SDU 504 illustrated in FIG. 5. The process of inserting the TPS in the

payload 504 instead of the MAC-e header 506 and transmitting the TPS is called MAC-e control PDU signaling in the present invention. The UE notifies the Node B of whether the MAC-e control PDU signaling is used by an Enhanced TF Index (E-TFI). Upon receipt of a MAC-e control PDU by the MAC-e control PDU signaling, the Node B may not transmit the MAC-e control PDU to the RNC.

Hereinbelow a description will be made of a method of transmitting a TPS to a Node B by MAC-e signaling in exemplary embodiments of the present invention. Since MAC-e control PDU signaling can be contemplated from the MAC-e signaling, TPS transmission by the MAC-e control PDU signaling will not be described in detail.

First Exemplary Embodiment

FIG. 8 illustrates TPS transmission using a MAC-e header from a UE for E-DCH scheduling according to an exemplary embodiment of the present invention.

Referring to FIG. 8, when new data is buffered, a UE 804 first transmits a BO & TPS 806 to a Node B 801 on an E-DCH 805. The BO & TPS 806 is included in an initial MAC-e PDU. The initial MAC-e PDU includes the BO or/and TPS in a MAC-e header with no data in payload and is transmitted by MAC-e signaling. The initial MAC-e PDU is used to indicate the start of data transmission on the E-DCH to the Node B 801.

Upon receipt of the BO or/and TPS on the E-DCH 805, the Node B 801 determines from the BO whether E-DCH data exists in the UE and schedules E-DCH data transmission based on the BO and TPS. The Node B 801 then transmits scheduling grant information to the UE 804 on a scheduling grant channel 802 as a result of the scheduling. The scheduling grant information can be the absolute value of available resources or the relative value of available resources to the previous resources. The former is called an absolute grant and the latter is called a relative grant. The Node B 801 receives a MAC-e PDU, performs an HARQ operation, and transmits an ACK/NACK signal to the UE 804 on an ACK/NACK channel 803.

The UE 804 transmits the E-DCH based on the scheduling grant information and the ACK/NACK signal. In accordance with the exemplary embodiment of the present invention, the UE transmits a TPS by a MAC-e header only in the presence of E-DCH data. In all E-DCH transmission time intervals 807 and 808, MAC-e PDUs have TPSs in their MAC-e headers.

On the other hand, in the absence of E-DCH data as before a time interval 807, no TPSs are transmitted. Yet, exceptionally a TPS can also be transmitted along with a BO in a BO transmission time interval. In a time interval 810 in which the buffer has data but the UE 804 is not allowed to transmit the data by scheduling or for any other reason, a TPS is not transmitted. When the buffer becomes empty, the UE 804 discontinues the TPS transmission as indicated by reference numeral 809.

Every time it receives a MAC-e PDU, the Node B 801 extracts a BO or/and TPS from the MAC-e PDU and performs scheduling based on the BO or/and TPS.

Second Exemplary Embodiment

FIG. 9 illustrates periodic TPS transmission from a UE for E-DCH scheduling according to another exemplary embodiment of the present invention.

The UE transmits a TPS every predetermined TPS period. In the presence of E-DCH data in time intervals defined by the TPS period, a TPS is transmitted along with the E-DCH data in a MAC-e PDU. In the absence of E-DCH data, the MAC-e PDU contains only the TPS.

Referring to FIG. 9, when new data is buffered, a UE 904 first transmits a BO & TPS 906 in an initial MAC-e PDU to a Node B 901 on an E-DCH 905. The initial MAC-e PDU includes only the BO or/and TPS in a MAC-e header with no data in payload and is transmitted by MAC-e signaling.

Upon receipt of the BO or/and TPS, the Node B 901 determines from the BO whether the UE 904 has E-DCH data and schedules based on the BO and the TPS. The Node B 901 then transmits scheduling grant information to the UE 904 on a scheduling grant channel 902 as a result of the scheduling. The scheduling grant information can be an absolute grant or a relative grant. The Node B 901 receives the MAC-e PDU, performs an HARQ operation, and transmits an ACK/NACK signal to the UE 904 on an ACK/NACK channel 903.

The UE 904 transmits the E-DCH data based on the scheduling grant information and the ACK/NACK signal. In accordance with the second exemplary embodiment of the present invention, the UE 904 transmits a TPS every predetermined TPS period 910. For example, in the presence of E-DCH data, the UE 904 transmits a TPS in the MAC-e header of a MAC-e PDU with the E-DCH data. In the absence of E-

DCH data, the UE 904 transmits a MAC-e PDU containing the TPS only. Thus, MAC-e PDUs with TPSs are transmitted in time intervals 907, 908 and 909 each apart from the following time interval by the TPS period 910.

The time intervals 907, 908 and 909 are limited to the case where an ACK signal is received for the previous MAC-e PDU or the number of transmissions of the previous MAC-e PDU has reached a maximum allowed number in an HARQ process. In other words, a TPS can be transmitted only in a time interval in which an initial transmission is possible. All conditions considered, the UE 904 transmits a TPS in the MAC-e header of an initial transmission MAC-e PDU in the earliest time interval in which TPS transmission is possible after expiration of the TPS period 910, that is, when the TPS period 910 has expired and the initial transmission MAC-e PDU has been created. The TPS period 910 is a predetermined fixed value or notified to the UE and the Node B from the RNC by upper layer signaling using Radio Resource Control (RRC) and Node B Application Part (NBAP) protocols.

In a BO transmission time interval 911, a TPS can also be transmitted in a MAC-e header even though the BO transmission time interval 911 is not a time interval in which TPS transmission is allowed according to the TPS period 910.

Before a time interval 907, that is, before the E-DCH data transmission, no TPSs are transmitted irrespective of the TPS period 910, except for a first BO transmission period 906 indicating the start of the E-DCH data transmission. In the time interval 906, the TPS and the BO are transmitted together. When there is no need for transmitting E-DCH data any longer, that is, when the buffer is empty in the UE 904, the UE 904 discontinues the E-DCH data transmission as indicated by reference numeral 912.

After receiving an initial MAC-e PDU containing a BO and a TPS only, the Node B 901 extracts the TPS from the first MAC-e PDU including data. Then, the Node B 904 extracts a TPS from a MAC-e PDU received every TPS period 910.

Third Exemplary Embodiment

FIG. 10 illustrates event-triggered TPS transmission from a UE for E-DCH scheduling according to a third exemplary embodiment of the present invention.

The UE transmits a TPS when a predetermined event is fulfilled. When the

event has occurred and E-DCH data exists, the UE transmits the E-DCH data and a TPS in a MAC-e PDU. In the absence of E-DCH data, the UE transmits a MAC-e PDU including only the TPS.

Referring to FIG. 10, when new data is buffered, a UE 1004 first transmits a BO & TPS 1006 in an initial MAC-e PDU to a Node B 1001 on an E-DCH 1005. The initial MAC-e PDU includes only the BO or/and TPS in a MAC-e header with no data in payload and is transmitted by MAC-e signaling.

Upon receipt of the BO or/and TPS, the Node B 1001 determines from the BO whether the UE 1004 has E-DCH data and schedules based on the BO and the TPS. The Node B 1001 then transmits scheduling grant information to the UE 1004 on a scheduling grant channel 1002 as a result of the scheduling. The scheduling grant information can be an absolute grant or a relative grant. The Node B 1001 receives the MAC-e PDU, performs an HARQ operation, and transmits an ACK/NACK signal to the UE 1004 on an ACK/NACK channel 1003.

The UE 1004 transmits the E-DCH data based on the scheduling grant information and the ACK/NACK signal. In accordance with the third exemplary embodiment of the present invention, the UE determines whether a predetermined event has occurred. Upon generation of the event, the UE 1004 transmits a TPS in a MAC-e PDU. To describe in more detail, in the presence of E-DCH data, the UE 1004 transmits a TPS in the MAC-e header of a MAC-e PDU with the E-DCH data. In the absence of E-DCH data, the UE 904 transmits a MAC-e PDU containing the TPS only.

For instance, when the difference between a TPS transmitted in the previous MAC-e PDU and the current TPS exceeds a predetermined threshold, this is an event that triggers TPS transmission. The UE 1004 transmits the TPS in a MAC-e header in a transmission time interval following the event. The threshold is a predetermined fixed value or notified to the UE and the Node B from the RNC by RRC and NBAP upper signaling. Many other events that trigger TPS transmission can be defined.

When the UE 1004 detects occurrence of a predetermined event in a time interval 1009, it transmits a TPS in a MAC-e header in the following time interval 1010. The time interval 1010 can be limited to the case where an ACK signal is received for the previous MAC-e PDU or the number of transmissions of the previous MAC-e PDU has reached a maximum allowed number in an HARQ process. That is, the TPS can be

transmitted only when an initial transmission is possible. All conditions considered, the UE 1004 transmits a TPS in the MAC-e header of an initial transmission MAC-e PDU in the earliest time interval in which TPS transmission is possible after the event, that is, when the event has occurred and then the initial transmission MAC-e PDU has been created.

In a BO transmission time interval 1008, a TPS can also be transmitted in a MAC-e header even though the event has not occurred in the previous time interval to the BO transmission time interval 1008.

Before a time interval 1007, that is, before the E-DCH data transmission, no TPSs are transmitted irrespective of event occurrence, except for a first BO transmission period 1006 indicating the start of the E-DCH data transmission. In the time interval 1006, the TPS and the BO are transmitted together. When there is no need for transmitting E-DCH data any longer, that is, when the buffer is empty in the UE 1004, the UE 1004 discontinues the E-DCH data transmission as indicated by reference numeral 1011.

Every time the Node B 1001 receives a MAC-e PDU, it determines whether the MAC-e PDU includes a TPS based on a MAC-e signaling indicator bit set in the MAC-e PDU. If the MAC-e signaling indicator bit indicates the presence of the TPS, the Node B 1001 extracts the TPS from the MAC-e PDU and uses the TPS in scheduling.

Fourth Exemplary Embodiment

FIG. 11 illustrates periodic or event-triggered TPS transmission from a UE for E-DCH scheduling according to a fourth exemplary embodiment of the present invention.

The UE transmits a TPS not only when a predetermined event is fulfilled but also every predetermined TPS period. As the UE transmits a TPS in an event-triggered manner and in addition, periodically, the periodic TPS transmission ensures stable TPS transmission despite failure of the event-triggered TPS transmission. When either the event has occurred or the TPS period has expired, in the presence of E-DCH data, the TPS is transmitted along with the E-DCH data in a MAC-e PDU. In the absence of E-DCH data, the MAC-e PDU contains only the TPS.

Referring to FIG. 11, when new data is buffered, a UE 1104 first transmits a BO

& TPS 1106 in an initial MAC-e PDU to a Node B 1101 on an E-DCH 1105. The initial MAC-e PDU includes only the BO or/and TPS in a MAC-e header with no data in payload and is transmitted by MAC-e signaling.

Upon receipt of the BO or/and TPS, the Node B 1101 determines from the BO whether the UE 1104 has E-DCH data and schedules based on the BO and the TPS. The Node B 1101 then transmits scheduling grant information to the UE 1104 on a scheduling grant channel 1102 as a result of the scheduling. The scheduling grant information can be an absolute grant or a relative grant. The Node B 1101 receives the MAC-e PDU, performs an HARQ operation, and transmits an ACK/NACK signal to the UE 1104 on an ACK/NACK channel 1103.

The UE 1104 transmits the E-DCH data based on the scheduling grant information and the ACK/NACK signal. In accordance with the fourth exemplary embodiment of the present invention, the UE 1104 transmits a TPS every predetermined TPS period 1111. Besides the periodic TPS transmission, the UE 1104 additionally transmits a TPS when the event occurs. In the presence of E-DCH data, the UE 1104 transmits a TPS in the MAC-e header of a MAC-e PDU with the E-DCH data. In the absence of E-DCH data, the UE 1104 transmits a MAC-e PDU containing the TPS only.

For instance, when the difference between a TPS transmitted in the previous MAC-e PDU and the current TPS exceeds a predetermined threshold, this is an event that triggers TPS transmission. The UE 1104 transmits the TPS in a MAC-e header in a transmission time interval following the event. The threshold is a predetermined fixed value or notified to the UE and the Node B from the RNC by RRC and NBAP upper signaling. Many other events that trigger TPS transmission can be defined. The TPS period 1111 is also a predetermined fixed value or notified to the UE and the Node B by RRC and NBAP upper signaling.

In time intervals 1107, 1109 and 1110, the UE 1104 transmits TPSs according to the TPS period 1111. Also, when the UE 1104 detects occurrence of the event in a time interval 1112, it transmits a TPS in the following time interval 1113. The time intervals 1107, 1109, 1110 and 1113 carrying the TPSs are limited to the case where an ACK signal is received for the previous MAC-e PDU or the number of transmissions of the previous MAC-e PDU has reached a maximum allowed number in an HARQ process. In other words, a TPS can be transmitted only in a time interval in which an initial

transmission is possible.

Therefore, all conditions considered, the UE 1104 transmits a TPS in the MAC-e header of an initial transmission MAC-e PDU in the earliest time interval in which TPS transmission is possible after expiration of the TPS period 1111 or occurrence of the event, that is, when the TPS period 1111 has expired or the event has occurred, and the initial transmission MAC-e PDU has been created.

In a BO transmission time interval 1108, a TPS can also be transmitted in a MAC-e header even though the BO transmission time interval 1108 is neither a time interval in which TPS transmission is allowed according to the TPS period 1111 nor a time interval following occurrence of the event.

Before a time interval 1107, that is, before the E-DCH data transmission, no TPSs are transmitted irrespective of the TPS period 1111 and the event, except for a first BO transmission period 1106 indicating the start of the E-DCH data transmission. In the time interval 1106, the TPS and the BO are transmitted together. When there is no need for transmitting E-DCH data any longer, that is, when the buffer is empty in the UE 1104, the UE 1104 discontinues the E-DCH data transmission as indicated by reference numeral 1114.

After receiving an initial MAC-e PDU containing a BO and a TPS only, the Node B 1101 extracts the TPS from the first MAC-e PDU including data. Then, the Node B 1104 extracts a TPS from a MAC-e PDU received every TPS period 1111. Also, every time the Node B 1101 receives a MAC-e PDU, it determines whether the MAC-e PDU includes a TPS based on a MAC-e signaling indicator bit set in the MAC-e PDU. In the presence of the TPS, the Node B 1101 extracts the TPS from the MAC-e PDU and uses the TPS in scheduling.

Fifth Exemplary Embodiment

FIG. 12 illustrates periodic event-triggered TPS transmission from a UE for E-DCH scheduling according to a fifth exemplary embodiment of the present invention.

The UE monitors a predetermined TPS period. Only when a predetermined event is fulfilled upon expiration of the TPS period, the UE transmits a TPS. When the TPS period has expired and the event has occurred, in the presence of E-DCH data, the TPS is transmitted along with the E-DCH data in a MAC-e PDU. In the absence of E-

DCH data, the MAC-e PDU contains only the TPS.

Referring to FIG. 12, when new data is buffered, a UE 1204 first transmits a BO & TPS 1206 in an initial MAC-e PDU to a Node B 1201 on an E-DCH 1205. The initial MAC-e PDU includes only the BO or/and TPS in a MAC-e header with no data in payload and is transmitted by MAC-e signaling.

Upon receipt of the BO or/and TPS, the Node B 1201 determines from the BO whether the UE 1104 has E-DCH data and schedules based on the BO and the TPS. The Node B 1201 then transmits scheduling grant information to the UE 1204 on a scheduling grant channel 1202 as a result of the scheduling. The scheduling grant information can be an absolute grant or a relative grant. The Node B 1201 receives the MAC-e PDU, performs an HARQ operation, and transmits an ACK/NACK signal to the UE 1204 on an ACK/NACK channel 1203.

The UE 1204 transmits the E-DCH data based on the scheduling grant information and the ACK/NACK signal. In accordance with the fifth exemplary embodiment of the present invention, the UE 1204 determines whether the event has occurred in time intervals 1207, 1209 and 1211 defined by the TPS period 1210 and transmits a TPS in the time interval 1211 for which the event is fulfilled. In the presence of E-DCH data, the UE 1204 transmits a TPS in the MAC-e header of a MAC-e PDU with the E-DCH data. In the absence of E-DCH data, the UE 1204 transmits a MAC-e PDU containing the TPS only.

For instance, when the difference between the previous TPS and the current TPS exceeds a predetermined threshold, this is an event that triggers TPS transmission. The UE 1204 transmits the TPS in a MAC-e header in a transmission time interval following the event. The threshold is a predetermined fixed value or notified to the UE and the Node B from the RNC by RRC and NBAP upper signaling.

Many other events that trigger TPS transmission can be defined. The TPS period 1210 is also a predetermined fixed value or notified to the UE and the Node B by RRC and NBAP upper signaling.

In time intervals 1207, 1209 and 1211 each apart from the following time interval by the TPS period 1210, the UE 1204 determines whether the event has occurred in the previous time interval. Upon occurrence of the event in a time interval 1212, the UE 1204 transmits a TPS in the following time interval 1211. In the time intervals 1207

and 1209, no TPSs are transmitted because the TPS period 1210 has expired but the event has not occurred. The time interval 1211 carrying the TPS is limited to the case where an ACK signal is received for the previous MAC-e PDU or the number of transmissions of the previous MAC-e PDU has reached a maximum allowed number in an HARQ process. In other words, a TPS can be transmitted only in a time interval in which an initial transmission is possible.

Therefore, all conditions considered, the UE 1104 transmits a TPS in the MAC-e header of an initial transmission MAC-e PDU in the earliest time interval when the TPS period 1210 has expired after occurrence of the event.

In a BO transmission time interval 1208, a TPS can also be transmitted in a MAC-e header even though the TPS period 1210 has expired in the BO transmission time interval 1208 after the event occurred.

Before a time interval 1207, that is, before E-DCH data transmission, no TPSs are transmitted irrespective of the TPS period 1210 and the event, except a first BO transmission period 1206 indicating the start of the E-DCH data transmission. In the time interval 1206, the TPS and the BO are transmitted together. When there is no need for transmitting E-DCH data any longer, that is, when the buffer is empty in the UE 1204, the UE 1204 discontinues the E-DCH data transmission as indicated by reference numeral 1213.

Every time the Node B 1201 receives a MAC-e PDU, it determines whether the MAC-e PDU includes a TPS based on a MAC-e signaling indicator bit set in the MAC-e PDU. In the presence of the TPS, the Node B 1101 extracts the TPS from the MAC-e PDU and uses the TPS in scheduling.

Sixth Exemplary Embodiment

In this exemplary embodiment of the present invention, the UE transmits a BO and a TPS together at both a BO transmission time and a TPS transmission time by MAC-e signaling.

In the case where BO transmission is confined to a BO transmission time and TPS transmission to a TPS transmission time, the MAC-e PDU has very different sizes. As a result, the amount of PHY layer signaling information to deliver information about a MAC-e PDU size on an E-DCH control channel, Enhanced-Dedicated Physical

Control CHannel (E-DPCCH) can be increased. Therefore, the UE allocates a BO field of a predetermined size and a TPS field of a predetermined size and when it needs to transmit either the BO or the TPS, the UE fills both the BO and the TPS in the two fields all the time. Thus, the number of the MAC-e PDU sizes is reduced and as a result, the amount of the MAC-e PDU size information is decreased.

Separate BO and TPS transmission as in the previous exemplary embodiments of the present invention physically requires a 2-bit information field to represent four MAC-e signaling types for each MAC-e PDU: BO only, TPS only, both BO and TPS, and none. However, concurrent BO and TPS transmission physically needs only a 1-bit information field to represent two MAC-e signaling types: both BO and TPS and none. Therefore, the number of bits required to indicate MAC-e signaling is reduced.

TPS transmission is carried out by MAC-e signaling every predetermined TPS period, or in an event-triggered manner, or in both in the above-described exemplary embodiments. BO transmission is carried out by MAC-e signaling in the same manner. Therefore once the conditions for transmitting the BO and the TPS are set, separately, if either of the conditions is satisfied, both the BO and TPS are transmitted by MAC-e signaling.

A BO period may be equal to or different from a TPS period and BO and TPS transmission time intervals are set separately. For example, the BO is initially transmitted when data is first buffered in the E-DCH buffer of the UE. An event that triggers BO transmission can be defined as buffering of new data in the E-DCH buffer or buffered data filled to a threshold. An event that triggers TPS transmission can be defined as a great channel status change or a band channel status.

The sizes of the BO and TPS are predetermined and the BO and TPS size information and E-DCH data form a MAC-e PDU or MAC-e signaling. That is, a MAC-e PDU for MAC-e signaling is configured to include a BO field and a TPS field and these fields are filled with a BO and a TPS when MAC-e signaling is performed.

The UE determines every time interval whether the BO period or the TPS period has expired. If neither of the BO and TPS periods has expired, the UE determines whether a BO event or a TPS event has occurred. If either of the BO and TPS periods has expired or either of the BO and TPS events has occurred, the UE inserts a BO and a TPS in a MAC-e PDU and transmits the MAC-e PDU.

In accordance with the sixth exemplary embodiment of the present invention, the following operation can be further contemplated.

The UE sets a MAC-e signaling field to contain a BO and a TPS. If a BO transmission condition is satisfied, the BO is written in a BO field and null data is filled in a TPS field within the MAC-e signaling field. On the other hand, if a TPS transmission condition is satisfied, the TPS is written in the TPS field and null data is filled in the BO field within the MAC-e signaling field. In this case, two information bits are physically required to represent four MAC-e signaling types.

Every time it receives a MAC-e PDU, the Node B checks a MAC-e signaling indicator bit in the MAC-e PDU. If the MAC-e signaling indicator bit indicates the presence of UE status information, the Node B extracts a BO and a TPS from the MAC-e PDU and schedules based on the BO and the TPS.

Exemplary implementations of certain embodiments of the present invention and a related block diagram will be described below.

FIG. 13 is a flowchart illustrating TPS transmission from a UE according to the fourth exemplary embodiment of the present invention. Step 1302 through step 1308 are performed in every E-DCH transmission interval.

Referring to FIG. 13, the UE determines whether E-DCH data transmission is to start in step 1302. If the UE determines that the E-DCH data transmission will start in the current time interval, it includes a BO and a TPS in a MAC-e PDU in step 1306 and proceeds to step 1308. If the E-DCH data transmission will not start in the current time interval, the UE determines whether a BO is to be transmitted in the current time interval in step 1303. If the current time interval is a BO transmission interval, the UE includes the BO and the TPS in a MAC-e PDU in step 1306 and proceeds to step 1308. If the TPS is transmitted irrespective of the BO in another embodiment, step 1303 will not be performed.

If the current time interval is not a BO transmission interval, the UE determines whether a TPS period has expired in step 1304. That is, the UE determines whether the TPS period has elapsed after transmission of the previous TPS or the start of the E-DCH data transmission. If the current time interval is a TPS transmission interval, the UE includes the TPS in the MAC-e PDU in step 1306 and proceeds to step 1308. If the current time interval is not a TPS transmission interval, the UE determines whether a

TPS event has occurred in the previous time interval in step 1305. If the TPS event has occurred in the previous time interval, the UE includes the TPS in the MAC-e PDU in step 1306 and proceeds to step 1308.

If the TPS event has not occurred in step 1305, the UE determines whether E-DCH data exists for transmission in step 1307. In the presence of E-DCH data, the UE fills the E-DCH data in the payload of the MAC-e PDU and transmits the MAC-e PDU in step 1308. The MAC-e PDU may include the BO or/and TPS inserted in step 1306. In the absence of E-DCH data, the UE waits till the next time interval and returns to step 1302. It can be further contemplated as another exemplary embodiment that in the absence of E-DCH data to be transmitted, a MAC-e PDU including only a BO or/and TPS is transmitted.

When applying the flowchart of FIG. 13 to the first exemplary embodiment, the UE proceeds to step 1307 directly if the E-DCH data transmission is not to start in the current time interval in step 1302. In the second embodiment, the UE directly jumps to step 1307 if the TPS period has not expired in step 1304. In the third embodiment, the UE directly jumps to step 1305 if the E-DCH data transmission is not to start in the current time interval in step 1302 or if the current time interval is not a BO transmission interval in step 1303.

FIG. 14 is a flowchart illustrating TPS transmission from a UE according to the fifth exemplary embodiment of the present invention. Step 1402 through step 1408 are performed in every E-DCH transmission interval.

Referring to FIG. 14, the UE determines whether E-DCH data transmission is to start in step 1402. If the UE determines that the E-DCH data transmission will start in the current time interval, it includes a BO and a TPS in a MAC-e PDU in step 1406 and proceeds to step 1408. If the E-DCH data transmission will not start in the current time interval, the UE determines whether a BO is to be transmitted in the current time interval in step 1403. If the current time interval is a BO transmission interval, the UE includes the BO and the TPS in a MAC-e PDU in step 1406 and proceeds to step 1408. If the TPS is transmitted irrespective of the BO in another exemplary embodiment, step 1403 will not be performed.

If the current time interval is not a BO transmission interval, the UE determines whether a TPS period has expired in step 1404. That is, the UE determines whether the

TPS period has elapsed after transmission of the previous TPS or the start of the E-DCH data transmission. If the current time interval is not a TPS transmission interval, the UE goes to step 1407. On the other hand, if the current time interval is a TPS transmission interval, the UE determines whether a TPS event has occurred for the previous TPS period in step 1405. If the TPS event has occurred in the previous TPS period, the UE includes the TPS in the MAC-e PDU in step 1406 and proceeds to step 1408. If the TPS event has not occurred in step 1405, the UE proceeds to step 1407.

In step 1407, the UE determines whether E-DCH data exists for transmission. In the presence of E-DCH data, the UE fills the E-DCH data in the payload of the MAC-e PDU and transmits the MAC-e PDU in step 1408. The MAC-e PDU may include the BO or/and TPS inserted in step 1406. In the absence of E-DCH data, the UE waits till the next time interval and returns to step 1402. It can be further contemplated as another embodiment that in the absence of E-DCH data to be transmitted, a MAC-e PDU including only a BO or/and TPS is transmitted.

FIG. 15 is a block diagram of a UE according to an exemplary embodiment of the present invention. It is to be appreciated that components of the receiver not related to the subject matter of the present invention are not shown in FIG. 15.

Referring to FIG. 15, the UE includes an E-DCH buffer 1501 for buffering E-DCH data and a TPS manager 1502 for managing a TPS. The E-DCH buffer 1501 monitors the amount of uplink data, correspondingly generates a BO 1504, and provides the BO 1504 to a UE status information generator 1507. The TPS manager 1502 has knowledge of a maximum transmit power available to the UE, monitors the transmit power of each channel according to Node B power control and according to whether uplink channels are in use or not, correspondingly generates a TPS 1503, and provides the TPS 1503 to the UE status information generator 1507.

The UE status information generator 1507 determines whether it is time to transmit the BO 1504 or the TPS 1503 and generates UE status information with the BO 1504 or/and the TPS 1503. The criterion for including the BO 1504 in the UE status information can be periodic transmission, event-triggered transmission, or initial E-DCH transmission. Similarly, the criterion for including the TPS 1503 in the UE status information can be periodic transmission, event-triggered transmission, or initial E-DCH transmission, as in the embodiments of the present invention. The TPS manager 1502

may provides the TPS 1503 to the UE status information generator 1507 according to control information 1506 indicating whether the BO 1504 is to be transmitted, received from the E-DCH buffer 1501.

The E-DCH buffer 1501 outputs E-DCH data 1505 at an allowed data rate in each transmission interval. The E-DCH data 1505 is provided to a MAC-e PDU generator 1508, and when MAC-e signaling is needed, the UE status information generator 1507 provides the UE status information including the BO 1504 and the TPS 1503 to the MAC-e PDU generator 1508. The MAC-e PDU generator 1508 generates a MAC-e PDU containing at least one of the E-DCH data and the UE status information. The MAC-e PDU is transmitted to a Node B, after coding and modulation in an E-DCH transmitter 1509.

As described above, the present invention can enable accurate, efficient TPS transmission to assist rate scheduling for uplink packet transmission in a WCDMA communication system supporting the E-DCH. A UE transmits a TPS in a MAC-e header by MAC-e signaling along with E-DCH data to a Node B. Therefore, PHY channel resources are saved and the efficient TPS transmission improves E-DCH performance.

While the invention has been shown and described with reference to certain exemplary embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

WHAT IS CLAIMED IS:

1. A method of transmitting user equipment (UE) status information for uplink data transmission in a mobile communication system, the method comprising the steps of:

generating buffer occupancy (BO) information by monitoring an amount of uplink data to be transmitted;

generating transmit power status (TPS) information by monitoring uplink transmit power status;

determining whether the BO information is to be transmitted in a current time interval;

determining whether the TPS information is to be transmitted in the current time interval, if the BO information is to be transmitted in the current time interval according to a TPS period;

generating a packet data unit (PDU) comprising the BO information and the TPS information if the TPS information is to be transmitted in the current time; and

transmitting the PDU after coding and modulation.

2. The method of claim 1, further comprising the steps of:

determining whether a TPS information transmission event has occurred if the TPS information is not to be transmitted in the current time interval according to the TPS period; and

generating a PDU comprising the BO information and the TPS information if the TPS information transmission event has occurred and transmitting the PDU.

3. The method of claim 1, wherein the PDU generating step comprises the steps of:

determining whether the TPS information transmission event has occurred if the TPS period has expired and the TPS information is to be transmitted in the current time interval; and

generating a PDU comprising the BO information and the TPS information if the TPS information transmission event has occurred.

4. The method of claim 1, wherein the PDU further comprises uplink packet data.

5. The method of claim 4, wherein the PDU comprises a medium access control PDU (MAC-e PDU) transmitted on an enhanced uplink dedicated channel (E-DCH).

6. An apparatus for transmitting user equipment (UE) status information for uplink data transmission in a mobile communication system, the apparatus comprising:

a buffer for buffering uplink data and generating buffer occupancy (BO) information by monitoring an amount of the uplink data;

a transmit power status (TPS) information manager for generating TPS information by monitoring uplink transmit power status;

a UE status information generator for determining whether the BO information is to be transmitted in a current time interval, determining whether the TPS information is to be transmitted in the current time interval, if the BO information is to be transmitted in the current time interval according to a TPS period, and generating UE status information comprising the BO information and the TPS information if the TPS information is to be transmitted in the current time interval;

a packet data unit (PDU) generator for generating a PDU comprising the UE status information; and

a transmitter for transmitting the PDU after coding and modulation.

7. The apparatus of claim 6, wherein the UE status information generator determines whether a TPS information transmission event has occurred if the TPS information is not to be transmitted in the current time interval according to the TPS period, and generates the UE status information comprising the BO information and the TPS information if the TPS information transmission event has occurred.

8. The apparatus of claim 6, wherein the UE status information generator

determines whether the TPS information transmission event has occurred if the TPS period has expired and the TPS information is to be transmitted in the current time interval, and generates the UE status information comprising the BO information and the TPS information if the TPS information transmission event has occurred.

9. The apparatus of claim 6, wherein the PDU further comprises uplink data.

10. The apparatus of claim 9, wherein the PDU comprises a medium access control PDU (MAC-e PDU) transmitted on an enhanced uplink dedicated channel (E-DCH).

11. A method of transmitting user equipment (UE) status information for uplink data transmission in a mobile communication system, the method comprising the steps of:

generating buffer occupancy (BO) information by monitoring an amount of uplink data to be transmitted;

generating transmit power status (TPS) information by monitoring uplink transmit power status;

determining whether the BO information is to be transmitted in a current time interval;

determining whether a TPS information transmission event has occurred, if the BO information is to be transmitted in the current time interval;

generating a packet data unit (PDU) comprising the BO information and the TPS information if the TPS information transmission event has occurred; and

transmitting the PDU after coding and modulation.

12. The method of claim 11, further comprising the steps of:

determining whether the TPS information is to be transmitted in the current time interval according to a TPS period, if the TPS information transmission event has not occurred; and

generating a PDU comprising the BO information and the TPS information if

the TPS information is to be transmitted in the current time interval according to the TPS period, and transmitting the PDU.

13. The method of claim 11, wherein the PDU generating step comprises the steps of:

determining whether the TPS information is to be transmitted in the current time interval according to the TPS period, if the TPS information transmission event has occurred; and

generating a PDU comprising the BO information and the TPS information if the TPS information is to be transmitted in the current time interval according to the TPS period.

14. The method of claim 11, wherein the PDU further comprises uplink packet data.

15. The method of claim 14, wherein the PDU comprises a medium access control PDU (MAC-e PDU) transmitted on an enhanced uplink dedicated channel (E-DCH).

16. An apparatus for transmitting user equipment (UE) status information for uplink data transmission in a mobile communication system, the apparatus comprising:

a buffer for buffering uplink data to be transmitted and generating buffer occupancy (BO) information by monitoring an amount of the uplink data;

a transmit power status (TPS) information manager for generating TPS information by monitoring uplink transmit power status;

a UE status information generator for determining whether the BO information is to be transmitted in a current time interval, determining whether a TPS information transmission event has occurred, if the BO information is to be transmitted in the current time interval, and generating UE status information comprising the BO information and the TPS information if the TPS information transmission event has occurred;

a packet data unit (PDU) generator for generating a PDU comprising the UE

status information; and

a transmitter for transmitting the PDU after coding and modulation.

17. The apparatus of claim 16, wherein the UE status information generator determines whether the TPS information is to be transmitted in the current time interval according to a TPS period, if the TPS information transmission event has not occurred, and generates the UE status information comprising the BO information and the TPS information if the TPS information is to be transmitted in the current time interval according to the TPS period.

18. The apparatus of claim 16, wherein the UE status information generator determines whether the TPS information is to be transmitted in the current time interval according to the TPS period, if the TPS information transmission event has occurred, and generates the UE status information comprising the BO information and the TPS information if the TPS information is to be transmitted in the current time interval according to the TPS period.

19. The apparatus of claim 16, wherein the PDU further comprises uplink packet data.

20. The apparatus of claim 19, wherein the PDU comprises a medium access control PDU (MAC-e PDU) transmitted on an enhanced uplink dedicated channel (E-DCH).

21. A method of transmitting user equipment (UE) status information for uplink data transmission in a mobile communication system, the method comprising the steps of:

generating buffer occupancy (BO) information by monitoring an amount of uplink data to be transmitted;

generating transmit power status (TPS) information by monitoring uplink transmit power status;

determining whether a current time interval is a BO transmission interval in

which the BO information is to be transmitted;

generating a packet data unit (PDU) comprising the BO information and the TPS information, if the current time interval is the BO transmission interval; and

transmitting the PDU after coding and modulation.

22. The method of claim 21, wherein the BO transmission interval is at least one of periodic and event-triggered.

23. The method of claim 21, wherein the PDU further comprises uplink packet data.

24. The method of claim 21, wherein the PDU comprises a medium access control PDU (MAC-e PDU) transmitted on an enhanced uplink dedicated channel (E-DCH).

25. An apparatus for transmitting user equipment (UE) status information for uplink data transmission in a mobile communication system, the apparatus comprising:

a buffer for buffering uplink data to be transmitted and generating buffer occupancy (BO) information by monitoring an amount of the uplink data;

a transmit power status (TPS) information manager for generating TPS information by monitoring uplink transmit power status;

a UE status information generator for determining whether a current time interval is a BO transmission interval in which the BO information is to be transmitted, and generating UE status information comprising the BO information and the TPS information, if the current time interval is the BO transmission interval;

a packet data unit (PDU) generator for generating a PDU comprising the UE status information; and

a transmitter for transmitting the PDU after coding and modulation.

26. The apparatus of claim 25, wherein the BO transmission interval is at least one of periodic and event-triggered.

27. The apparatus of claim 25, wherein the PDU further comprises uplink packet data.

28. The apparatus of claim 27, wherein the PDU comprises a medium access control PDU (MAC-e PDU) transmitted on an enhanced uplink dedicated channel (E-DCH).

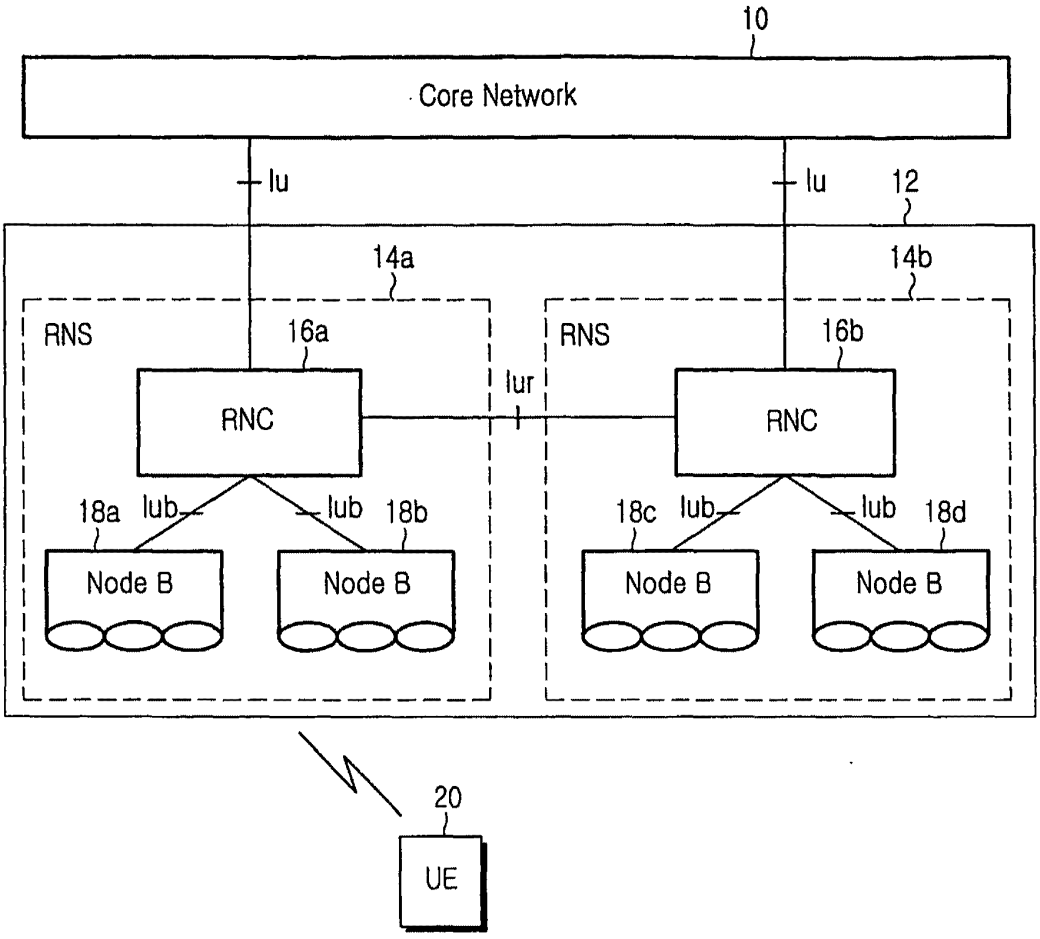

10
Core Network
Iu
Iu
12
14a
14b
RNS
16a
RNS
16b
RNC
Iur
RNC
18a
Iub
Iub
18b
18c
Iub
Iub
18d
Node B
Node B
Node B
Node B
20
UE

FIG.1

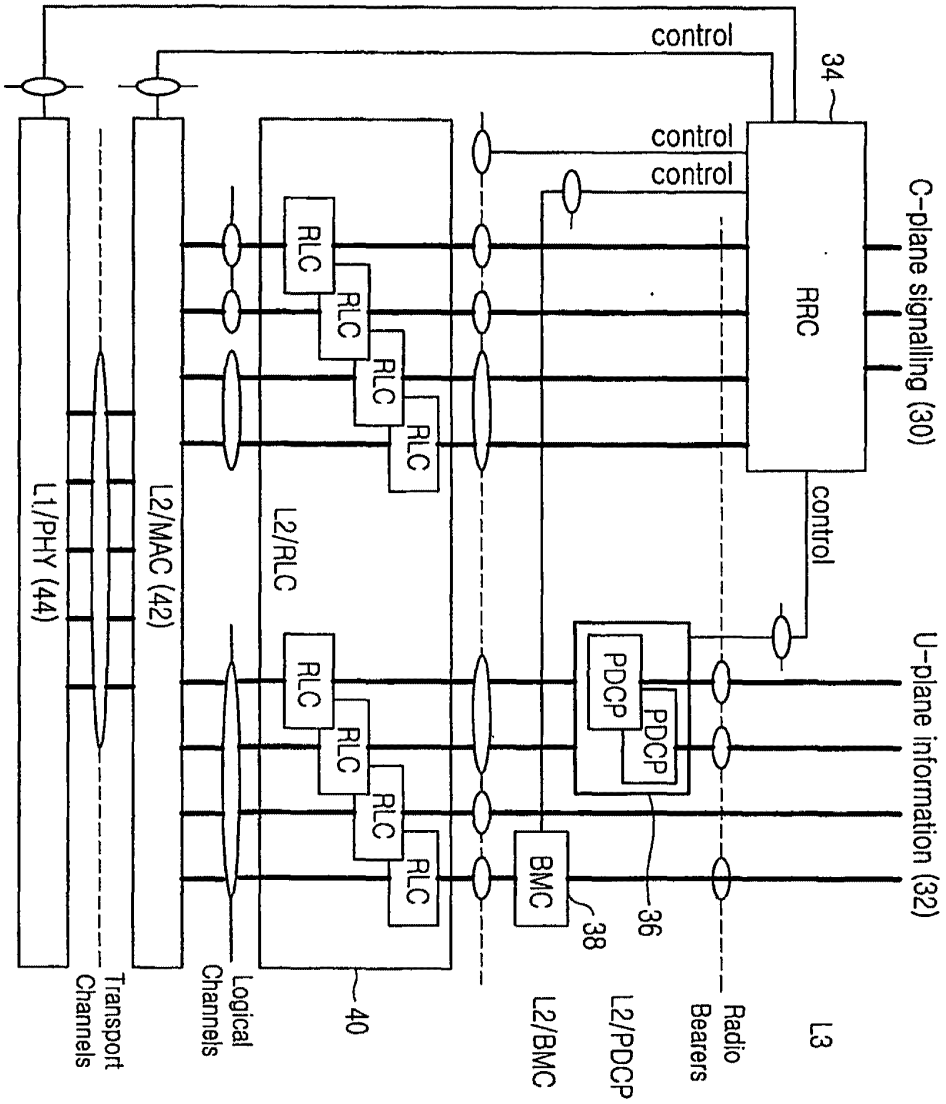

control
34
control
control
RRC
C-plane signalling (30)
control
RLC
RLC
RLC
RLC
L2/RLC
L1/PHY (44)
L2/MAC (42)
PDCP
PDCP
U-plane information (32)
BMC
38
36
40
Transport Channels
Logical Channels
L2/BMC
L2/PDCP
Radio Bearers
L3

FIG.2

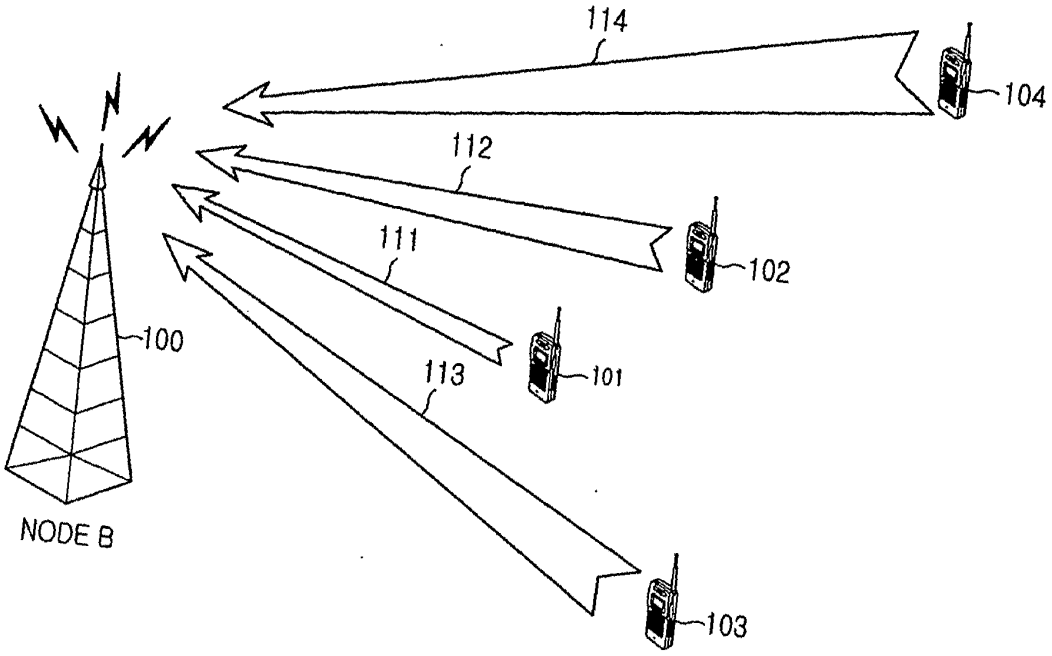


FIG.3

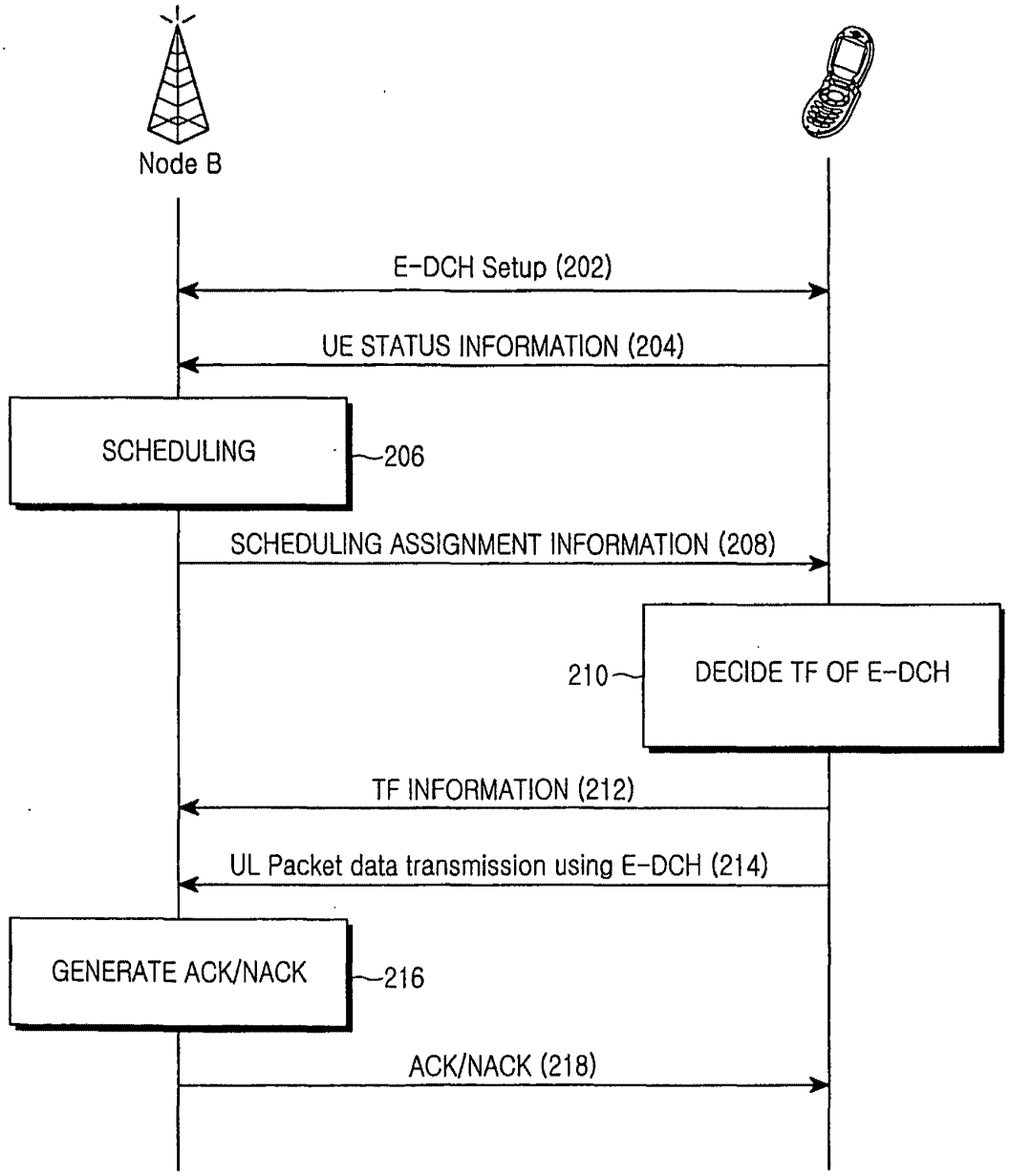

Node B
E-DCH Setup (202)
UE STATUS INFORMATION (204)
SCHEDULING
206
SCHEDULING ASSIGNMENT INFORMATION (208)
210
DECIDE TF OF E-DCH
TF INFORMATION (212)
UL Packet data transmission using E-DCH (214)
GENERATE ACK/NACK
216
ACK/NACK (218)

FIG.4

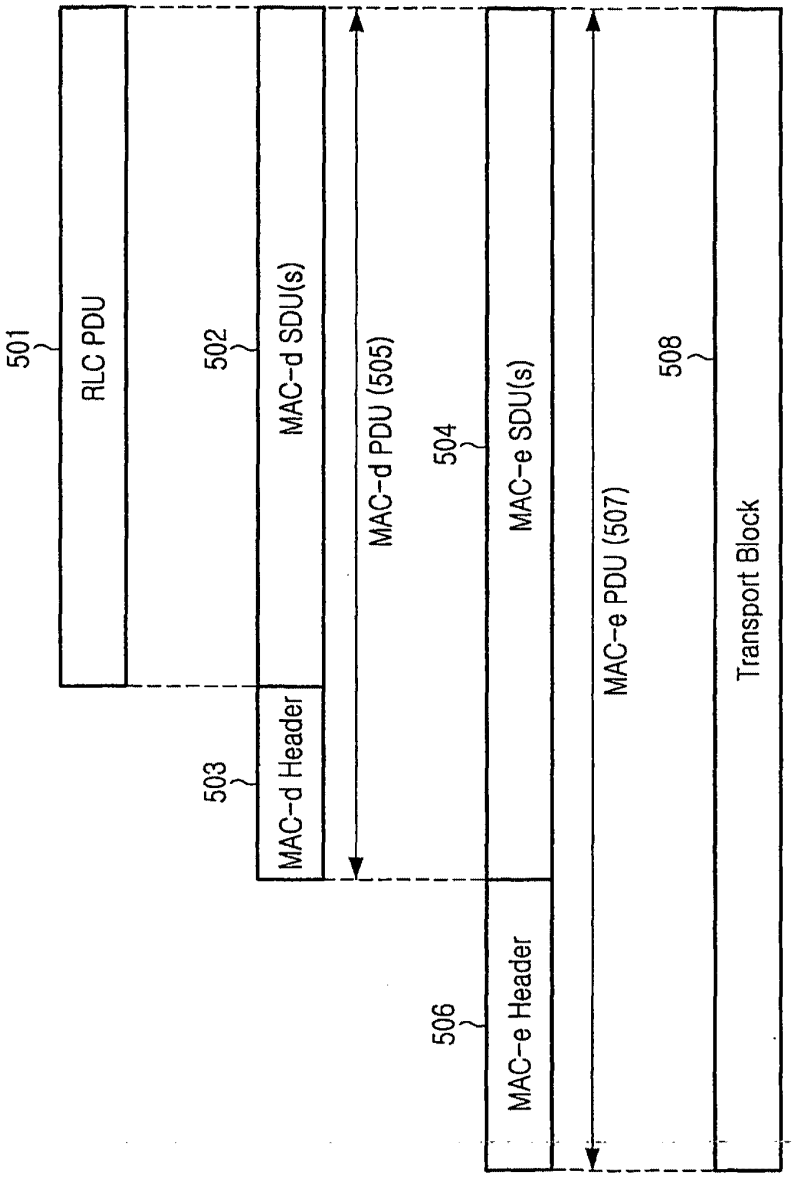

501
RLC PDU
502
MAC-d SDU(s)
503
MAC-d Header
MAC-d PDU (505)
504
MAC-e SDU(s)
506
MAC-e Header
MAC-e PDU (507)
508
Transport Block

FIG.5

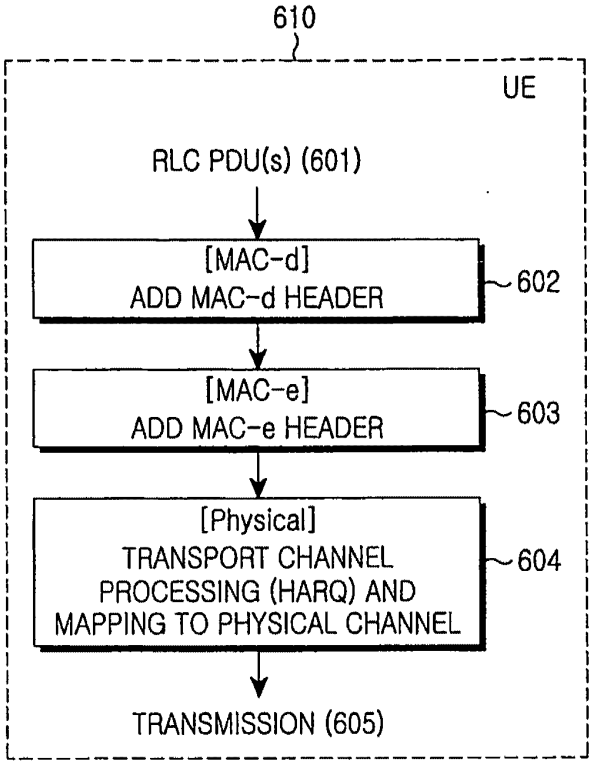

610
UE
RLC PDU(s) (601)
[MAC-d]
ADD MAC-d HEADER
602
[MAC-e]
ADD MAC-e HEADER
603
[Physical]
TRANSPORT CHANNEL
PROCESSING (HARQ) AND
MAPPING TO PHYSICAL CHANNEL
604
TRANSMISSION (605)

FIG.6

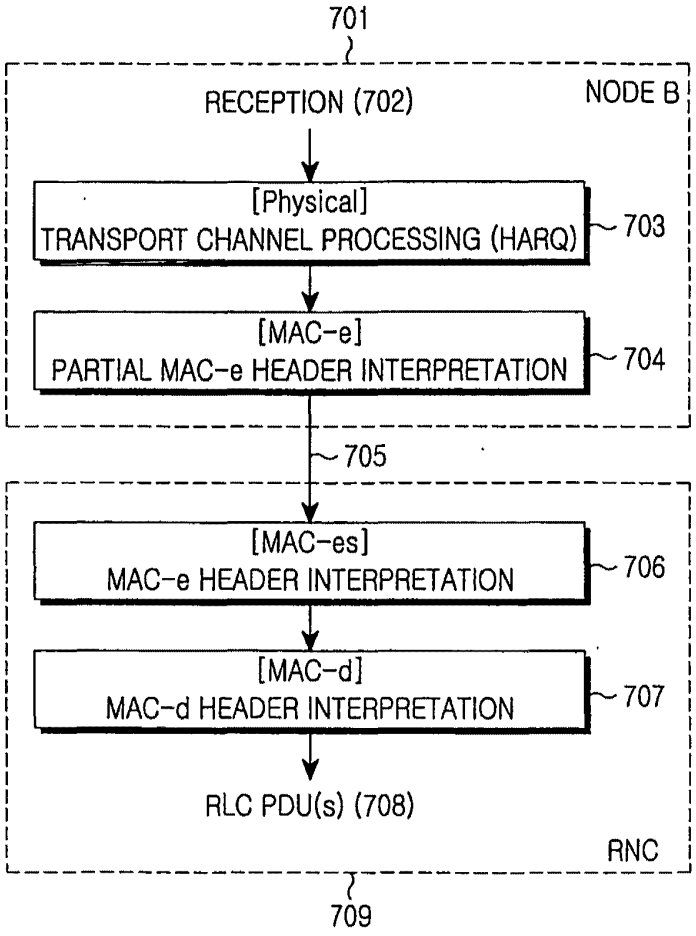

701
RECEPTION (702)
NODE B
[Physical]
TRANSPORT CHANNEL PROCESSING (HARQ)
703
[MAC-e]
PARTIAL MAC-e HEADER INTERPRETATION
704
705
[MAC-es]
MAC-e HEADER INTERPRETATION
706
[MAC-d]
MAC-d HEADER INTERPRETATION
707
RLC PDU(s) (708)
RNC
709

FIG.7

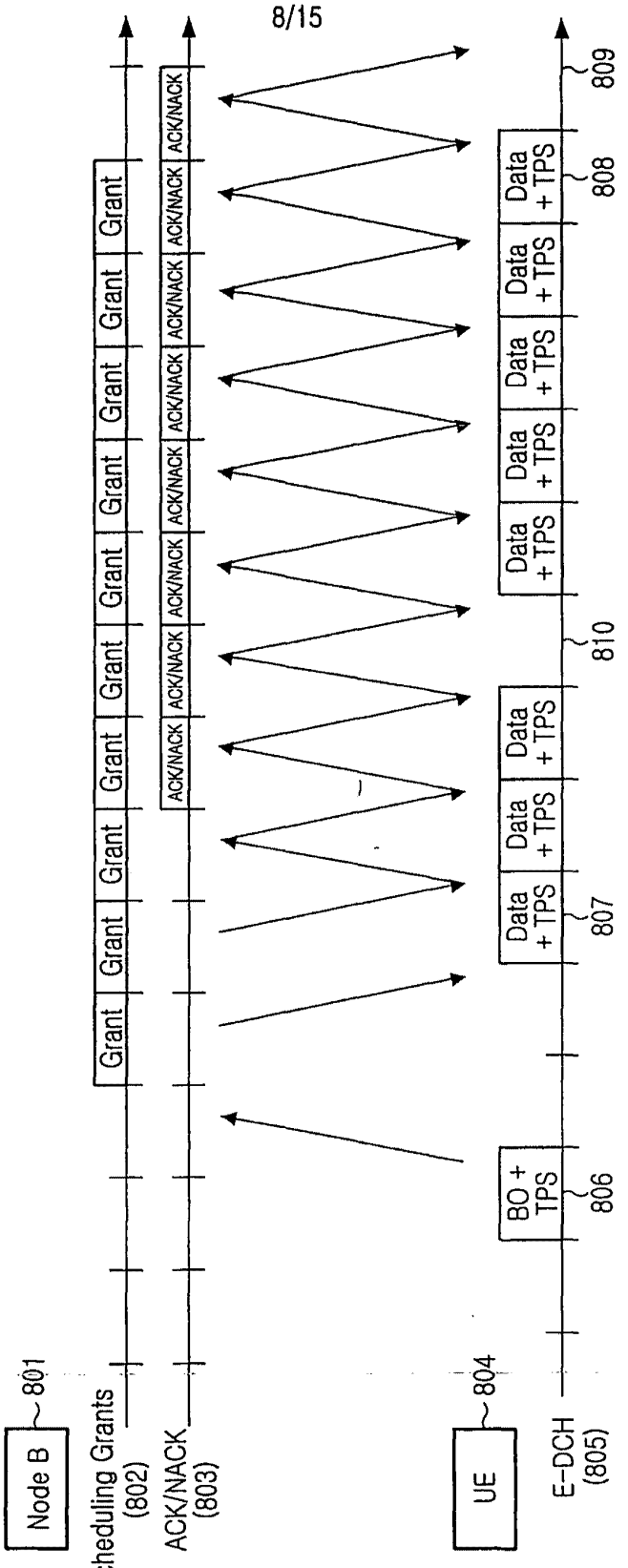

Node B
801
Scheduling Grants
(802)
ACK/NACK
(803)
UE
804
E-DCH
(805)
Grant
ACK/NACK
BO + TPS
806
Data + TPS
807
808
809
810

FIG.8

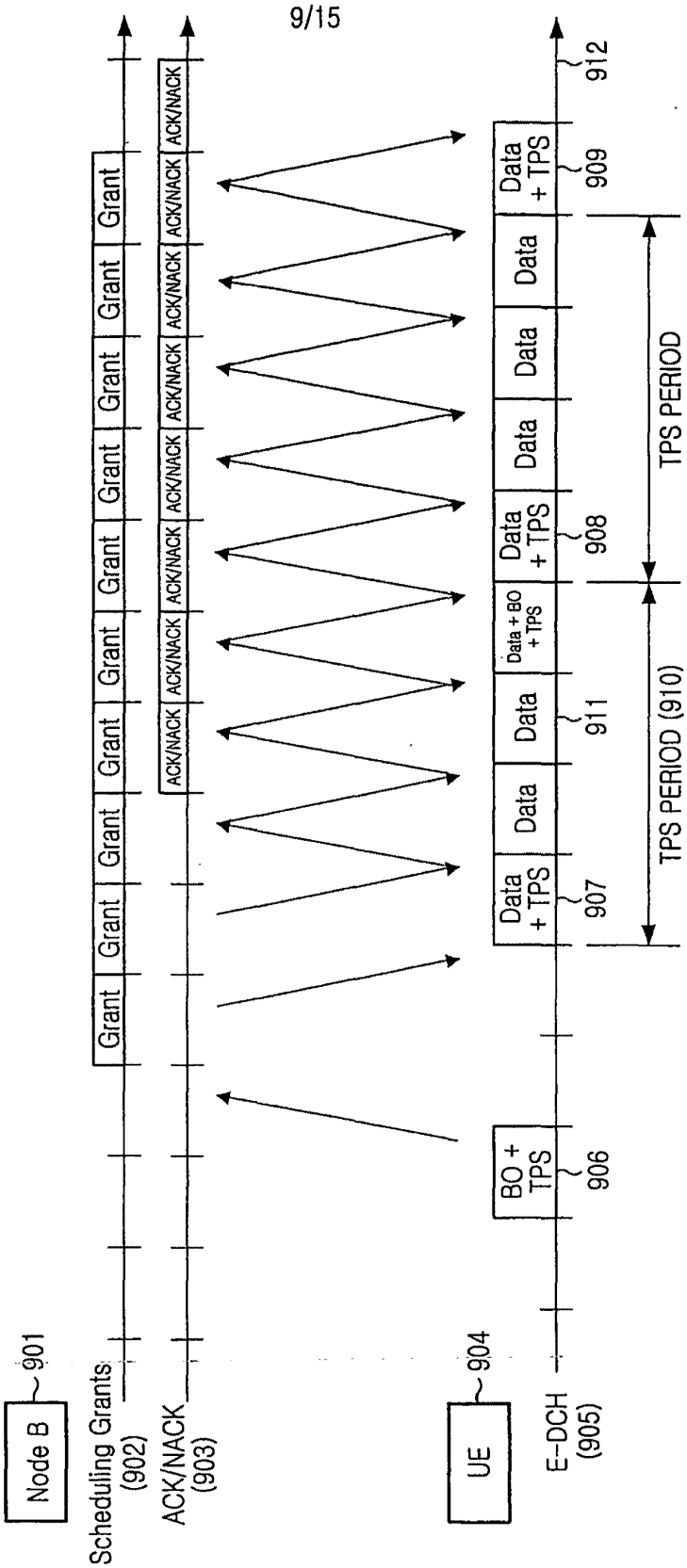

Node B
901
Scheduling Grants (902)
ACK/NACK (903)
UE
904
E-DCH (905)
Grant
ACK/NACK
BO + TPS
906
Data + TPS
907
Data
911
Data + BO + TPS
908
912
909
TPS PERIOD
TPS PERIOD (910)

FIG.9

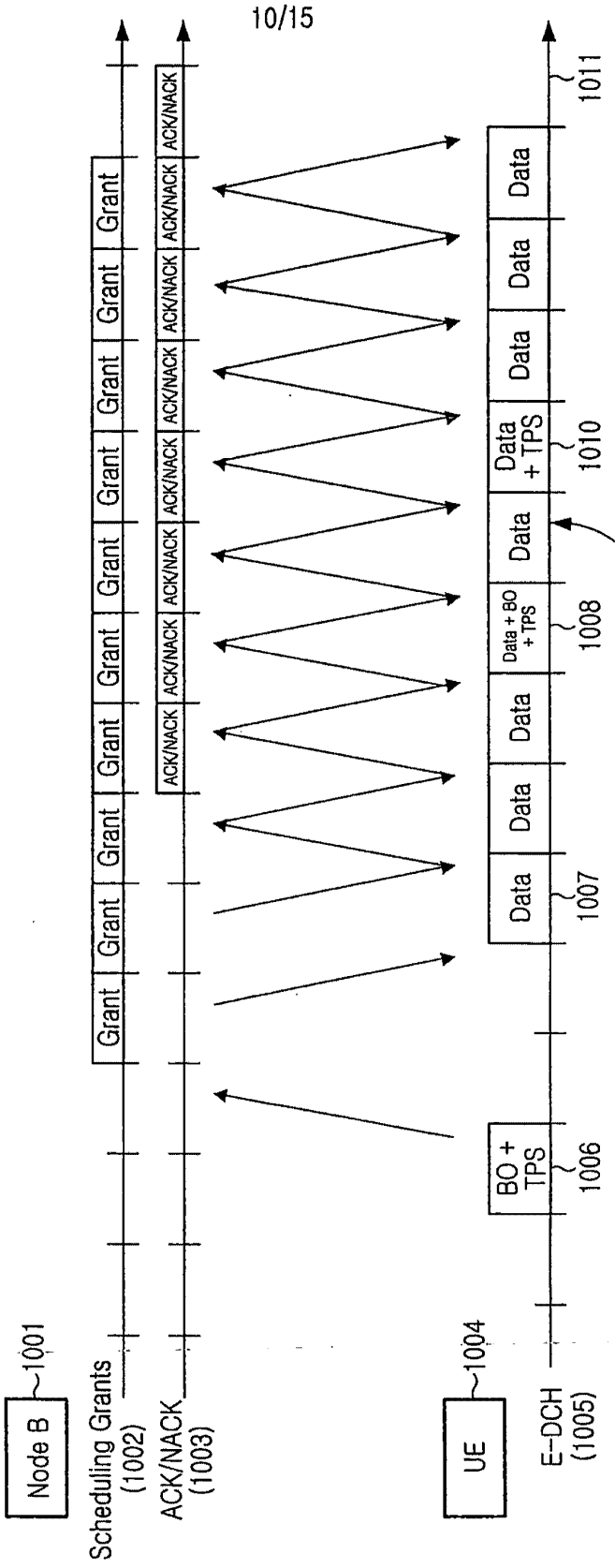

Node B
1001
Scheduling Grants
(1002)
ACK/NACK
(1003)
UE
1004
E-DCH
(1005)
Grant
ACK/NACK
BO + TPS
1006
Data
Data + BO + TPS
1008
Data + TPS
1010
1011
1007
TPS TRANSMISSION EVENT (1009)

FIG.10

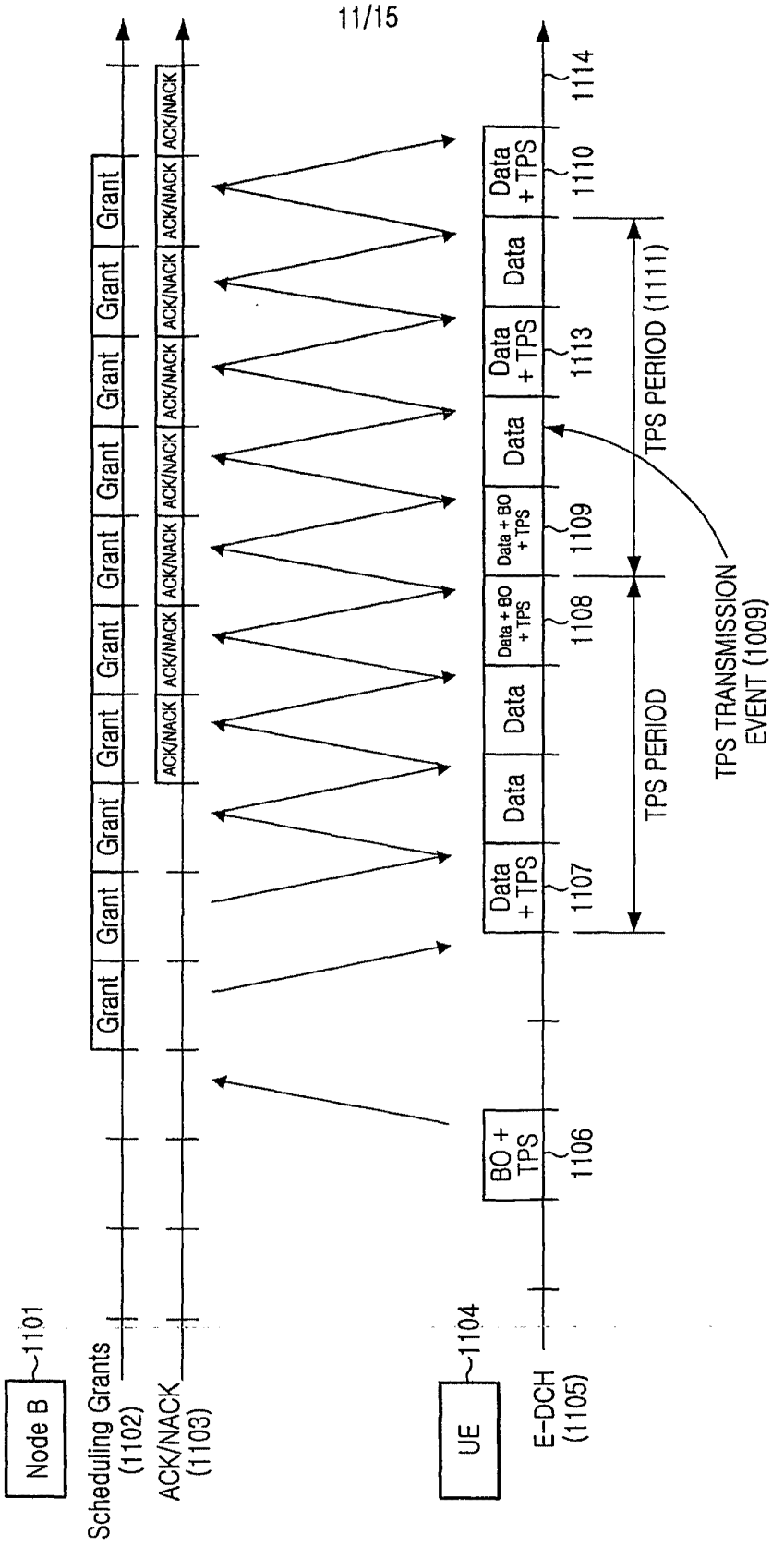

Node B
1101
Scheduling Grants
(1102)
ACK/NACK
(1103)
UE
1104
E-DCH
(1105)
Grant
ACK/NACK
BO + TPS
1106
Data + TPS
Data
Data + BO + TPS
1107
1108
1109
1110
1113
1114
TPS PERIOD
TPS PERIOD (1111)
TPS TRANSMISSION EVENT (1009)

FIG.11

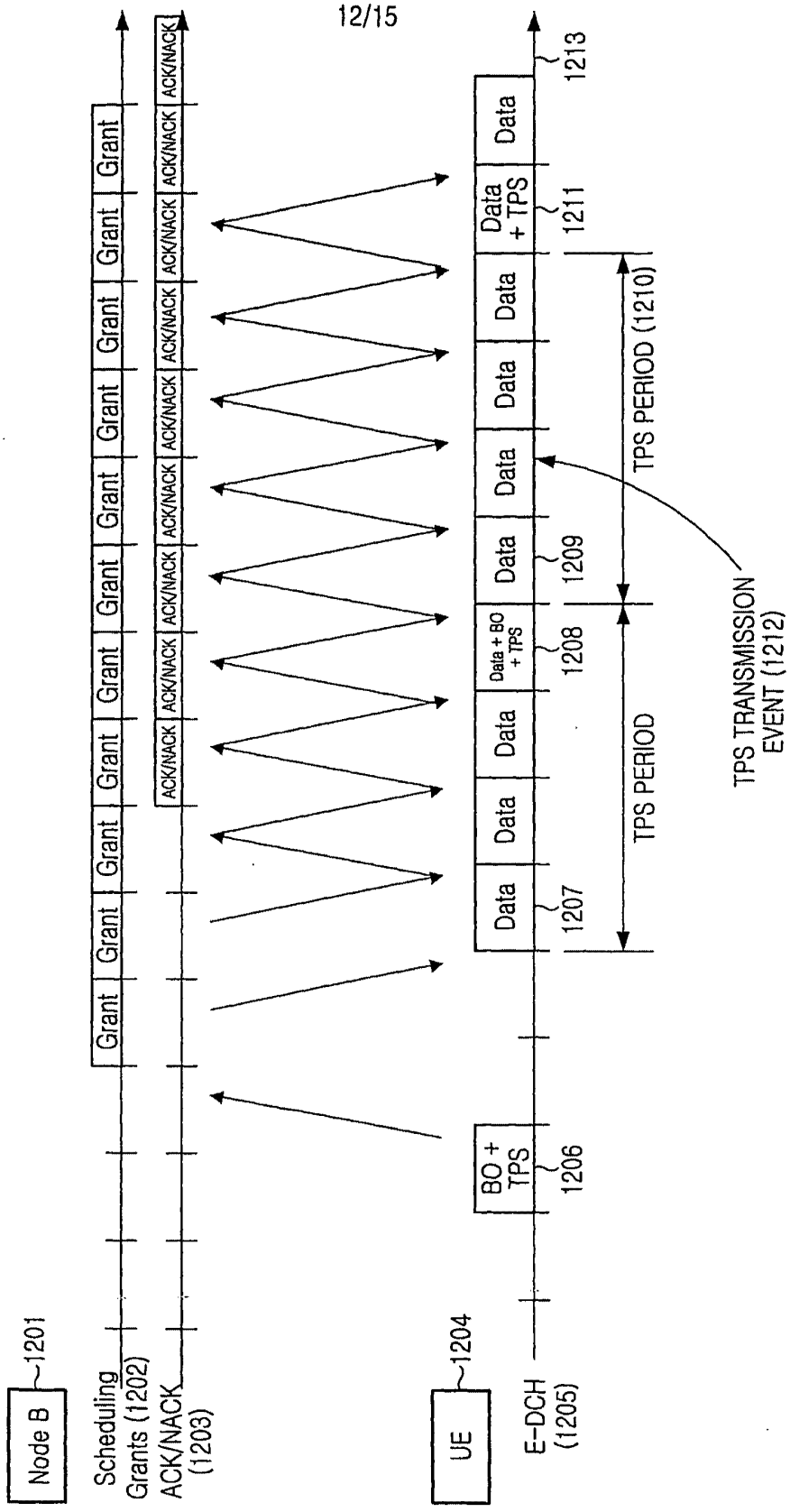

Node B
1201
Scheduling Grants (1202)
ACK/NACK (1203)
Grant
ACK/NACK
UE
1204
E-DCH (1205)
BO + TPS
1206
Data
1207
Data + BO + TPS
1208
1209
Data + TPS
1211
1213
TPS PERIOD
TPS PERIOD (1210)
TPS TRANSMISSION EVENT (1212)

FIG.12

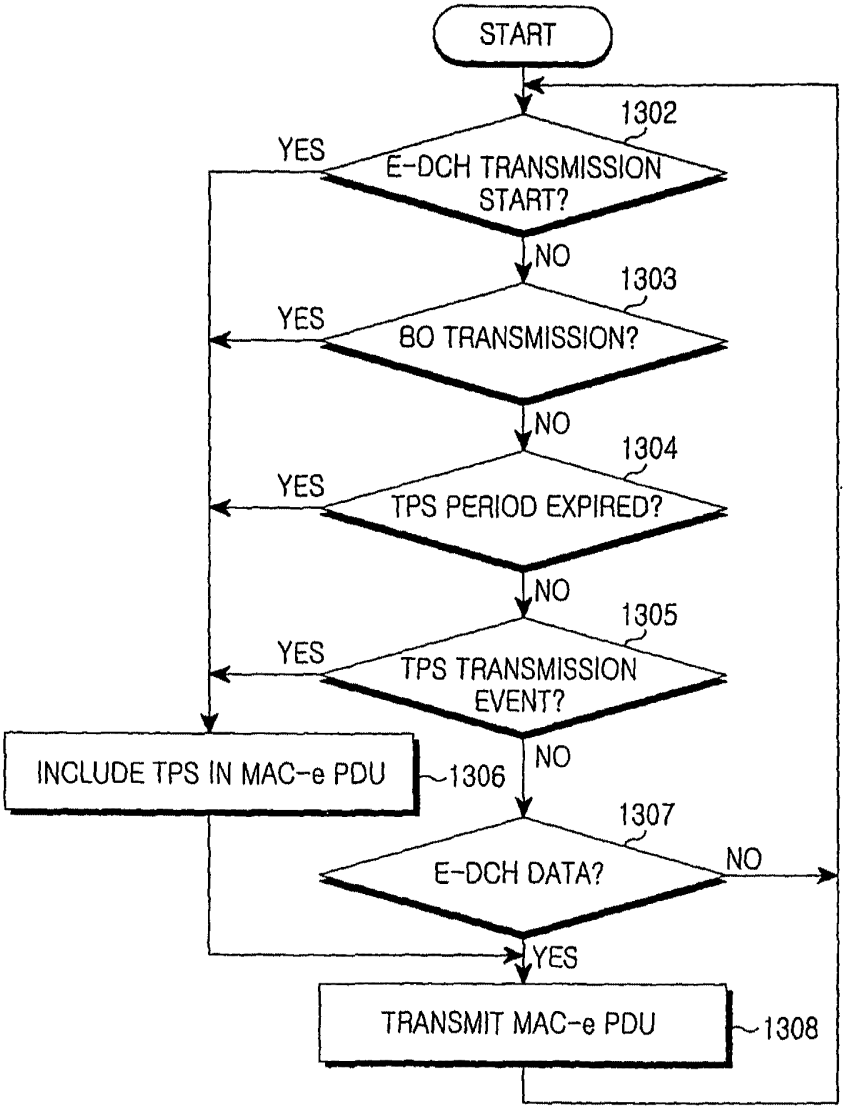

START
1302
E-DCH TRANSMISSION START?
YES
NO
1303
BO TRANSMISSION?
YES
NO
1304
TPS PERIOD EXPIRED?
YES
NO
1305
TPS TRANSMISSION EVENT?
YES
NO
INCLUDE TPS IN MAC-e PDU
1306
1307
E-DCH DATA?
NO
YES
TRANSMIT MAC-e PDU
1308

FIG.13

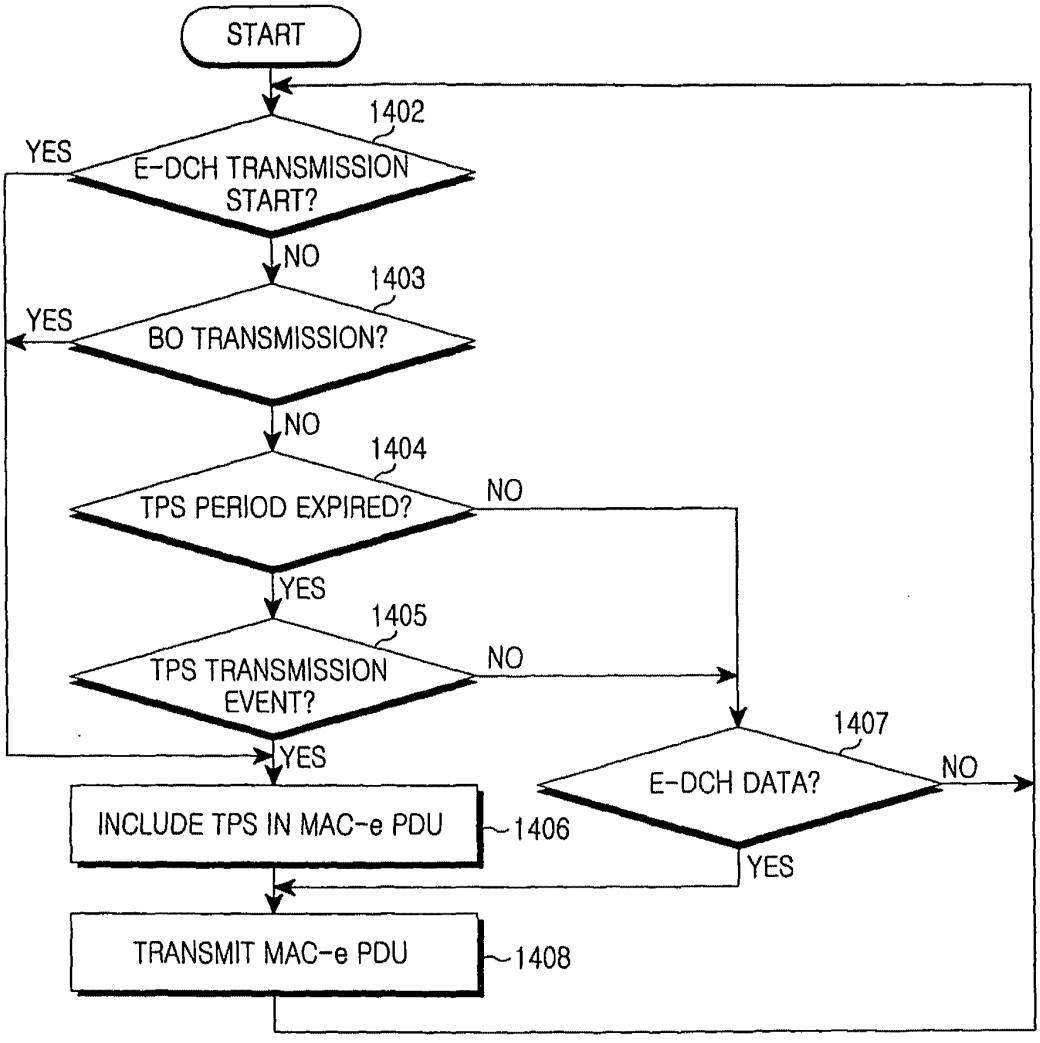

START
1402
E-DCH TRANSMISSION START?
YES
NO
1403
BO TRANSMISSION?
YES
NO
1404
TPS PERIOD EXPIRED?
NO
YES
1405
TPS TRANSMISSION EVENT?
NO
YES
1407
E-DCH DATA?
NO
YES
INCLUDE TPS IN MAC-e PDU
1406
TRANSMIT MAC-e PDU
1408

FIG.14

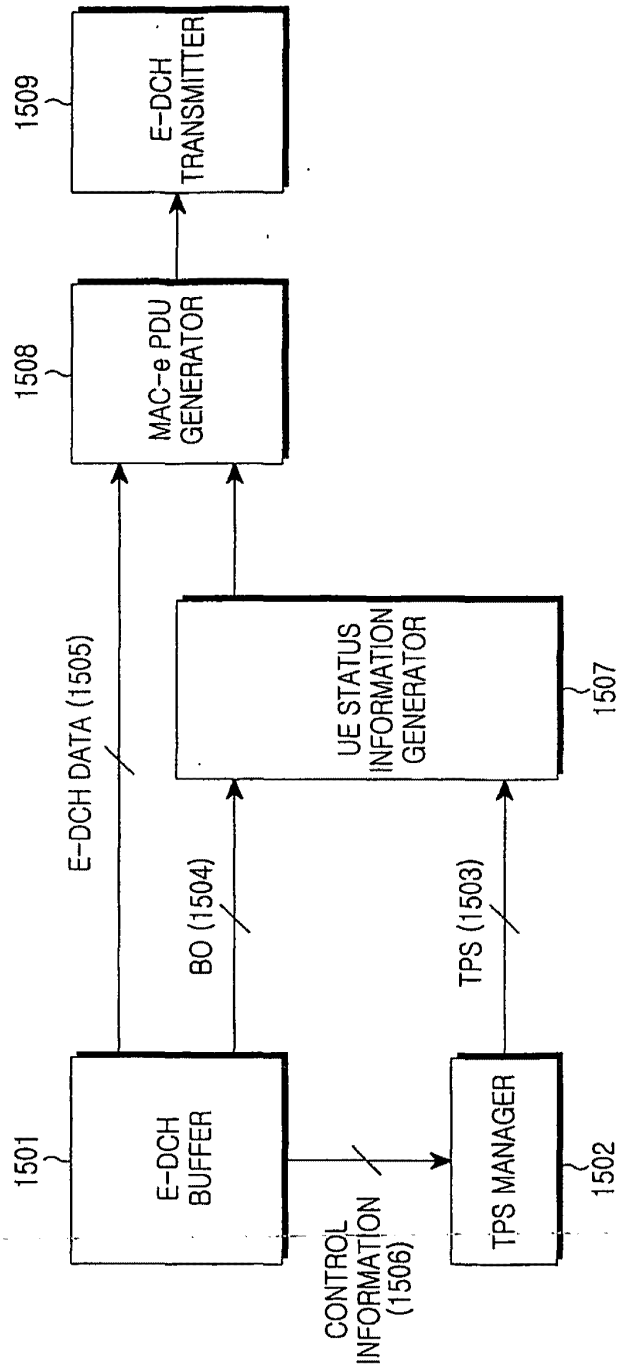

1509
E-DCH TRANSMITTER
1508
MAC-e PDU GENERATOR
E-DCH DATA (1505)
UE STATUS INFORMATION GENERATOR
1507
BO (1504)
TPS (1503)
1501
E-DCH BUFFER
CONTROL INFORMATION (1506)
TPS MANAGER
1502

FIG.15

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2005/003491

A. CLASSIFICATION OF SUBJECT MATTER

H04B 7/26(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 H04B 7/26, H04L 12/56, H04L 12/28

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search terms used)
KIPASS, DELPHION, ESPACENET & Keywords : scheduling, uplink, UE, MAC-e, E-DCH, status, information, transmit, power, buffer, PDU and similar terms.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PA	US2005-83943 A (SAMSUNG ELECTRONICS CO., LTD.) 21 April 2005 * abstract, paragraphs[0100]-[0103], figure 10 *	1-28
PA	US2005-78651 A (SAMSUNG ELECTRONICS CO., LTD.) 14 April 2005 * abstract, paragraphs[0096]-[0099], figure 13 *	1-28
PA	US2005-47416 A (SAMSUNG ELECTRONICS CO., LTD.) 3 March 2005 * abstract, paragraphs[0068]-[0072], figure 9 *	1-28
A	US2004-160919 A (Balachandran et al.) 19 August 2004 * abstract, paragraphs[0024]-[0029], figure 1 *	1-28

☐ 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
27 JANUARY 2006 (27.01.2006)	**31 JANUARY 2006 (31.01.2006)**
Name and mailing address of the ISA/KR Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer KIM, Sang Woo Telephone No. 82-42-481-8324

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

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/KR2005/003491

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US2005-83943 A	21.04.2005	NONE	
US2005-78651 A	14.04.2005	CN1604687A	06.04.2005
		EP01509011A2	23.02.2005
		JP2005065298A2	10.03.2005
		KR102005001854O	23.02.2005
US2005-47416 A	03.03.2005	NONE	
US2004-160919 A	19.08.2004	NONE	

Form PCT/ISA/210 (patent family annex) (April 2005)

OIPE IAP22
JUL 14 2009
PATENT & TRADEMARK OFFICE

PTO/SB/21 (09-04)
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(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	12/238,910
Filing Date	September 26, 2008
First Named Inventor	Pelletier et al.
Art Unit	2617
Examiner Name	Dwayne D. Bost
Attorney Docket Number	IPH-2-1853.01.US

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☒ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☒ Other Enclosure(s) (please Identify below):

Form PTO-1449 and sixteen (16) references.

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	VOLPE AND KOENIG, P.C.		
Signature			
Printed name	Thomas A. Mattioli		
Date	July 9, 2009	Reg. No.	56,773

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I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name	Thomas A. Mattioli	Date	July 9, 2009

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:

Pelletier et al.

Application No.: 12/238,910

Confirmation No.: 2438

Filed: September 26, 2008

For: METHOD AND APPARATUS FOR TERMINATING TRANSMISION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL

Group: 2617

Examiner: Dwayne D. Bost

Our File: IPH-2-1853.01.US

Date: July 9, 2009

INFORMATION DISCLOSURE STATEMENT

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

Dear Examiner:

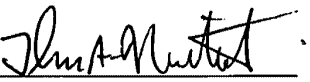
Further to Applicants' Duty of Disclosure pursuant to 37 C.F.R. §1.56, Applicants wish to bring to the Examiner's attention the material cited on the enclosed Form PTO-1449.

The listed references include references previously cited in this application. Newly cited documents are indicated by an asterisk (*) on the enclosed Form PTO-1449. Copies of the newly cited documents are enclosed.

It is respectfully requested that the Examiner consider these documents and return an initialed copy of the Form PTO-1449 indicating consideration of the cited materials.

Respectfully submitted,

Pelletier et al.

By 
Thomas A. Mattioli
Registration No. 56,773
(215) 568-6400

Volpe and Koenig, P.C.
United Plaza, Suite 1600
30 South 17th Street
Philadelphia, PA 19103

TAM/pck
Enclosures (17)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
	Pelletier et al.
Application No.:	12/238,910
Confirmation No.:	2438
Filed:	September 26, 2008
For: METHOD AND APPARATUS FOR TERMINATING TRANSMISION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL	
Group:	2617
Examiner:	Dwayne D. Bost

Our File: IPH-2-1853.01.US

Date: August 20, 2009

INFORMATION DISCLOSURE STATEMENT

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

Dear Examiner:

Further to Applicants' Duty of Disclosure pursuant to 37 C.F.R. §1.56, Applicants wish to bring to the Examiner's attention the material cited on the enclosed Form PTO-1449.

The listed references include references previously cited in this application. Newly cited documents are indicated by an asterisk (*) on the enclosed Form PTO-1449. Copies of the newly cited documents are enclosed.

This application claims priority from provisional applications: No. 61/083,409, filed on July 24, 2008; 61/074,288, filed on June 20, 2008; 61/038,576, filed on March 21, 2008; 61/025,441, filed on February 1, 2008; 61/018,999, filed on

January 4, 2008; 60/982,528, filed on October 25, 2007; and 60/975,985, filed on September 28, 2007.

This application is also related to: Application No. 12/256,964, filed on October 23, 2008; Application No. 61/018,567, filed on January 2, 2008; and Application No. 12/346,631, filed on December 30, 2008.

It is respectfully requested that the Examiner consider these documents and return an initialed copy of the Form PTO-1449 indicating consideration of the cited materials.

Respectfully submitted,

Pelletier et al.

By__/Thomas A. Mattioli/_____
Thomas A. Mattioli
Registration No. 56,773
(215) 568-6400

Volpe and Koenig, P.C.
United Plaza, Suite 1600
30 South 17th Street
Philadelphia, PA 19103

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Enclosures (4)

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	APPLICANT Pelletier et al.	
	FILING DATE September 26, 2008	GROUP 2617

U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

FOREIGN PATENT DOCUMENTS								
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
							YES	NO
		06/043782	04/2006	WO				
		07/078155	07/2007	WO				

OTHER DOCUMENTS		
EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
		ERICSSON, "Implicit release for enhanced uplink in CELL_FACH," 3GPP TSG RAN WG2 #61bis, R2-081501 (March 31-April 8, 2008).
		ERICSSON, "Resource release of common E-DCH in CELL_FACH," 3GPP TSG RAN WG2 #60bis, R2-080044 (January 14-18, 2008).
		HUAWEI, "Release procedure of E-RACH," 3GPP TSG RAN2 #60bis, R2-080262 (January 14-18, 2008).
		INFINEON, "Resource release mechanisms for CELL_FACH E-DCH," 3GPP TSG-RAN WG2 Meeting #60bis, R2-080148 (January 14-18, 2008).
		NOKIA CORPORATION, ET AL., "Introduction of Uplink Enhanced CELL_FACH in 25.321 (Draft CR)", Change Request, 25.23, CR CRNum, Current Version: 8.1.0, 3GPP TSG-RAN WG2 Meeting #62, R2-082371, (Kansas City, USA, May 5-9, 2008).
	*	NOKIA ET AL., "CELL_FACH state E-DCH – coverage comparison," 3GPP TSG-RAN WG1 Meeting #50bis, R1-074302 (October 8-12, 2007).
	*	NOKIA ET AL., "Resource assignment for E-DCH access in CELL_FACH state," 3GPP TSG-RAN WG1 Meeting #50-BIS, R1-074303 (October 8-12, 2007).
		NOKIA SIEMENS NETWORKS ET AL., " Enhanced Uplink For CELL_FACH State In FDD", TSG-RAN #37 Meeting, RP-070677, (Riga, Latvia, September 11-14, 2007).

EXAMINER	DATE CONSIDERED

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

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	APPLICANT Pelletier et al.	
	FILING DATE September 26, 2008	GROUP 2617

EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
		NOKIA SIEMENS NETWORKS, "Draft CR on TS25.435 For Enhanced Uplink In CELL_FACH", Change Request, 25.435, CR, Current Version: 7.8.0, 3GPP TSG-RAN WG3 Meeting #60, R3-081276, (Kansas City, USA, May 5-9, 2008).
		NSN ET AL., "Further Discussion On Enhanded CELL_FACH In REL8", 3GPP TSG-RAN WG2 Meeting #59, R2-073254, (Athens, Greece, August 20-24, 2007).
		QUALCOMM EUROPE, "Layer 1/2 aspects for enhanced UL for CELL_FACH," 3GPP TSG-RAN WG2 #59bis, R2-074390 (Oct 8-12, 2007).
		THIRD GENERATION PARTNERSHIP PROJECT SUPPORT TEAM, "Minutes of The 59bis TSG-WG2 Meeting (Shanghai, China, 08-12 October 2007)", TSG-RAN WG2 meeting #60, R2-075189, (Korea November 05-09, 2007).
		THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams (Release 6)," 3GPP TS 25.425 V6.4.0 (December 2006).
		THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams (Release 6)," 3GPP TS 25.425 V6.5.0 (September 2008).
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		THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams (Release 8)," 3GPP TS 25.425 V8.0.0 (September 2008).
	*	THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; Medium Access Control (MAC) Protocol Specification (Release 7), 3GPP TS 25.321, V7.3.0, (December 2006).
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Physical Channels And Mapping Of Transport Channels Onto Physical Channels (FDD) (Release 7)", 3GPP TS 25.211 V7.2.0, (May 2007).
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Physical Channels And Mapping Of Transport Channels Onto Physical Channels (FDD) (Release 7)", 3GPP TS 25.211 V7.3.0, (September 2007).

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FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. IPH-2-1853.01.US	SERIAL NO. 12/238,910
	APPLICANT Pelletier et al.	
	FILING DATE September 26, 2008	GROUP 2617

EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Physical Channels And Mapping Of Transport Channels Onto Physical Channels (FDD) (Release 8)", 3GPP TS 25.211 V8.2.0, (September 2008).
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Medium Access Control (MAC) Protocol Spcification (Release 7)", 3GPP TS 25.321 V7.5.0, (June 2007).
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Medium Access Control (MAC) Protocol Spcification (Release 8)", 3GPP TS 25.321 V8.3.0, (September 2008).
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Enhanced Uplink; Overall Description Stage 2 (Release 7)", 3GPP TS 25.319 V7.2.0 (March 2007).
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		THIRD GENERATION PARTNERSHIP PRORGAM SUPPORT TEAM, "Current Minutes of the 59bis TSG-RAN WG2 Meeting (Shanghai, China, 08-12 October 2007)", TSG-RAN WG2 Meeting #60, R2-7xxxx, (Korea, November 05-09, 2007).

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Electronic Acknowledgement Receipt

EFS ID:	5926572
Application Number:	12238910
International Application Number:	
Confirmation Number:	2438
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Customer Number:	24374
Filer:	Robert Solomon/Carey Kulp
Filer Authorized By:	Robert Solomon
Attorney Docket Number:	IPH-2-1853.01.US
Receipt Date:	20-AUG-2009
Filing Date:	26-SEP-2008
Time Stamp:	16:39:17
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	NPL Documents	3GPP.pdf	1104065 edf8921d0613749145266a627a8c172d39b09a3e	no	113
Warnings:					
Information:					

2	NPL Documents	R1074302.pdf	172799 e6b111c5df521c26c39957de5a14eb8820603374	no	4
Warnings:					
Information:					
3	NPL Documents	R1074303.pdf	178546 b2c7e2e68cd8beb1eb20e640082f83c148fa6d34	no	5
Warnings:					
Information:					
4	Information Disclosure Statement (IDS) Filed (SB/08)	Filed.pdf	92534 258d89c2ac5d7e40a4550cee8c84bedd11c59658	no	5
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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
Pelletier et al.	
Application No.: 12/238,910	
Confirmation No.: 2438	Our File: IPH-2-1853.01.US
Filed: September 26, 2008	Date: September 25, 2009
For: METHOD AND APPARATUS FOR TERMINATING TRANSMISION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL	
Group: 2617	
Examiner: Dwayne D. Bost	

INFORMATION DISCLOSURE STATEMENT

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

Dear Examiner:

Further to Applicants' Duty of Disclosure pursuant to 37 C.F.R. §1.56, Applicants wish to bring to the Examiner's attention the material cited on the enclosed Form PTO-1449.

The listed references include references previously cited in this application. Newly cited documents are indicated by an asterisk (*) on the enclosed Form PTO-1449. Copies of the newly cited documents are enclosed. Pursuant to 37 C.F.R. §1.98(a)(2)(ii), copies of the newly cited U.S. publications and/or patent documents have not been included.

This application claims priority from: Provisional Application No. 61/083,409, filed on July 24, 2008; Provisional Application No. 61/074,288, filed on June 20, 2008; Provisional Application No. 61/038,576, filed on March 21, 2008; Provisional Application No. 61/025,441, filed on February 1, 2008; Provisional Application No. 61/018,999, filed on January 4, 2008; Provisional Application No. 60/982,528, filed on October 25, 2007; and Provisional Application No. 60/975,985, filed on September 28, 2007.

This application is also related to: Non-Provisional Application No. 12/256,964, filed on October 23, 2008; Non-Provisional Application No. 61/018,567, filed on January 2, 2008; and Non-Provisional Application No. 12/346,631, filed on December 30, 2008.

It is respectfully requested that the Examiner consider these documents and return an initialed copy of the Form PTO-1449 indicating consideration of the cited materials.

Respectfully submitted,

Pelletier et al.

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TAM/pck
Enclosures (4)

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. IPH-2-1853.01.US	SERIAL NO. 12/238,910
	APPLICANT Pelletier et al.	
	FILING DATE September 26, 2008	GROUP 2617

U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	*	2005/101299	05/2005	Farnsworth			

FOREIGN PATENT DOCUMENTS								
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
							YES	NO
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		06/043782	04/2006	WO				
		07/078155	07/2007	WO				

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EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
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		THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams (Release 6)," 3GPP TS 25.425 V6.4.0 (December 2006).
		THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams (Release 6)," 3GPP TS 25.425 V6.5.0 (September 2008).
		THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams (Release 7)," 3GPP TS 25.425 V7.4.0 (June 2007).
		THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams (Release 7)," 3GPP TS 25.425 V7.8.0 (September 2008).
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		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Physical Channels And Mapping Of Transport Channels Onto Physical Channels (FDD) (Release 8)", 3GPP TS 25.211 V8.2.0, (September 2008).
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		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Medium Access Control (MAC) Protocol Spcification (Release 8)", 3GPP TS 25.321 V8.3.0, (September 2008).
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Enhanced Uplink; Overall Description Stage 2 (Release 7)", 3GPP TS 25.319 V7.2.0 (March 2007).
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Enhanced Uplink; Overall Description Stage 2 (Release 8)", 3GPP TS 25.319 V8.3.0 (September 2008).
		THIRD GENERATION PARTNERSHIP PRORGAM SUPPORT TEAM, "Current Minutes of the 59bis TSG-RAN WG2 Meeting (Shanghai, China, 08-12 October 2007)", TSG-RAN WG2 Meeting #60, R2-7xxxx, (Korea, November 05-09, 2007).
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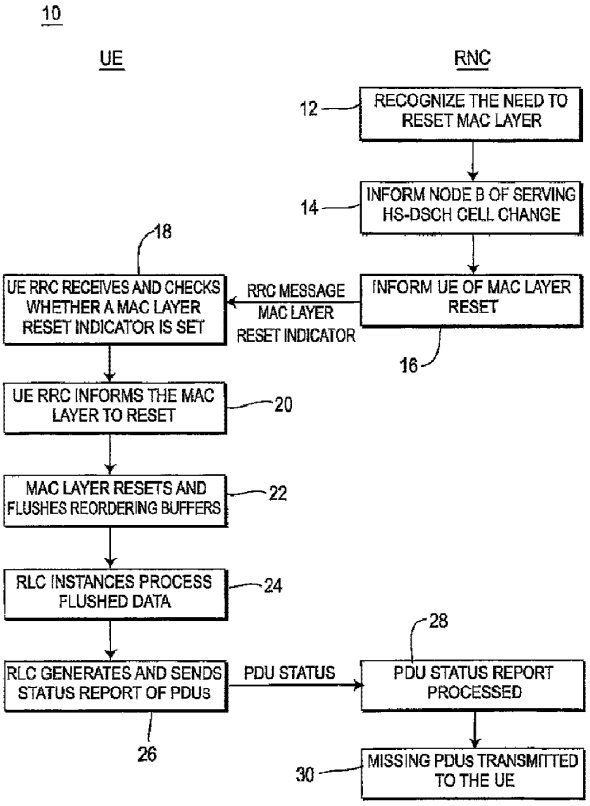
(71) Demandeur/Applicant:
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TERRY, STEPHEN E., US;
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(74) Agent: RIDOUT & MAYBEE LLP

(54) Titre : SYSTEME D'EXTRACTION EFFICACE DE DONNEES MISES EN MEMOIRE TAMPON SUR UN NOEUD B SUITE A UNE REMISE A ZERO DE LA COUCHE MAC

(54) Title: SYSTEM FOR EFFICIENT RECOVERY OF NODE-B BUFFERED DATA FOLLOWING MAC LAYER RESET



(57) Abrégé/Abstract:
A method and system for the UE and RNC to reduce transmission latency and potentially prevent loss of PDUs upon a MAC layer reset. UE generation of the status PDU is coupled with the MAC layer reset. The RNC generates a message with a MAC reset

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(13) A1

(57) **Abrégé(suite)/Abstract(continued):**
indication. Following the MAC layer reset all PDUs stored in the UE MAC layer reordering buffers are flushed to RLC entities and then processed by RLC entities prior to the generation of a PDU status report. The PDU status report provides to the RNC the status of all successfully received PDUs. Upon reception of a PDU status report in the RNC, missing PDUs are realized and retransmitted to the UE.

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ABSTRACT

A method and system for the UE and RNC to reduce transmission latency and potentially prevent loss of PDUs upon a MAC layer reset. UE generation of the status PDU is coupled with the MAC layer reset. The RNC generates a message with a MAC reset indication. Following the MAC layer reset all PDUs stored in the UE MAC layer reordering buffers are flushed to RLC entities and then processed by RLC entities prior to the generation of a PDU status report. The PDU status report provides to the RNC the status of all successfully received PDUs. Upon reception of a PDU status report in the RNC, missing PDUs are realized and retransmitted to the UE.

SYSTEM FOR EFFICIENT RECOVERY OF NODE-B BUFFERED DATA FOLLOWING MAC LAYER RESET

This application is a divisional of Canadian patent application Serial No. 2,498,163 filed internationally on September 10, 2003 and entered nationally on March 8,2005.

FIELD OF INVENTION

The present invention relates to the field of wireless communications. More specifically, the present invention relates to efficient recovery of data transmission between a pair of Layer 2 automatic repeat request (ARQ) peer entities following MAC layer reset of an intermediate node from where data transmissions are distributed. One such example of this handover scenario is a system employing hybrid ARQ (H-ARQ) and adaptive modulation and coding (AM&C) techniques.

BACKGROUND

A third generation (3G) Universal Terrestrial Radio Access Network (UTRAN) comprises several radio network controllers (RNCs), each of which is associated with one or more Node Bs, and each Node B is associated with one or more cells.

The 3G FDD and TDD systems typically use the RNC to distribute, (i.e., buffer and schedule), data transmissions to the UE. However, for the high speed channels of 3G cellular systems, data is distributed by the Node B. One of these high speed channels, for example, is the High Speed Downlink Shared Channel (HS-DSCH). Since data is distributed by the Node B, it is necessary to buffer data for transmission in Node B. When the distributing entity (Node B) to which the UE is attached changes, there is a potential loss of data buffered in the distributing entity. The RNC does not have an up-to-date status of the transmissions of Packet Data Units (PDUs) since data is distributed by the intermediate point (Node B). It is necessary for the UE to detect the data loss

and request retransmission, such as with a Status PDU, of lost PDUs from the RNC. If the generation of the Status PDU is delayed, as a consequence, the latency of data retransmission may be large and may not satisfy QoS requirements.

This problem is aggravated in the HS-DSCH case since there are several Node Bs associated with each RNC and there is a much higher likelihood that a mobile UE will require a Node B change than a change of RNC as a result of UE cell handovers.

The HS-DSCH utilizes AMC to enable high-speed transmission of data and utilizes H-ARQ to increase the possibility of successful delivery of data. A serving HS-DSCH cell change is when the UE has to change the cell associated with the UTRAN access point that is performing transmission and reception of the serving HS-DSCH radio link. The serving HS-DSCH cell change is invoked when improved physical channel conditions and/or improved physical capacity is realized in an alternate cell.

There are two types of serving HS-DSCH cell changes. An Intra-Node B serving HS-DSCH cell change is when the UE changes between two cells that are associated with the same Node B. An Inter-Node B serving HS-DSCH cell change is when the UE changes between two cells that are associated with different Node Bs. In an Inter-Node B cell change, the Node B before the serving HS-DSCH cell change is called the source Node B and the Node B after the serving HS-DSCH cell change is called the target Node B.

There are peer Radio Link Control (RLC) entities in both the RNC and the UE. The sending RLC entity signals a sequence number (SN) in the PDU header, which is used by the receiving RLC entity to ensure that no PDUs are missed in the transmission. If there are PDUs missed during the transmission, realized by out-of-sequence delivery of PDUs, the receiving RLC entity sends a status report PDU to inform the sending RLC entity that certain PDUs are missing. The status report PDU describes the status of the successful and/or unsuccessful data transmissions. It identifies the SNs of the PDUs that

are missed or received. If a PDU is missed, the sending RLC entity will retransmit a duplicate of the missed PDU to the receiving RLC.

It is also possible for the sending RLC entity to poll for a status report PDU from the receiving RLC entity. The polling function provides a mechanism for the sending RLC entity to request the status of PDU transmissions. Although the H-ARQ operation removes some failed transmissions and increases the probability of successful delivery of data, it is the RLC protocol layer that ultimately ensures successful delivery.

Due to dynamic changes in propagation conditions, the HS-DSCH cell change must be performed rapidly to maintain quality of service. During the serving HS-DSCH cell change, it is possible that the UE stops transmission and reception in the source cell before all PDUs currently stored in the source Node B are successfully transmitted. Since the source Node B performs scheduling and buffering of the data, and since the data rates are very high, (for example 10 Mb/sec or higher), when the UE performs a serving HS-DSCH cell change (especially for an Inter-Node B handover) there is a possibility that considerable amounts of data buffered in the source Node B will be lost. One reason for this data loss is that no mechanism exists within the UTRAN architecture for data buffered at the source Node B to be transferred to the target Node B. Upon a serving HS-DSCH cell change, the RNC has no information on how much, if any, data is lost since the RNC has no way to know what data is buffered in the source Node B.

There are currently two ways that prior art systems handle the recovery of data buffered at the source Node B. Following the HS-DSCH cell change: 1) the RNC can explicitly poll for a status PDU from the UE; or 2) the RNC can start transmitting in the target cell and the out-of-sequence delivery realized by the UE will generate the status PDU.

In the first case, where the RNC explicitly polls for a status PDU, the RNC must first wait until the physical channel is established in the new cell. The status PDU request is then sent and is received and processed by the UE.

The UE generates the status PDU and sends it back to the RNC, which processes the status PDU and determines which PDUs are in need of retransmission.

In the second case, where the RNC just starts transmitting PDUs from where it stopped in the source cell, the UE recognizes the out-of-sequence delivery of data and generates a status PDU back to the RNC. The RNC processes the status PDU and learns which PDUs are in need of retransmission.

In either of these two cases, if data buffered in the source Node B needs to be recovered, then a status PDU will be processed, but proper reception of data retransmitted by the UE will be considerably delayed. This is due to delayed generation of the status PDU by the UE and reception of the status PDU in the RNC. If transmission is being performed in the RLC acknowledged mode, data is not passed to higher layers until in-sequence delivery of data can be performed. Accordingly, the UE will be required to buffer the out-of-sequence data until the missing PDUs can be retransmitted. This not only results in a delay of the transmission, but requires the UE to have a memory capable of data buffering for continuous data reception until the missed data can be successfully retransmitted. Otherwise the effective data transmission rate is reduced, thereby effecting quality of service. Since memory is very expensive, this is an undesirable design constraint.

Another problem encountered with handover is the data that is buffered within the UE. Within the MAC layer, there are typically a number of H-ARQ processors that perform H-ARQ processing. As shown in Figure 1, H-ARQ processing is a scheme comprising multiple parallel H-ARQ processors on the transmitting side ($P1_B$- $P5_B$) and corresponding multiple parallel H-ARQ processors on the receiving side ($P1_{UE}$-$P5_{UE}$). Each processor pair, (for example $P1_B$ and $P1_{UE}$), repeatedly and sequentially attempt transmission of a data block until the transmission is successful, to ensure that each block of data is received without an error. For each data block, the time required to achieve successful H-ARQ transmission varies. Since several data blocks are processed in parallel, it is possible that the sequence of transmission is not maintained. Therefore, once a

data block is received successfully by the receiving H-ARQ processor, the data block is forwarded to a reordering buffer to provide in-sequence delivery to the RLC layer. The reordering buffers will reorder the data blocks based on their transmission sequence numbers before forwarding them to the RLC layer.

During Inter-Node B or Intra-Node B handovers, the RRC messages often carry a MAC layer reset indicator to the UE. Upon receiving a MAC layer reset indicator, the UE performs a sequence of functions including, but not limited to, flushing out buffers for all configured H-ARQ processes, (i.e. flushing out the reordering buffers by disassembling all MAC-hs layer PDUs in the reordering buffers into MAC-d layer PDUs and delivering all MAC-d layer PDUs to the MAC-d layer and then to its associated RLC entities). Upon Inter-Node B handovers (and some Intra Node B handovers), it is necessary to reset the MAC-hs layer in the UE such that all H-ARQ processes and all the reordering buffers are reset for data reception from a new MAC-hs entity of the target Node B.

After a serving HS-DSCH cell change, the correct status of successful or unsuccessful received PDUs cannot be obtained until the procedure of the MAC layer reset is completed and the data blocks are processed by the RLC.

It would be desirable to have a system and method where data buffered in the UE can be accounted for in order to properly maintain user quality of service requirements.

SUMMARY

The present invention is a method and system for the UE and RNC to perform a series of actions in order to reduce transmission latency and potentially prevent loss of PDUs upon a MAC layer reset. UE generation of the status PDU is coupled with the MAC layer reset. The RNC generates a signaling message with a MAC reset indication. Following the MAC layer reset due to reception of a MAC layer reset request, all PDUs stored in the UE MAC layer reordering buffers are flushed to RLC entities and then processed by RLC entities

prior to the generation of a PDU status report. The PDU status report provides the status of all successfully received PDUs to the RNC. This provides fast generation of a PDU status report. Upon reception of a PDU status report in the RNC, missing PDUs are realized and retransmitted to the UE.

According to an aspect, the invention provides for a Universal Terrestrial Radio Access Network (UTRAN) user equipment (UE), the UE comprising: a processing device configured to receive a radio resource control (RRC) message associated with a high speed downlink shared channel (HS-DSCH) inter-Node B cell change, when the radio resource control (RRC) message has an identifier indicating that a medium access control high speed (MAC-hs) is to be reset, the processing device flushes a reordering buffer and after the flushing of the reordering buffer, the processing device has each acknowledge mode (AM) radio link control (RLC) entity mapped to the HS-DSCH generate a status report.

According to another aspect, the invention provides for a Universal Terrestrial Radio Access Network (UTRAN) user equipment (UE), the UE comprising: a processing device configured to receive a radio resource control (RRC) message associated with a high speed downlink shared channel (HS-DSCH) inter-Node B cell change; a medium access control high speed (MAC-hs) configured to reset itself when the radio resource control (RRC) message has an identifier indicating that the MAC-hs is to be reset; a reordering buffer configured to be flushed when the MAC-hs is reset; and each of a plurality of acknowledge mode (AM) radio link control (RLC) entities mapped to the HS-DSCH are configured to generate a status report when the MAC-hs is reset and after the reordering buffer is flushed.

According to yet another aspect, the invention provides for a method for use by a Universal Terrestrial Radio Access Network (UTRAN) user equipment (UE), the method comprising: receiving a radio resource control (RRC) message associated with a high speed downlink shared channel (HS-DSCH) inter-Node B cell change; when the radio resource control (RRC) message

has an identifier indicating that a medium access control high speed (MAC-hs) is to be reset, a reordering buffer is flushed; and after the flushing of the reordering buffer, each acknowledge mode (AM) radio link control (RLC) entity mapped to the HS-DSCH generates a status report.

BRIEF DESCRIPTION OF THE DRAWING(S)

Figure 1 is a block diagram of a prior art H-ARQ process.

Figure 2 is a flow diagram of an efficient procedure in accordance with the present invention for efficient recovery of UE buffered data following an HS-DSCH cell change.

Figure 3 is a flow diagram of a first alternative method whereby the RNC waits for a status PDU prior to initiating a transmission of new data in the target cell.

Figure 4 is a flow diagram of a second alternative method whereby the RNC waits for a trigger prior to initiating a transmission of new data in the target cell.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

The preferred embodiments of the present invention will be described with reference to the drawing figures wherein like numerals represent like elements throughout.

Referring to the flow diagram of Figure 2, a first embodiment of the present invention which comprises a method 10 of determining the status of the PDU transmissions to the UE with minimal delay following a MAC layer reset condition is shown. The procedure commences with the RNC recognizing the need to reset the UE MAC layer (step 12).

One possible cause for a UE MAC layer reset is in the event of a serving HS-DSCH cell change. The RNC informs the Node B of the HS-DSCH cell change (step 14) in the case of an Inter-Node B serving HS-DSCH cell change, and also in the case of an Intra-Node B serving HS-DSCH cell change where the

source Node B is the same as the target Node B, but where transmission queues cannot be rerouted from the source to target cell. In both of these cases, a MAC reset is required. Along with the HS-DSCH cell change indication, the UE is informed of the MAC layer reset requirement by the RNC, as indicated via a Radio Resource Control (RRC) message (step 16). It should be noted that it is also possible to invoke step 16 in advance of step 14 with no adverse consequences.

Those of skill in the art would realize that there are many causes for a MAC layer reset other than the HS-DSCH cell change, where the method 10 for the RNC to determine PDU transmission status following MAC reset applies. For example, a MAC layer reset may be warranted any time the Node B H-ARQ processes need to be reinitialized.

Within the RRC message, there is an identifier for the MAC layer to perform a reset. This identifier may be part of the serving HS-DSCH cell change procedure, or may be part of any other procedure that results in resetting of the MAC layer in Node B and the UE in either an Inter-Node B cell change or an Intra-Node B cell change. It would be understood by those of skill in the art that there are many aspects to the MAC layer, including the MAC-hs layer and the MAC-d layer. For simplicity in describing the present invention, reference will be made hereinafter generally to the MAC layer.

The HS-DSCH is a data transport channel. For each data transport channel, there can be a plurality of RLC instances. The RLC instances are essentially logical channels which may be mapped to the same transport channel; for example, several RLC entities may be mapped to a single transport channel HS-DSCH. An RLC instance is called Acknowledged Mode (AM) if ARQ is used to ensure correct transmission between the peer RLC instances. A pair of AM RLC entities uses status PDUs for the receiver to indicate to the sender the status of successful transmissions of PDUs. Following the occurrence of the HS-DSCH cell change and a MAC layer reset, each of the AM RLC instances associated with a particular HS-DSCH generate a status PDU.

The RRC message along with the MAC layer reset indicator is received and processed by the RRC in the UE (step 18). The UE RRC checks whether a MAC layer reset indicator is set and, if so, the RRC informs the MAC layer of the MAC layer reset request (step 20). Upon reception of the MAC layer reset request, the MAC layer resets and in addition to other tasks, flushes all PDUs stored in its reordering buffers to the RLC entities mapped to the HS-DSCH (step 22). All flushed PDUs are then processed by the RLC instances mapped to HS-DSCH (step 24) before generation of a PDU status report (step 26).

RLC processing of PDUs stalled in reordering buffers before the generation of a PDU status report is necessary to provide accurate and complete transmission status to the RNC. If PDU status reports are generated early, (i.e. before all PDUs buffered in MAC reordering queues are processed by the RLC instances), some PDUs may be incorrectly indicated as not being received, and as a result unnecessary PDU retransmissions may be generated by the RNC.

There are several ways to ensure that all PDUs have been processed by the RLC so that the AM RLC entities will be able to obtain the correct status of all successfully received PDUs. First, the MAC layer forwards PDUs in-sequence from each reordering queue and then generates an "end-of-PDU" indication for each reordering queue.

In a second alternative, the last PDU from each reordering queue has a special indicator. These are reports of the status of the RLC PDUs received in the UE.

In a third alternative, the RLC confirms to the MAC layer when PDUs have been processed, and following the processing of all PDUs, the MAC layer generates a PDU status request to the RLC. It should be understood that there are numerous ways to coordinate processing between the MAC layer and the RLC to ensure all PDUs are processed by the RLC before generation of the PDU status message.

After receiving and processing the PDUs, the AM RLC generates a PDU status report (step 26) which indicates all successfully or unsuccessfully

received PDUs. The PDU status report is generated for each AM RLC instance mapped to the HS-DSCH. A PDU status report may be generated even though no PDUs were forwarded from the MAC layer for that AM RLC instance. The UE then autonomously sends the PDU status report for each AM RLC instance associated with the HS-DSCH to the RNC.

In the RNC, assuming that the AM RLC and MAC entities are not informed to stop transmitting PDUs due to the MAC layer reset, the RNC continues to transmit PDUs regardless of the MAC layer reset. Upon reception of the PDU status report for each AM RLC instance associated with the HS-DSCH, the RLC instances in the RNC process the status reports (step 28) to determine lost PDUs and generate PDU retransmissions as necessary to ensure successful delivery (step 30). To achieve quality of service requirements, the retransmissions may take precedence over current transmission processing.

It should be understood that the need for the MAC layer reset is common with the need to generate a PDU status report. Indication of either requirement, or some common indication, can be signaled to the UE to invoke both the MAC layer reset and generation of the PDU status report. The UE will then perform each function in the sequence described.

This first embodiment of the present invention as shown in Figure 2 permits the RNC to keep transmitting to the UE while the data path is switched from one radio link to another. However, in accordance with two alternative embodiments of the present invention, shown in Figures 3 and 4, data transmissions are halted upon an HS-DSCH cell change or other events that result in the need for MAC layer reset until the occurrence of a subsequent event. It should be noted that the steps shown in Figures 3 and 4 which have the same element numbers as the steps shown in Figure 2 are identical. Accordingly, the description of those steps will not be repeated when referring to Figures 3 and 4.

A second embodiment of the present invention comprises a method 40 for determining the status of PDU transmissions to the UE with minimal delay following a MAC layer reset condition and is shown in Figure 3. After the

RNC recognizes the need for a MAC layer reset (step 12) and the Node B and UE are notified (steps 14 and 16), the RNC halts all downlink HS-DSCH transmissions (step 17). Note that step 17 may occur in advance of step 14 or 16 without any adverse consequences. The RNC subsequently receives the PDU status report (step 32). The PDU status report indicates the PDUs lost as a result of the MAC reset and potentially additional PDUs lost in the source Node B the case of an HS-DSCH cell change. The PDU status report is then processed (step 34) and the missing PDUs are retransmitted to the UE (step 36). The RNC initiates transmission in the new cell by scheduling transmission of lost PDUs that require retransmission first. The RNC then resumes PDU transmissions (step 38) at the point where transmissions were previously stopped at step 17. Note it is also possible that steps 36 and 38 are performed simultaneously.

Referring to Figure 4, a third embodiment of a method 50 in accordance with the present invention is shown. This method 50 is similar to the method 40 shown in Figure 3. However, instead of restarting the downlink HS-DSCH transmissions to the UE in response to the receipt of a PDU status report at step 32 as shown in Figure 3, the method 50 of this embodiment of the present invention restarts transmissions upon the receipt of a "trigger", or a pre-determined event (step 19). In a first example, the trigger may comprise the establishment of the transport channel in UTRAN which, as would be understood by those of skill in the art, is accomplished by an RNC with the new "target" Node B signaling procedure. The reception in the RNC of a confirmation generated by the Node B is used as the trigger.

In a second example, the trigger may comprise reception or detection of the "in-sync" indication. Upon establishment of dedicated resources in the target Node B, an "in-sync" indication may be determined in the Node B when the assigned physical channels are determined to be available for transmission in the Node B. Indication of this event is relayed to the RNC and can then be used as a trigger

In a third example, the trigger may comprise completion of the RRC procedure, (i.e., confirmation of the RNC reception of the UE RRC message). The RRC message signaled in step 16 results in an RRC confirmation message that is generated by the UE and sent to the RNC. When this message is received at the RNC it can be used as a trigger.

It should be noted that there are many different signals that are sent between the UE and the RNC, and any of these may be selected as desired by the user to act as the trigger in accordance with the present invention. Accordingly, the aforementioned three examples are intended to be instructive rather than restrictive. Regardless of the form of the trigger, after the trigger is received the RNC restarts HS-DSCH transmissions (step 21).

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CLAIMS:

1. A Universal Terrestrial Radio Access Network (UTRAN) user equipment (UE), the UE comprising:

a processing device configured to receive a radio resource control (RRC) message associated with a high speed downlink shared channel (HS-DSCH) inter-Node B cell change, when the radio resource control (RRC) message has an identifier indicating that a medium access control high speed (MAC-hs) is to be reset, the processing device flushes a reordering buffer and after the flushing of the reordering buffer, the processing device has each acknowledge mode (AM) radio link control (RLC) entity mapped to the HS-DSCH generate a status report.

2. The UE of claim 1 wherein when the RRC message has the identifier indicating that the MAC-hs is to be reset, the processing device flushes the MAC-hs H-ARQ processes prior to the processing device generating the status report.

3. The UE of claim 1 wherein the UE configured to receive data blocks over an air interface.

4. The UE of claim 1 wherein the UE configured to transmit ACKs and NAKs generated by the MAC-hs H-ARQ processes.

5. The UE of claim 1 wherein the processing device prior to status report generation, generates an end of packet data unit indication for each reordering queue.

6. The UE of claim 1 wherein for a last packet data unit for each reordering queue, the processing device produces a special indication prior to the generation of the status report.

7. The UE of claim 1 wherein when the MAC-hs confirms that all the packet data units have been processed, the MAC-hs sends a packet data unit status report to a radio link control (RLC) layer.

8. A Universal Terrestrial Radio Access Network (UTRAN) user equipment (UE), the UE comprising:

a processing device configured to receive a radio resource control (RRC) message associated with a high speed downlink shared channel (HS-DSCH) inter-Node B cell change;

a medium access control high speed (MAC-hs) configured to reset itself when the radio resource control (RRC) message has an identifier indicating that the MAC-hs is to be reset;

a reordering buffer configured to be flushed when the MAC-hs is reset; and

each of a plurality of acknowledge mode (AM) radio link control (RLC) entities mapped to the HS-DSCH are configured to generate a status report when the MAC-hs is reset and after the reordering buffer is flushed.

9. The UE of claim 8 comprising H-ARQ processes which are flushed when the RRC message has the identifier indicating that the MAC-hs is to be reset.

10. The UE of claim 8 wherein the UE is configured to receive data blocks over an air interface.

11. The UE of claim 8 comprising H-ARQ processes configured to generate ACKs and NAKs; wherein the UE is configured to transmit the ACKs and NAKs over the air interface.

12. The UE of claim 8 wherein the processing device prior to status report generation, generates an end of packet data unit indication for each reordering queue.

13. The UE of claim 8 wherein for a last packet data unit for each reordering queue, the processing device produces a special indication prior to the generation of the status report.

14. The UE of claim 8 wherein when the MAC-hs confirms that all the packet data units have been processed, the MAC-hs sends a packet data unit status report to a radio link control (RLC) layer.

15. A method for use by a Universal Terrestrial Radio Access Network (UTRAN) user equipment (UE), the method comprising:

receiving a radio resource control (RRC) message associated with a high speed downlink shared channel (HS-DSCH) inter-Node B cell change;

when the radio resource control (RRC) message has an identifier indicating that a medium access control high speed (MAC-hs) is to be reset, a reordering buffer is flushed; and

after the flushing of the reordering buffer, each acknowledge mode (AM) radio link control (RLC) entity mapped to the HS-DSCH generates a status report.

16. The method of claim 15 comprising when the RRC message has the identifier indicating that the MAC-hs is to be reset, the MAC-hs H-ARQ processes are flushed prior to the processing device generating the status report.

17. The method of claim 15 comprising receiving data blocks over an air interface.

18. The method of claim 15 comprising transmitting ACKs and NAKs generated by the MAC-hs H-ARQ processes.

19. The method of claim 15 comprising prior to status report generation, generating an end of packet data unit indication for each reordering queue.

20. The method of claim 15 wherein for a last packet data unit for each reordering queue, producing a special indication prior to the generation of the status report.

21. The method of claim 15 wherein when the MAC-hs confirms that all the packet data units have been processed, the MAC-hs sends a packet data unit status report to a radio link control (RLC) layer.

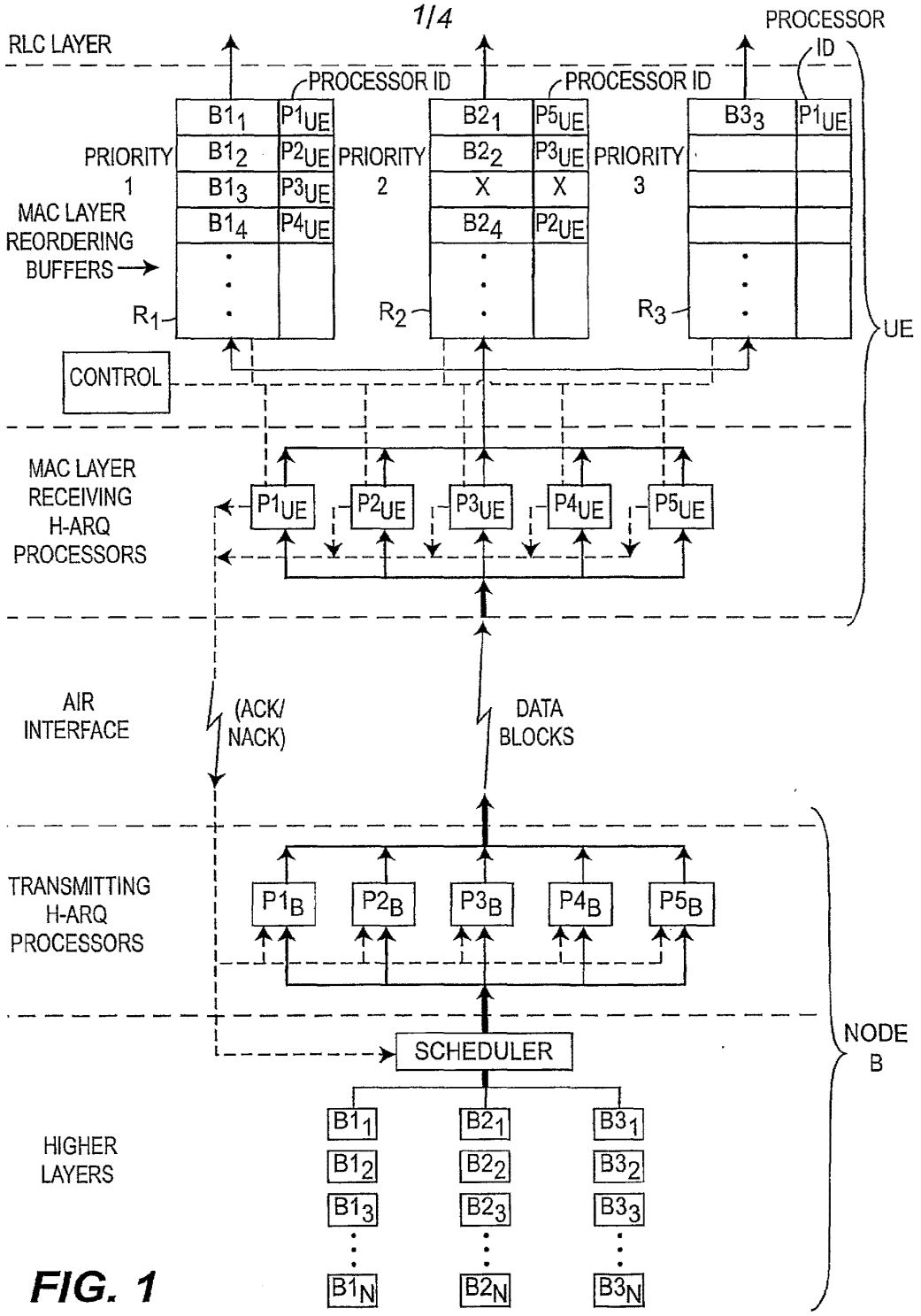

RLC LAYER
PROCESSOR ID
PROCESSOR ID
PROCESSOR ID
PRIORITY 1
PRIORITY 2
PRIORITY 3
MAC LAYER REORDERING BUFFERS
R1
R2
R3
UE
CONTROL
MAC LAYER RECEIVING H-ARQ PROCESSORS
AIR INTERFACE
(ACK/ NACK)
DATA BLOCKS
TRANSMITTING H-ARQ PROCESSORS
SCHEDULER
NODE B
HIGHER LAYERS

FIG. 1

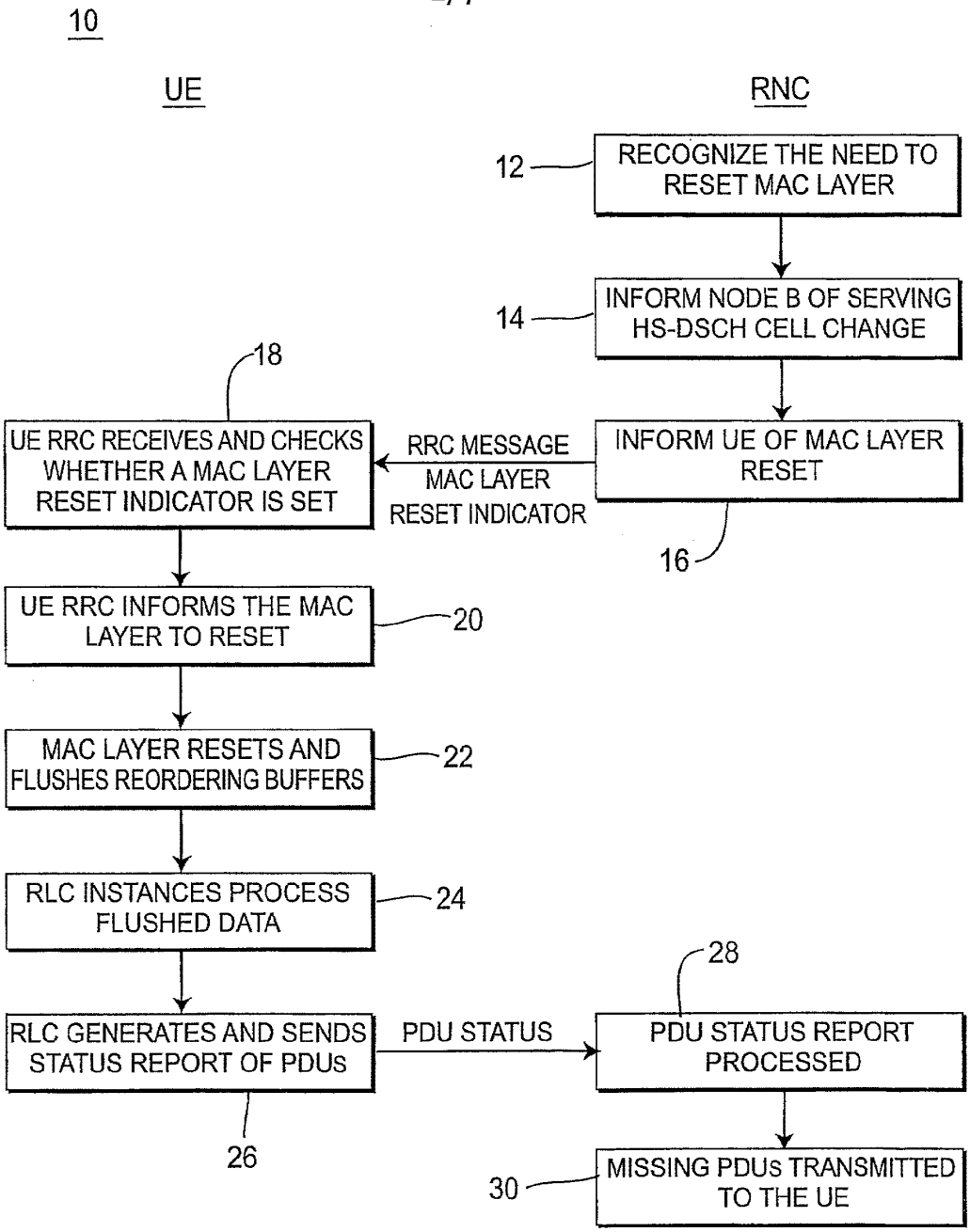

10
UE
RNC
12
RECOGNIZE THE NEED TO RESET MAC LAYER
14
INFORM NODE B OF SERVING HS-DSCH CELL CHANGE
18
UE RRC RECEIVES AND CHECKS WHETHER A MAC LAYER RESET INDICATOR IS SET
RRC MESSAGE
MAC LAYER RESET INDICATOR
INFORM UE OF MAC LAYER RESET
16
UE RRC INFORMS THE MAC LAYER TO RESET
20
MAC LAYER RESETS AND FLUSHES REORDERING BUFFERS
22
RLC INSTANCES PROCESS FLUSHED DATA
24
28
RLC GENERATES AND SENDS STATUS REPORT OF PDUs
PDU STATUS
PDU STATUS REPORT PROCESSED
26
30
MISSING PDUs TRANSMITTED TO THE UE

FIG. 2

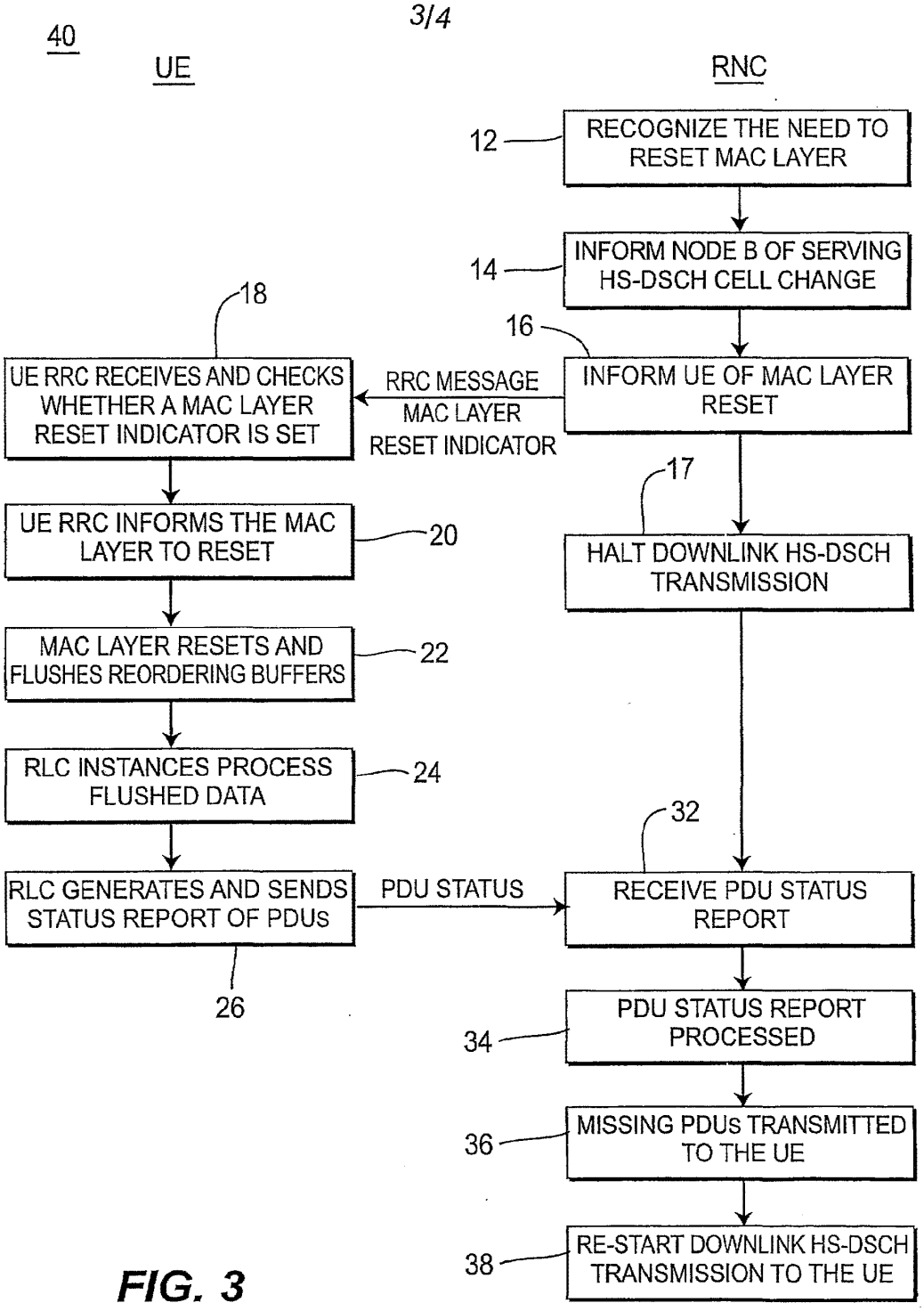

40
UE
RNC
12
RECOGNIZE THE NEED TO RESET MAC LAYER
14
INFORM NODE B OF SERVING HS-DSCH CELL CHANGE
16
INFORM UE OF MAC LAYER RESET
RRC MESSAGE
MAC LAYER RESET INDICATOR
18
UE RRC RECEIVES AND CHECKS WHETHER A MAC LAYER RESET INDICATOR IS SET
17
HALT DOWNLINK HS-DSCH TRANSMISSION
UE RRC INFORMS THE MAC LAYER TO RESET
20
MAC LAYER RESETS AND FLUSHES REORDERING BUFFERS
22
RLC INSTANCES PROCESS FLUSHED DATA
24
32
RLC GENERATES AND SENDS STATUS REPORT OF PDUs
PDU STATUS
RECEIVE PDU STATUS REPORT
26
PDU STATUS REPORT PROCESSED
34
MISSING PDUs TRANSMITTED TO THE UE
36
RE-START DOWNLINK HS-DSCH TRANSMISSION TO THE UE
38

FIG. 3

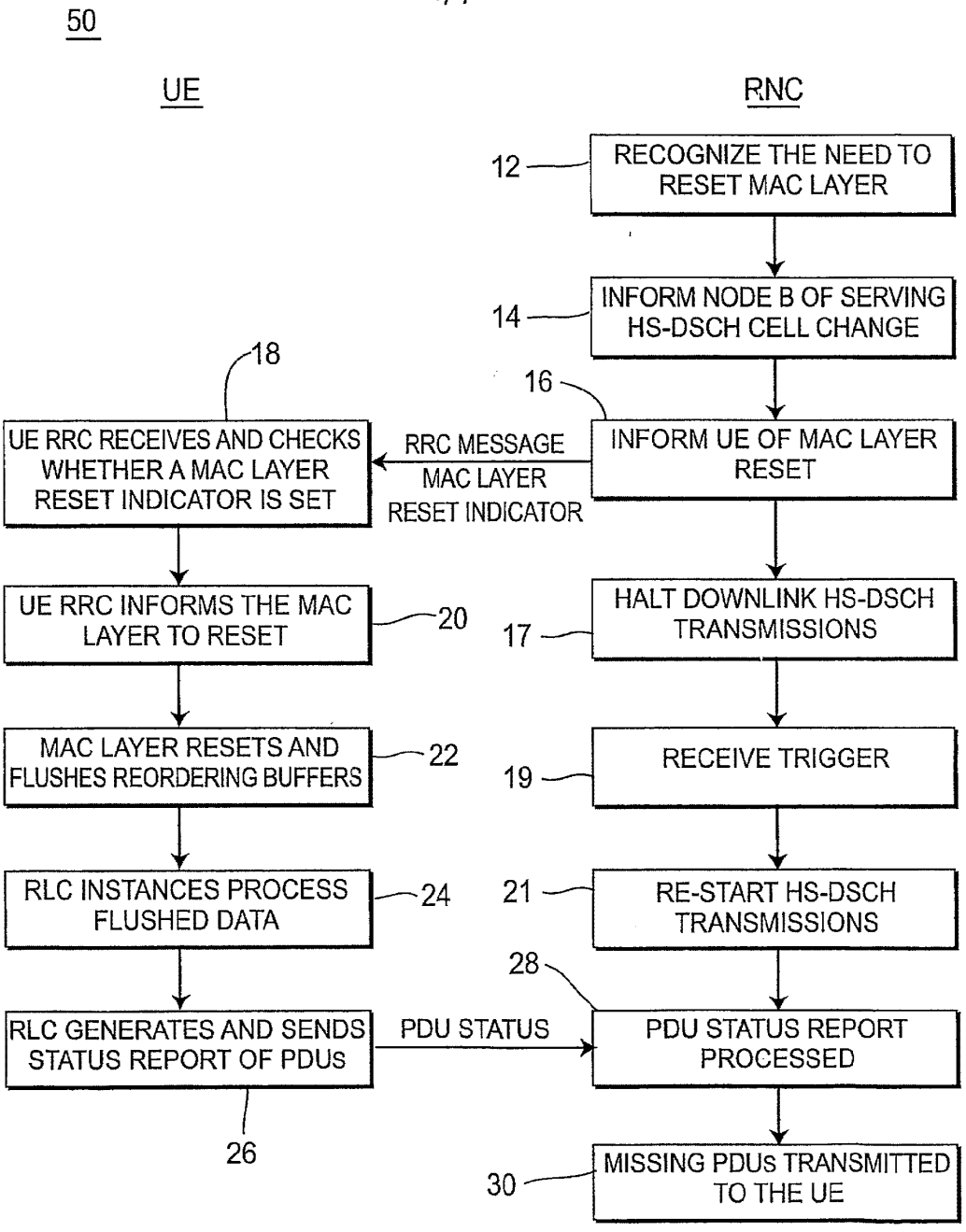
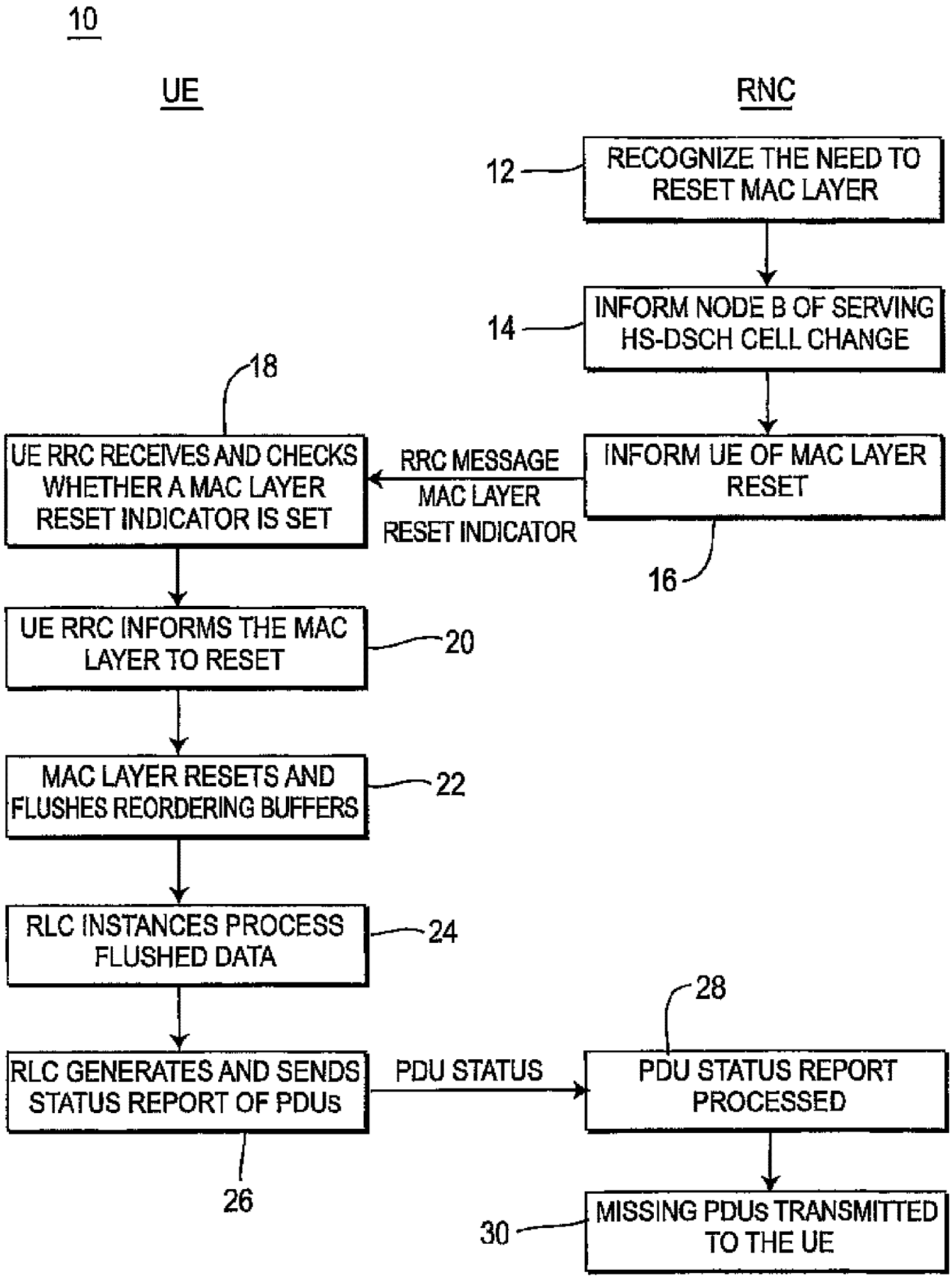

50
UE
RNC
12
RECOGNIZE THE NEED TO RESET MAC LAYER
14
INFORM NODE B OF SERVING HS-DSCH CELL CHANGE
16
INFORM UE OF MAC LAYER RESET
RRC MESSAGE
MAC LAYER RESET INDICATOR
18
UE RRC RECEIVES AND CHECKS WHETHER A MAC LAYER RESET INDICATOR IS SET
17
HALT DOWNLINK HS-DSCH TRANSMISSIONS
20
UE RRC INFORMS THE MAC LAYER TO RESET
19
RECEIVE TRIGGER
22
MAC LAYER RESETS AND FLUSHES REORDERING BUFFERS
21
RE-START HS-DSCH TRANSMISSIONS
24
RLC INSTANCES PROCESS FLUSHED DATA
28
PDU STATUS
RLC GENERATES AND SENDS STATUS REPORT OF PDUs
PDU STATUS REPORT PROCESSED
26
30
MISSING PDUs TRANSMITTED TO THE UE

FIG. 4


10
UE
RNC
12
RECOGNIZE THE NEED TO RESET MAC LAYER
14
INFORM NODE B OF SERVING HS-DSCH CELL CHANGE
INFORM UE OF MAC LAYER RESET
16
RRC MESSAGE
MAC LAYER RESET INDICATOR
18
UE RRC RECEIVES AND CHECKS WHETHER A MAC LAYER RESET INDICATOR IS SET
UE RRC INFORMS THE MAC LAYER TO RESET
20
MAC LAYER RESETS AND FLUSHES REORDERING BUFFERS
22
RLC INSTANCES PROCESS FLUSHED DATA
24
RLC GENERATES AND SENDS STATUS REPORT OF PDUs
26
PDU STATUS
28
PDU STATUS REPORT PROCESSED
MISSING PDUs TRANSMITTED TO THE UE
30

Electronic Acknowledgement Receipt

EFS ID:	6150549
Application Number:	12238910
International Application Number:	
Confirmation Number:	2438
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Customer Number:	24374
Filer:	Robert Solomon/Carey Kulp
Filer Authorized By:	Robert Solomon
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Filing Date:	26-SEP-2008
Time Stamp:	17:13:14
Application Type:	Utility under 35 USC 111(a)

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Submitted with Payment	no

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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed (SB/08)	FILED.pdf	93723 3933ce6ef5bb3eb8b2e8499ff4a9281214b11788	no	6

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	APPLICANT Pelletier et al.	
	FILING DATE September 26, 2008	GROUP 2617

U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
		2005/101299	05/2005	Farnsworth			
	*	2005/250504	11/2005	Mikola			
	*	2007/0135113	06/2007	Moinet et al.[1]			

FOREIGN PATENT DOCUMENTS								
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
							YES	NO
		2 615 915	03/2004	CA				
		06/043782	04/2006	WO				
		07/078155	07/2007	WO				

OTHER DOCUMENTS		
EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
		ERICSSON, "Implicit release for enhanced uplink in CELL_FACH," 3GPP TSG RAN WG2 #61bis, R2-081501 (March 31-April 8, 2008).
		ERICSSON, "Resource release of common E-DCH in CELL_FACH," 3GPP TSG RAN WG2 #60bis, R2-080044 (January 14-18, 2008).
		HUAWEI, "Release procedure of E-RACH," 3GPP TSG RAN2 #60bis, R2-080262 (January 14-18, 2008).
		INFINEON, "Resource release mechanisms for CELL_FACH E-DCH," 3GPP TSG-RAN WG2 Meeting #60bis, R2-080148 (January 14-18, 2008).
		NOKIA CORPORATION, ET AL., "Introduction of Uplink Enhanced CELL_FACH in 25.321 (Draft CR)", Change Request, 25.23, CR CRNum, Current Version: 8.1.0, 3GPP TSG-RAN WG2 Meeting #62, R2-082371, (Kansas City, USA, May 5-9, 2008).
		NOKIA ET AL., "CELL_FACH state E-DCH – coverage comparison," 3GPP TSG-RAN WG1 Meeting #50bis, R1-074302 (October 8-12, 2007).

EXAMINER	DATE CONSIDERED

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

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. IPH-2-1853.01.US	SERIAL NO. 12/238,910
	APPLICANT Pelletier et al.	
	FILING DATE September 26, 2008	GROUP 2617

EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
		NOKIA ET AL., "Resource assignment for E-DCH access in CELL_FACH state," 3GPP TSG-RAN WG1 Meeting #50-BIS, R1-074303 (October 8-12, 2007).
		NOKIA SIEMENS NETWORKS ET AL., " Enhanced Uplink For CELL_FACH State In FDD", TSG-RAN #37 Meeting, RP-070677, (Riga, Latvia, September 11-14, 2007).
		NOKIA SIEMENS NETWORKS, "Draft CR on TS25.435 For Enhanced Uplink In CELL_FACH", Change Request, 25.435, CR, Current Version: 7.8.0, 3GPP TSG-RAN WG3 Meeting #60, R3-081276, (Kansas City, USA, May 5-9, 2008).
		NSN ET AL., "Further Discussion On Enhanded CELL_FACH In REL8", 3GPP TSG-RAN WG2 Meeting #59, R2-073254, (Athens, Greece, August 20-24, 2007).
		QUALCOMM EUROPE, "E-RNTI handling in Active Set Update procedure," 3GPP TSG-RAN WG 2 Meeting #51, R2-060682 (February 13–17, 2006).
		QUALCOMM EUROPE, "Layer 1/2 aspects for enhanced UL for CELL_FACH," 3GPP TSG-RAN WG2 #59bis, R2-074390 (Oct 8-12, 2007).
		THIRD GENERATION PARTNERSHIP PROJECT SUPPORT TEAM, "Minutes of The 59bis TSG-WG2 Meeting (Shanghai, China, 08-12 October 2007)", TSG-RAN WG2 meeting #60, R2-075189, (Korea November 05-09, 2007).
		THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams (Release 6)," 3GPP TS 25.425 V6.4.0 (December 2006).
		THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams (Release 6)," 3GPP TS 25.425 V6.5.0 (September 2008).
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	APPLICANT Pelletier et al.	
	FILING DATE September 26, 2008	GROUP 2617

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		TSG-RAN-WG2, "Reply LS on Enhanced Uplink for CELL_FACH state in FDD," 3GPP TSG-RAN-WG2 Meeting #60, R2-075472 (November 5-9, 2007).

[1] Corresponds to EP 1 796 416.

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Electronic Acknowledgement Receipt

EFS ID:	6429825
Application Number:	12238910
International Application Number:	
Confirmation Number:	2438
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Customer Number:	24374
Filer:	Robert Solomon/Carey Kulp
Filer Authorized By:	Robert Solomon
Attorney Docket Number:	IPH-2-1853.01.US
Receipt Date:	10-NOV-2009
Filing Date:	26-SEP-2008
Time Stamp:	18:39:44
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	IDS.pdf	50547 6737069a2a6ab7eb6f60af2522c476c82522ab48	no	3

Warnings:	
Information:	

2	Information Disclosure Statement (IDS) Filed (SB/08)	PTO1449.pdf	45785 d391bd6ce6ba2f7cc53db92a82276167f18c0772	no	3

Warnings:	
Information:	
This is not an USPTO supplied IDS fillable form	
Total Files Size (in bytes):	96332

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
Pelletier et al.	
Application No.: 12/238,910	
Confirmation No.: 2438	Our File: IPH-2-1853.01.US
Filed: September 26, 2008	Date: November 10, 2009
For: METHOD AND APPARATUS FOR TERMINATING TRANSMISION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL	
Group: 2617	
Examiner: Dwayne D. Bost	

INFORMATION DISCLOSURE STATEMENT

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

Dear Examiner:

Further to Applicants' Duty of Disclosure pursuant to 37 C.F.R. §1.56, Applicants wish to bring to the Examiner's attention the material cited on the enclosed Form PTO-1449.

The listed references include references previously cited in this application. Newly cited documents are indicated by an asterisk (*) on the enclosed Form PTO-1449. Pursuant to 37 C.F.R. §1.98(a)(2)(ii), copies of the newly cited U.S. publications and/or patent documents have not been included.

This application claims priority from: Provisional Application No. 61/083,409, filed on July 24, 2008; Provisional Application No. 61/074,288, filed on June 20,

2008; Provisional Application No. 61/038,576, filed on March 21, 2008; Provisional Application No. 61/025,441, filed on February 1, 2008; Provisional Application No. 61/018,999, filed on January 4, 2008; Provisional Application No. 60/982,528, filed on October 25, 2007; and Provisional Application No. 60/975,985, filed on September 28, 2007.

This application is also related to: Non-Provisional Application No. 12/256,964, filed on October 23, 2008; Provisional Application No. 61/018,567, filed on January 2, 2008; and Non-Provisional Application No. 12/346,631, filed on December 30, 2008.

It is respectfully requested that the Examiner consider these documents and return an initialed copy of the Form PTO-1449 indicating consideration of the cited materials.

Respectfully submitted,

Pelletier et al.

By__/Thomas A. Mattioli/_____
Thomas A. Mattioli
Registration No. 56,773
(215) 568-6400

Volpe and Koenig, P.C.
United Plaza, Suite 1600
30 South 17th Street
Philadelphia, PA 19103

TAM/pck
Enclosure

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. IPH-2-1853.01.US	SERIAL NO. 12/238,910
	APPLICANT Pelletier et al.	
	FILING DATE September 26, 2008	GROUP 2617

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
		2005/101299	05/2005	Farnsworth			
		2005/250504	11/2005	Mikola			
		2007/0135113	06/2007	Moinet et al.[1]			

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
							YES	NO
		2 615 915	03/2004	CA				
	*	2 371 179	07/2002	GB				
		06/043782	04/2006	WO				
		07/078155	07/2007	WO				

OTHER DOCUMENTS

EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
		ERICSSON, "Implicit release for enhanced uplink in CELL_FACH," 3GPP TSG RAN WG2 #61bis, R2-081501 (March 31-April 8, 2008).
		ERICSSON, "Resource release of common E-DCH in CELL_FACH," 3GPP TSG RAN WG2 #60bis, R2-080044 (January 14-18, 2008).
		HUAWEI, "Release procedure of E-RACH," 3GPP TSG RAN2 #60bis, R2-080262 (January 14-18, 2008).
		INFINEON, "Resource release mechanisms for CELL_FACH E-DCH," 3GPP TSG-RAN WG2 Meeting #60bis, R2-080148 (January 14-18, 2008).
		NOKIA CORPORATION, ET AL., "Introduction of Uplink Enhanced CELL_FACH in 25.321 (Draft CR)", Change Request, 25.23, CR CRNum, Current Version: 8.1.0, 3GPP TSG-RAN WG2 Meeting #62, R2-082371, (Kansas City, USA, May 5-9, 2008).
		NOKIA ET AL., "CELL_FACH state E-DCH – coverage comparison," 3GPP TSG-RAN WG1 Meeting #50bis, R1-074302 (October 8-12, 2007).

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	APPLICANT Pelletier et al.	
	FILING DATE September 26, 2008	GROUP 2617

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	*	NOKIA ET AL., "Enhanced CELL_FACH State with E-DCH," 3GPP TSG-RAN WG2 Meeting #59bis, R1-074300 (October 8-12, 2007).
		NOKIA ET AL., "Resource assignment for E-DCH access in CELL_FACH state," 3GPP TSG-RAN WG1 Meeting #50-BIS, R1-074303 (October 8-12, 2007).
		NOKIA SIEMENS NETWORKS ET AL., " Enhanced Uplink For CELL_FACH State In FDD", TSG-RAN #37 Meeting, RP-070677, (Riga, Latvia, September 11-14, 2007).
		NOKIA SIEMENS NETWORKS, "Draft CR on TS25.435 For Enhanced Uplink In CELL_FACH", Change Request, 25.435, CR, Current Version: 7.8.0, 3GPP TSG-RAN WG3 Meeting #60, R3-081276, (Kansas City, USA, May 5-9, 2008).
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	*	THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; UTRAN Iub/Iur interface user plane protocol for DCH data streams (Release 7)," 3GPP TS 25.427 V7.4.0 (March 2008).

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Electronic Acknowledgement Receipt

EFS ID:	6640762
Application Number:	12238910
International Application Number:	
Confirmation Number:	2438
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Customer Number:	24374
Filer:	Robert Solomon/Carey Kulp
Filer Authorized By:	Robert Solomon
Attorney Docket Number:	IPH-2-1853.01.US
Receipt Date:	15-DEC-2009
Filing Date:	26-SEP-2008
Time Stamp:	16:05:23
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	IDS.pdf	50047 b5086ccd8c425a16f7063a7990fbb3cee39011dc	no	2

Warnings:	
Information:	

2	Information Disclosure Statement (IDS) Filed (SB/08)	PTO1449.pdf	48244 11ff7d057a2b91263782ce74549622439d76b349	no	4
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Information:					
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3	NPL Documents	25427v730.pdf	459671 f2188de81f7e12ae6a64c4945b33a231b8631ad8	no	44
Warnings:					
Information:					
4	NPL Documents	25427v740.pdf	458929 09ff53aa168fae4fa7b37a7d14b71fd5672eea54	no	44
Warnings:					
Information:					
5	NPL Documents	25427v750.pdf	461093 2bab27abb3051803185025 9b176f02906e78519c	no	44
Warnings:					
Information:					
6	NPL Documents	25427v800.pdf	486755 9b92d2c01a8526f4c44f88ae389ca919420a5b09	no	47
Warnings:					
Information:					
7	NPL Documents	25427v810.pdf	490072 f7d6a4842f51ab56d03c139e5eb46dcc9fff0885	no	47
Warnings:					
Information:					
8	NPL Documents	R1074300.pdf	138816 978445269fe02f01697472e26d310da1c5c4dad0	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	2593627	

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
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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
Pelletier et al.	
Application No.: 12/238,910	
Confirmation No.: 2438	Our File: IPH-2-1853.01.US
Filed: September 26, 2008	Date: December 15, 2009
For: METHOD AND APPARATUS FOR TERMINATING TRANSMISION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL	
Group: 2617	
Examiner: Dwayne D. Bost	

INFORMATION DISCLOSURE STATEMENT

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

Sir:

Further to Applicants' Duty of Disclosure pursuant to 37 C.F.R. §1.56, Applicants wish to bring to the Examiner's attention the material cited on the enclosed Form PTO-1449.

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Application No. 61/025,441, filed on February 1, 2008; Provisional Application No. 61/018,999, filed on January 4, 2008; Provisional Application No. 60/982,528, filed on October 25, 2007; and Provisional Application No. 60/975,985, filed on September 28, 2007.

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Respectfully submitted,

Pelletier et al.

By__/Thomas A. Mattioli/_____
Thomas A. Mattioli
Registration No. 56,773
(215) 568-6400

Volpe and Koenig, P.C.
United Plaza, Suite 1600
30 South 17th Street
Philadelphia, PA 19103

TAM/pck
Enclosures (6)

PTO/SB/80 (11-08)
Approved for use through 11/30/2011. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☑ Practitioners associated with the Customer Number: 94772

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☑ The address associated with Customer Number: 94772

OR

☐ Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

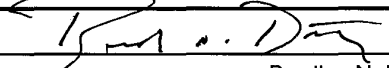
Assignee Name and Address:

InterDigital Patent Holdings, Inc.
3411 Silverside Road, Hagley Building, Suite 105
Wilmington, DE 19810

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

~~The individual~~ whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	MAR-23-2010
Name	Bradley N. Ditty	Telephone	610 878 5621
Title	Senior Patent Executive		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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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.

PTO/SB/96 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: InterDigital Patent Holdings, Inc.

Application No./Patent No.: 12/238,910 Filed/Issue Date: September 26, 2008

Titled: METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL

InterDigital Patent Holdings, Inc. , a corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. [X] the assignee of the entire right, title, and interest in;

2. [ ] an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____ %); or

3. [ ] the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

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

A. [X] 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 021966, Frame 0202, or for which a copy therefore 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(s).

[ ] 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.

/Joseph R. Condo/	September 8, 2010
Signature	Date
Joseph R. Condo	Attorney of Record
Printed or Typed Name	Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

Electronic Acknowledgement Receipt

EFS ID:	8371140
Application Number:	12238910
International Application Number:	
Confirmation Number:	2438
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Customer Number:	24374
Filer:	Steven J. Rocci/MaryAnn Devine
Filer Authorized By:	Steven J. Rocci
Attorney Docket Number:	IPH-2-1853.01.US
Receipt Date:	08-SEP-2010
Filing Date:	26-SEP-2008
Time Stamp:	10:37:50
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	powerofattorney.pdf	141509 c16e76b9fae0e757decbe50ac559fc8b41dd8c45	no	2

Warnings:

Information:

2	Assignee showing of ownership per 37 CFR 3.73(b).	373statement.pdf	33970 4ac347f3359d522f5f37a3e3b9024ceace96347b	no	2

Warnings:	
Information:	
Total Files Size (in bytes):	175479

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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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/238,910	09/26/2008	Benoit Pelletier	IPH-2-1853.01.US	2438

24374 7590 07/08/2011

VOLPE AND KOENIG, P.C.
DEPT. ICC
UNITED PLAZA
30 SOUTH 17TH STREET
PHILADELPHIA, PA 19103

EXAMINER	
YUEN, KAN	

ART UNIT	PAPER NUMBER
2464	

NOTIFICATION DATE	DELIVERY MODE
07/08/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

eoffice@volpe-koenig.com

Office Action Summary	Application No.	Applicant(s)	
	12/238,910	PELLETIER ET AL.	
	Examiner	Art Unit	
	KAN YUEN	2464	

-- 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 *26 September 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ 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

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) *8-29* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 September 2008* 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).

11)☐ 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

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ 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

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 1-7, drawn to a method for transmitting and receiving scheduling information (SI) and releasing an E-DCH resource allocation, classified in class 370, subclass 329.

   II. Claims 8-10, drawn to a method and a wireless device for releasing the E-RACH/E-DCH resources during the transition from cell forward access channel (CELL_FACH) to cell dedicated channel (CELL_DCH) state, classified in class 455, subclass 422.1.

   III. Claims 11-13, drawn to a method for receiving an explicit E-DCH termination signal and wherein the explicit signal comprises a special value signaled on an E-AGCH, classified in class 455, subclass 450.

   IV. Claims 14-22, drawn to a method for initiating a timer in response to a trigger; and releasing resource allocation for common control channel (CCCH) when a maximum allowable transmission time for the CCCH has been reached, classified in class 370, subclass 332.

   V. Claim 23, drawn to a Node-B comprising a processor configured to an end of enhanced random access channel (E-RACH) message transmission; and a transmitter configured to transmit a special value over an enhanced

dedicated channel (E-DCH) absolute grant channel (E-AGCH) indicating the end of transmission, classified in class 370, subclass 338.

VI. Claims 24-29, drawn to a method for terminating reception and transmission procedures and resetting the medium access control (MAC) entity, classified in class 370, subclass 395.2.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I, II, III and IV are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the releasing of an E-DCH resource allocation in group I does not need to be performed based on channel state switching between CELL_FACH and CELL_DCH in group II or when a maximum allowable transmission time for the CCCH has been reached in group III or wherein the explicit E-DCH termination signal comprises a special value signaled on an E-DCH absolute grant channel (E-AGCH) in group IV. The subcombination has separate utility such as releasing the E-RACH message during transition from CELL_FACH state to CELL_DCH state.

3. Inventions V and VI are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct if they do not overlap in

scope and are not obvious variants, and if it is shown that at least one subcombination is separately usable. In the instant case, subcombinations V and VI have separate utility such as terminating transmission procedures for an E-DCH dedicated physical control channel (E-DPCCH) and an enhanced dedicated physical data channel (E-DPDCH)). See MPEP § 806.05(d).

The examiner has required restriction between combination and subcombination inventions and subcombinations disclosed as usable together in a single combination. Where applicant elects a subcombination, and claims thereto are subsequently found allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

4. Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and examination burden if restriction were not required because one or more of the following reasons apply:

(a) the inventions have acquired a separate status in the art in view of their different classification;

(b) the inventions have acquired a separate status in the art due to their recognized divergent subject matter;

(c) the inventions require a different field of search (for example, searching different classes/subclasses or electronic resources, or employing different search queries);

(d) the prior art applicable to one invention would not likely be applicable to another invention;

(e) the inventions are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph.

5. During a telephone conversation with Attorney Swanson on June 20, 2011 a provisional election was made without traverse to prosecute the invention of 12/238910, claims 1-7. Affirmation of this election must be made by applicant in replying to this Office action. Claims 8-29 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 103

6. 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.

7. 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.

8. Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lundby et al. (Pub No.: 2008/0049669) in view of Dai et al. (Pat No.: 6246692).

Regarding claim 1, Lundby et al. disclosed a method comprising:

determining that a buffer is empty (Lundby et al. see paragraph 0063; the UE has no more data to transmit on the uplink). Thus, the UE determines that there is no more data in the buffer for transmission on the uplink;

triggering a transmission of scheduling information (SI) with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero (Lundby et al. see fig. 4; T8; paragraph 0063; at time T8, the UE has no more data to transmit on the uplink and sends scheduling information with TEBS=0 to indicate that the UE has no data to transmit);

However, Lundby et al. did not explicitly disclose the feature of determining a last hybrid automatic repeat request (HARQ) data transmission; and releasing a E-DCH resource allocation.

Dai et al. from the same or similar fields of endeavor disclosed the feature of determining a last data transmission; and releasing a E-DCH resource allocation (Dai et

al. see column 11, lines 45-55; after the last burst of packet data in a channel is read out of the external packet buffer 168, the channel bandwidth resource manager 90 releases the packet buffer channel bandwidth allocated for that channel). Although Dai et al. did not explicitly disclose the burst of data transmission being HARQ transmission, however it is obvious to a person of ordinary skill in the art at the time of the invention to substitute burst of data transmission to be HARQ transmission and the result would be reasonably predicted.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the disclosure of Lundby et al. and to implement the feature as disclosed by Dai et al. to provide the feature of determining a last hybrid automatic repeat request (HARQ) data transmission; and releasing a E-DCH resource allocation.

The motivation would be to reduce the head of line blocking effects (HOL blocking effects) on the receive queues 174 (fig. 2A) coupled to the network input ports 177 and 194.

Regarding claim 6, Lundby disclosed a method comprising:

receiving initial scheduling information (SI) with a total enhanced dedicated channel (E-DCH) buffer status (TEBS); determining that the TEBS is equal to zero (Lundby et al. see fig. 4; T8; paragraph 0063; at time T8, the UE has no more data to transmit on the uplink and sends scheduling information with TEBS=0 to indicate that the UE has no data to transmit. At time T9, the serving cell sends a zero absolute grant

to the UE on the E-AGCH). Thus, the serving cell receives the scheduling information with a TEBS=0;

However, Lundby et al. failed to disclose the feature waiting until a hybrid automatic repeat request (HARQ) buffer is empty; and releasing a E-DCH resource allocation.

Dai et al. from the same or similar fields of endeavor disclosed the feature waiting until a buffer is empty; and releasing a E-DCH resource allocation (Dai et al. see column 11, lines 45-55; after the last burst of packet data in a channel is read out of the external packet buffer 168, the channel bandwidth resource manager 90 releases the packet buffer channel bandwidth allocated for that channel). Once the last burst of packet data is read out (buffer empty), the manager releases the packet buffer channel bandwidth allocation. Although Dai et al. did not explicitly disclose the external buffer 168 being the HARQ buffer, however it is obvious to a person of ordinary skill in the art at the time of the invention to substitute the external buffer 168 to be the HARQ buffer and the result would be reasonably predicted.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the disclosure of Lundby et al. and to implement the feature as disclosed by Dai et al. to provide the feature of determining a last hybrid automatic repeat request (HARQ) data transmission; and releasing a E-DCH resource allocation.

The motivation would be to reduce the head of line blocking effects (HOL blocking effects) on the receive queues 174 (fig. 2A) coupled to the network input ports 177 and 194.

9. Claims 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lundby et al. (Pub No.: 2008/0049669) in view of Dai et al. (Pat No.: 6246692) as applied to claim 2 above, and further in view of Lin (Pub No.: 2010/0091652).

Regarding claim 2, Lundby et al. and Dai et al. failed to disclose the feature wherein an inactivity timer is started when the buffer is empty.

Lin from the same or similar fields of endeavor disclosed the feature wherein an inactivity timer is started when the buffer is empty (Lin see paragraph 0038; when a queue becomes empty, the timer corresponding to the queue starts counting).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the disclosure of Lundby et al. in view of Dai et al. and to implement the feature as disclosed by Lin to provide the feature wherein an inactivity timer is started when the buffer is empty.

The motivation would be to increase the transmission efficiency by providing indication on how long the queue is empty.

Regarding claim 4, Lin disclosed the feature wherein the inactivity timer is restarted upon reception of data (Lin see paragraph 0038).

10. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lundby et al. (Pub No.: 2008/0049669) in view of Dai et al. (Pat No.: 6246692) as applied to claim 2 above, and further in view of Lee et al. (Pub No.: 2009/0168704).

Regarding claim 3, Lundby et al. and Dai et al. failed to disclose the feature wherein the transmission of the SI is triggered when the inactivity timer expires.

Lee et al. from the same or similar fields of endeavor disclosed the feature wherein the transmission of the SI is triggered when the inactivity timer expires (Lee et al. see paragraphs 0077 and 0078; the SI is sent each time the timer expires).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the disclosure of Lundby et al. in view of Dai et al. and to implement the feature as disclosed by Lee et al. to provide the feature wherein the transmission of the SI is triggered when the inactivity timer expires.

The motivation would be to improve transmission reliability by sending scheduling information from a UE to control an uplink radio resource.

11. Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lundby et al. (Pub No.: 2008/0049669) in view of Dai et al. (Pat No.: 6246692) as applied to claim 2 above, and further in view of Hamalainen et al. (Pat No.: 6167248).

Regarding claims 5 and 7, Lundby et al. and Dai et al. both failed to disclose the feature of terminating the E-RACH message in case of cell reselection or radio link failure.

Hamalainen et al. from the same or similar fields of endeavor disclosed the feature of terminating the E-RACH message when the timer expires (Hamalainen et al. see column 16, lines 1-15; on the random access channels the trafficking time runs out, and the connection is terminated forcibly). Although Hamalainen et al. did not explicitly disclose to terminating the random access channels when radio link failure occurs, however it is well known in the art at the time of the invention to determinate random access channels when radio link failure occurs.

Thus, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the disclosure of Lundby et al. in view of Dai et al. and to implement the feature as disclosed by Hamalainen et al.

The motivation would be to improve the usage of network resources by providing channel termination when timer is expired or when link failure occurs to provide resource reservation.

Examiner's Note:

Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

In the case of amending the claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on for proper interpretation and also to verify and ascertain the metes and bounds of the claimed invention.

The Applicant is welcome to request a telephonic interview if the Applicant has any questions or requires any additional information that would further or expedite the prosecution of the application.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAN YUEN whose telephone number is (571)270-1413. The examiner can normally be reached on Monday-Friday 11:00a.m-6:00p.m EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky O. Ngo can be reached on 571-272-3139. 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.

/Kan Yuen/
Examiner, Art Unit 2464

/Pao Sinkantarakorn/
Primary Examiner, Art Unit 2464
6/30/2011

KY

Notice of References Cited	Application/Control No. 12/238,910	Applicant(s)/Patent Under Reexamination PELLETIER ET AL.	
	Examiner KAN YUEN	Art Unit 2464	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,167,248 A	12-2000	Hamalainen et al.	455/403
*	B	US-6,246,692 B1	06-2001	Dai et al.	370/438
*	C	US-2008/0049669 A1	02-2008	Lundby et al.	370/329
*	D	US-2009/0168704 A1	07-2009	Lee et al.	370/329
*	E	US-2010/0091652 A1	04-2010	Lin, Wei	370/231
	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.	Applicant(s)/Patent Under Reexamination
	12238910	PELLETIER ET AL.
	Examiner	**Art Unit**
	KAN YUEN	2464

SEARCHED			
Class	**Subclass**	**Date**	**Examiner**
370	328,329,338,341,348	6/27/2011	KY
455	464	6/27/2011	KY
709	226,229	6/27/2011	KY

SEARCH NOTES		
Search Notes	**Date**	**Examiner**
EAST SEARCH CONSULTED WITH SPE	6/27/2011	KY
MANUAL SEARCH CLASS 370 SUBCLASS 341	6/27/2011	KY
INVENTORSHIP SEARCH	6/27/2011	KY

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

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12238910	PELLETIER ET AL.
	Examiner	**Art Unit**
	KAN YUEN	2464

✓	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	06/27/2011								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	N								
	9	N								
	10	N								
	11	N								
	12	N								
	13	N								
	14	N								
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	20	N								
	21	N								
	22	N								
	23	N								
	24	N								
	25	N								
	26	N								
	27	N								
	28	N								
	29	N								

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	100	(e-dch or e$1dch or (enhanc $4 adj2 dedicate$4 adj2 channel)) with (terminat$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 11:33
L2	62	(cancel$4 or disconnect$4 or terminat$4 or give$1up or clos $4 or releas$4) with (e-dch or e$1dch or (enhanc$4 adj2 dedicate$4 adj2 channel)) with (resource)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 11:34
L3	44	2 harq	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 11:35
L6	155	e-rach or e$1rach or (enhanc $4 adj random adj access adj channel)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 11:41
L7	25	2 6	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 11:42
L8	5	(cancel$4 or disconnect$4 or terminat$4 or give$1up or clos $4 or releas$4) with (e-rach or e$1rach or (enhanc$4 adj2 random$4 adj access adj channel)) with (fail$4 or fault $4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 11:45
L9	24	(cancel$4 or disconnect$4 or terminat$4 or give$1up or clos $4 or releas$4) with (e-rach or e$1rach or (enhanc$4 adj2 random$4 adj access adj channel))	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 11:46
L10	160	(e-rach or e$1rach or (enhanc $4 adj2 random$4 adj access adj channel))	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 11:50

L12	13	(e-rach or e$1rach or (enhanc $4 adj2 random$4 adj access adj channel)) with (terminat$4 or clos$4 or cancel$5 or disconnect$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 11:52
L13	7742	(e-rach or e$1rach or (enhanc $4 adj2 random$4 adj access adj channel) or rach or (random$4 adj access adj channel))	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 11:54
L14	319	(e-rach or e$1rach or (enhanc $4 adj2 random$4 adj access adj channel) or rach or (random$4 adj access adj channel)) with (terminat$4 or clos$4 or cancel$5 or disconnect$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 11:55
L15	19	(e-rach or e$1rach or (enhanc $4 adj2 random$4 adj access adj channel) or rach or (random$4 adj access adj channel)) with (terminat$4 or clos$4 or cancel$5 or disconnect$4) with (fault$4 or fail$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 11:55
L16	41	(e-rach or e$1rach or (enhanc $4 adj2 random$4 adj access adj channel) or rach or (random$4 adj access adj channel)) with (cell adj2 reselect$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 11:57
L17	5	(e-rach or e$1rach or (enhanc $4 adj2 random$4 adj access adj channel) or rach or (random$4 adj access adj channel)) with (cell adj2 reselect$4) with (terminat$4 or clos$4 or disconnect$4 or releas$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 12:05
L18	436	(e-rach or e$1rach or (enhanc $4 adj2 random$4 adj access adj channel) or rach or (random$4 adj access adj channel)) with (releas$4 or terminat$4 or clos$4 or cancel $5)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 12:41
L19	20	(e-rach or e$1rach or (enhanc $4 adj2 random$4 adj access adj channel) or rach or (random$4 adj access adj channel)) with (releas$4 or terminat$4 or clos$4 or cancel $5) with (fail$4 or fault$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 12:48

L20	5	(e-rach or e$1rach or (enhanc $4 adj2 random$4 adj access adj channel) or rach or (random$4 adj access adj channel)) with (releas$4 or terminat$4 or clos$4 or cancel $5) with (reselect$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:06
L21	131	(e-rach or e$1rach or (enhanc $4 adj2 random$4 adj access adj channel) or rach or (random$4 adj access adj channel)) with (terminat$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:07
L22	84	(e-rach or e$1rach or (enhanc $4 adj2 random$4 adj access adj channel) or rach or (random$4 adj access adj channel)) near9 (terminat$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:09
L23	5	(e-rach or e$1rach or (enhanc $4 adj2 random$4 adj access adj channel) or rach or (random$4 adj access adj channel)) near9 (terminat$4) with (fault$4 or fail$4 or bad or fail$1over)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:19
L24	16	(e-rach or e$1rach or (enhanc $4 adj2 random$4 adj access adj channel) or rach or (random$4 adj access adj channel)) near9 (terminat$4 or cancel$5 or disconnect$4 or clos$4) with (fault$4 or fail$4 or bad or fail$1over)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:19
L25	246	(e-rach or e$1rach or (enhanc $4 adj2 random$4 adj access adj channel) or rach or (random$4 adj access adj channel)) with (fault$4 or fail $4 or bad or fail$1over)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:22
L26	33	(e-rach or e$1rach or (enhanc $4 adj2 random$4 adj access adj channel) or rach or (random$4 adj access adj channel)) with (fault$4 or fail $4 or bad or fail$1over) near2 (link or channel or connection)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:23
L27	3	(buffer$4 or queu$4 or memor $4 or stor$3 or fifo) near3 (zero or empty or "0") with (disconnect$4 or terminat$4 or clos$4 or releas$4) with (edch or e$1dch or (enhanc$4 adj2 dedicat$4 adj2 channel))	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:27

L28	1	(buffer$4 or queu$4 or memor $4 or stor$3 or fifo) near3 (zero or empty or "0") with (disconnect$4 or terminat$4 or clos$4 or releas$4) with (dedicat$4 adj2 channel)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:28
L29	81	(buffer$4 or queu$4 or memor $4 or stor$3 or fifo) near3 (zero or empty or "0") with (disconnect$4 or terminat$4 or clos$4 or releas$4) near5 (channel)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:29
L30	147	(buffer$4 or queu$4 or memor $4 or stor$3 or fifo) near5 (clear$4 or zero or empty or "0") with (disconnect$4 or terminat$4 or clos$4 or releas $4) near5 (channel)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:32
L31	332003	"370"/$.ccls. or "455"/$.ccls.	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:34
L32	42	30 31	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:34
L33	7742	(e-rach or e$1rach or (enhanc $4 adj2 random$4 adj access adj channel) or rach or (random$4 adj access adj channel))	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:39
L34	3	32 33	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:40
L35	2	(last$4 near7 (harq or (hybrid near2 request$4 near2 queu $4))) with (disconnect$4 or terminat$4 or clos$4 or releas $4) near5 (channel or dch or e-dch or e$1dch)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:43
L36	2	(last$4 near7 (harq or (hybrid near2 request$4 near2 repeat $4))) with (disconnect$4 or terminat$4 or clos$4 or releas $4) near5 (channel or dch or e-dch or e$1dch)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:43
L37	107	(last$4 near7 (data or packet or transmission)) with (disconnect$4 or terminat$4 or clos$4 or releas$4) near5 (channel or dch or e-dch or e $1dch)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:48

L38	32248416	(@rlad<"20070928" or @ad<"20070928" or @ptad<"20070928")	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:49
L39	87	37 38	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:49
L40	1	12/238910	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 13:55
L43	786	(start$4 or activat$4) near7 (clock or timer) with (buffer$4 or queu$4 or memor$4 or stor $3 or fifo) near5 (clear$4 or zero or empty or "0")	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 14:10
L44	703	38 43	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 14:11
L45	128	31 44	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 14:11
L46	29	(send$4 or transmit$4 or transmission) with (SI or (schedul$4 near2 information)) with (tim$4) near8 (expir$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 14:16
L47	8	(US-20070042785-$ or US-20090086671-$ or US-20070165634-$ or US-20060088003-$ or US-20100091652-$ or US-20090168704-$).did. or (US-6167248-$ or US-6246692-$).did.	US-PGPUB; USPAT	AND	ON	2011/06/29 14:21
L48	6	47 terminat$4	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 14:21
L49	139	terminat$4 with (e-rach or erach or rach or (random near2 access near2 channel))	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 14:23

L50	106	49 38	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 14:23
L51	91	50 31	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 14:24
L52	3	terminat$4 with (e-rach or erach or rach or (random near2 access near2 channel)) with (link or channel or connection) near4 (fault$4 or fail$4 or bad or disconnect$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 14:26
L53	2	47 2	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 14:51
L54	150	25 31 38	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 17:18
L55	620	(receiv$4 or recept$4) with (e-dch)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 17:35
L56	24	(cancel$4 or disconnect$4 or terminat$4 or give$1up or clos $4 or releas$4) with (e-rach or e$1rach or (enhanc$4 adj2 random$4 adj access adj channel))	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 17:36
L57	617	(e-dch or e$1dch or (enhanc $4 adj2 dedicate$4 adj2 channel)) with (releas$4 or terminat$4 or free$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 17:37
L58	142	55 57	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 17:37
L59	74	58 38 31	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 17:38

L60	39	55 with 57	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 17:39
L61	27	60 (absolut$4 near3 grant$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 17:49
L62	1	11/842878	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/29 18:25

EAST Search History (Interference)

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6/29/2011 6:28:57 PM
C:\Documents and Settings\kyuen\My Documents\EAST\Workspaces\12238910a.wsp

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	12/238910	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/27 16:14
S2	181	SI with (tebs)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/27 16:30
S3	17198	(releas$4 near5 (resourc$4 or bandwidth$4))	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/27 16:37
S4	9	S2 S3	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/27 16:37
S6	45	SI with (tebs) with (zero or "0")	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/27 16:45
S7	66771	(buffer$4 or queu$4 or stor$3 or memory) near8 (empty)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/27 16:49
S8	7	S6 S7	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/27 16:50
S13	1	S1 resource	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/27 18:30
S22	45	SI with (tebs) with (zero or "0")	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 01:04

S23	182	SI with (tebs)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 01:12
S24	60129	(buffer$4 or queu$4 or memor $4 or fifo or storage) near9 (empty)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 01:20
S25	9	S23 S24	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 01:20
S26	6	("20050101299" | "20050250504" | "20070135113").PN.	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 01:23
S28	1	S24 S26	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 01:24
S29	332003	"370"/$.ccls. or "455"/$.ccls.	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 01:32
S30	17	S23 S29	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 01:33
S31	2	(release$4 (E-DCH)) with (switch$4) with (cell adj fach)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 14:09
S32	2088	(trigger$4 near5 timer).clm.	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 14:19
S33	73	((resource near4 allocat$4) with timer).clm.	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 14:19
S37	31	(e-dch or edch or (enhanc$4 adj3 dedicated adj3 channel)) with (buffer or queue or fifo or memory or storage) with (empty or zero or "0")	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 14:41

S38	33	(e-dch or edch or (enhanc$4 adj3 dedicated adj3 channel)) with (buffer or queue or fifo or memory or storage) with (clear $4 or vacant$4 or blank$4 or drain$4 or empty or zero or "0")	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 16:03
S39	6	("20050101299" | "20050250504" | "20070135113").PN.	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 16:07
S40	0	(e-dch or edch or (enhanc$4 adj3 dedicated adj3 channel)) with (buffer or queue or fifo or memory or storage) S39	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 16:08
S41	121	(e-dch or edch or (enhanc$4 adj3 dedicated adj3 channel)) with (tebs or (buffer$4 near3 status))	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 16:11
S42	18	(e-dch or edch or (enhanc$4 adj3 dedicated adj3 channel)) with (tebs or (buffer$4 near3 status)) with (clear$4 or vacant $4 or blank$4 or drain$4 or empty or zero or "0")	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 16:12
S43	54	(e-dch or edch or (enhanc$4 adj3 dedicated adj3 channel)) with tebs	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 16:18
S44	32248416	(@rlad<"20070928" or @ad<"20070928" or @ptad<"20070928")	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 16:19
S45	12	S43 S44	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 16:23
S46	487	tebs with (empty or zero or "0" or clear$4 or drain$4 or vacant$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 17:04
S47	25	S43 S46	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 17:05

S48	6	S44 S47	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 17:05
S49	39	(e-dch or edch or (enhanc$4 adj3 dedicated adj3 channel)) with (tebs or buffer$4 or queu $4 or database or stor$3 or memory or fifo) with (clear$4 or vacant$4 or blank$4 or drain $4 or empty or zero or "0")	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 17:18
S50	430	(e-dch or edch or (enhanc$4 adj3 dedicated adj3 channel)) with (tebs or buffer$4 or queu $4 or database or stor$3 or memory or fifo)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 17:19
S51	707589	(tebs or buffer$4 or queu$4 or database or stor$3 or memory or fifo) with (clear$4 or vacant $4 or blank$4 or drain$4 or empty or zero or "0")	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 17:19
S52	144	S50 S51	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 17:20
S53	50	S44 S52	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 17:20
S54	43	S53 (harq or (hybrid adj2 automatic$4 adj2 repeat$4 adj2 request$4))	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 17:29
S55	230	(schedul$4 near3 information) with (tebs or buffer$4 or queu $4 or database or stor$3 or memory or fifo) with (clear$4 or vacant$4 or blank$4 or drain $4 or empty or zero or "0")	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 18:39
S56	19	S50 S55	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 18:39
S58	54	(e-dch or edch or (enhanc$4 adj3 dedicated adj3 channel)) with (tebs$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 18:44

S59	12	S58 S44	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 18:45
S60	707589	(tebs or buffer$4 or queu$4 or database or stor$3 or memory or fifo) with (clear$4 or vacant $4 or blank$4 or drain$4 or empty or zero or "0")	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 18:45
S61	7	S59 S60	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 18:46
S62	6	(last$4 near9 (harq or (Hybrid adj2 automat$4 adj2 repeat$3 adj2 request$4))) with ((resource or time or cod$4) near3 (allocat$4 or assign$4 or schedul$4))	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 18:57
S63	82	(e-dch or edch or (enhanc$4 adj3 dedicated adj3 channel)) with (harq or (Hybrid adj2 automat$4 adj2 repeat$3 adj2 request$4)) with ((resource or time or cod$4) near3 (allocat $4 or assign$4 or schedul$4))	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 18:59
S65	67	S63 S44	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 19:00
S66	66	(empty$4 or clear$4 or drain $4 or delet$4 or zero$4 or "0") with (harq or (Hybrid adj2 automat$4 adj2 repeat$3 adj2 request$4)) with ((resource or time or cod$4) near3 (allocat $4 or assign$4 or schedul$4))	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 19:05
S67	16	S44 S66	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 19:06
S68	8	(US-20090086671-$ or US-20080045255-$ or US-20060268884-$ or US-20060140154-$ or US-20080049669-$).did. or (US-7855951-$ or US-7756087-$).did. or (US-20090086671-$).did.	US-PGPUB; USPAT; DERWENT	AND	ON	2011/06/28 19:08

S69	8	S68 ((resource or time or cod $4) near3 (allocat$4 or assign $4 or schedul$4))	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 19:08
S70	80	(tebs or buffer$4 or queu$4 or database or stor$3 or memory or fifo) with (clear$4 or vacant $4 or blank$4 or drain$4 or empty or zero or "0") with (releas$4 or free) with ((resource or time or cod$4) near3 (allocat$4 or assign$4 or schedul$4))	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 19:17
S71	65	S44 S70	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 19:18
S72	81	(tebs or buffer or queu$4) with (empty or zero or "0") with (releas$4 or free$4) near5 (resourc$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/06/28 19:28

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S14	1389	(buffer$4 near3 empty).clm.	US-PGPUB; USPAT; UPAD	AND	ON	2011/06/27 16:54
S15	66755	(si).clm.	US-PGPUB; USPAT; UPAD	AND	ON	2011/06/27 16:54
S16	155	tebs.clm.	US-PGPUB; USPAT; UPAD	AND	ON	2011/06/27 16:54
S17	1	S14 S15 S16	US-PGPUB; USPAT; UPAD	AND	ON	2011/06/27 16:54
S18	319	(releas$4 near3 (resource near4 allocat$4)).clm.	US-PGPUB; USPAT; UPAD	AND	ON	2011/06/27 16:55
S19	2	S14 S18	US-PGPUB; USPAT; UPAD	AND	ON	2011/06/27 16:55
S20	1	"Term Removed"	US-PGPUB	AND	ON	2011/06/27 18:29
S21	1	"Term Removed"	US-PGPUB	AND	ON	2011/06/27 18:30

6/29/2011 6:36:40 PM
C:\Documents and Settings\kyuen\My Documents\EAST\Workspaces\12238910.wsp

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CONFIRMATION NO. 2438

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/238,910	09/26/2008	370	2464	IPH-2-1853.01.US

APPLICANTS

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

This appln claims benefit of 60/975,985 09/28/2007
and claims benefit of 60/982,528 10/25/2007
and claims benefit of 61/018,999 01/04/2008
and claims benefit of 61/025,441 02/01/2008
and claims benefit of 61/038,576 03/21/2008
and claims benefit of 61/074,288 06/20/2008
and claims benefit of 61/083,409 07/24/2008

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

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
10/09/2008

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /KAN YUEN/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		CANADA	9	29	8

ADDRESS

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UNITED STATES

TITLE

METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL

FILING FEE RECEIVED		
2660	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 _____

BIB (Rev. 05/07).



FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. IPH-2-1853.01.US	SERIAL NO. 12/238,910
	APPLICANT Pelletier et al.	
	FILING DATE September 26, 2008	GROUP ~~2617~~ 2464

U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

FOREIGN PATENT DOCUMENTS								
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO
	*	06/043782	04/2006	WO				
	*	07/078155	07/2007	WO				

OTHER DOCUMENTS		
EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
	*	ERICSSON, "Implicit release for enhanced uplink in CELL_FACH," 3GPP TSG RAN WG2 #61bis, R2-081501 (March 31-April 8, 2008).
	*	ERICSSON, "Resource release of common E-DCH in CELL_FACH," 3GPP TSG RAN WG2 #60bis, R2-080044 (January 14-18, 2008).
	*	HUAWEI, "Release procedure of E-RACH," 3GPP TSG RAN2 #60bis, R2-080262 (January 14-18, 2008).
	*	INFINEON, "Resource release mechanisms for CELL_FACH E-DCH," 3GPP TSG-RAN WG2 Meeting #60bis, R2-080148 (January 14-18, 2008).
	*	NOKIA CORPORATION, ET AL., "Introduction of Uplink Enhanced CELL_FACH in 25.321 (Draft CR)", Change Request, 25.23, CR CRNum, Current Version: 8.1.0, 3GPP TSG-RAN WG2 Meeting #62, R2-082371, (Kansas City, USA, May 5-9, 2008).
		NOKIA SIEMENS NETWORKS ET AL., " Enhanced Uplink For CELL_FACH State In FDD", TSG-RAN #37 Meeting, RP-070677, (Riga, Latvia, September 11-14, 2007).
	*	NOKIA SIEMENS NETWORKS, "Draft CR on TS25.435 For Enhanced Uplink In CELL_FACH", Change Request, 25.435, CR, Current Version: 7.8.0, 3GPP TSG-RAN WG3 Meeting #60, R3-081276, (Kansas City, USA, May 5-9, 2008).

EXAMINER	DATE CONSIDERED
/Kan Yuen/	06/29/2011

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K.Y./

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	FILING DATE September 26, 2008	GROUP 2617

EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
		NSN ET AL., "Further Discussion On Enhanded CELL_FACH In REL8", 3GPP TSG-RAN WG2 Meeting #59, R2-073254, (Athens, Greece, August 20-24, 2007).
	*	QUALCOMM EUROPE, "Layer 1/2 aspects for enhanced UL for CELL_FACH," 3GPP TSG-RAN WG2 #59bis, R2-074390 (Oct 8-12, 2007).
	*	THIRD GENERATION PARTNERSHIP PROJECT SUPPORT TEAM, "Minutes of The 59bis TSG-WG2 Meeting (Shanghai, China, 08-12 October 2007)", TSG-RAN WG2 meeting #60, R2-075189, (Korea November 05-09, 2007).
	*	THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams (Release 6)," 3GPP TS 25.425 V6.4.0 (December 2006).
	*	THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams (Release 6)," 3GPP TS 25.425 V6.5.0 (September 2008).
	*	THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams (Release 7)," 3GPP TS 25.425 V7.4.0 (June 2007).
	*	THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams (Release 7)," 3GPP TS 25.425 V7.8.0 (September 2008).
	*	THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams (Release 8)," 3GPP TS 25.425 V8.0.0 (September 2008).
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Physical Channels And Mapping Of Transport Channels Onto Physical Channels (FDD) (Release 7)", 3GPP TS 25.211 V7.2.0, (May 2007).
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Physical Channels And Mapping Of Transport Channels Onto Physical Channels (FDD) (Release 7)", 3GPP TS 25.211 V7.3.0, (September 2007).
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		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Medium Access Control (MAC) Protocol Spcification (Release 7)", 3GPP TS 25.321 V7.5.0, (June 2007).

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/Kan Yuen/	06/29/2011

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	APPLICANT Pelletier et al.	
	FILING DATE September 26, 2008	GROUP 2617

EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Medium Access Control (MAC) Protocol Spcification (Release 8)", 3GPP TS 25.321 V8.3.0, (September 2008).
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Enhanced Uplink; Overall Description Stage 2 (Release 7)", 3GPP TS 25.319 V7.2.0 (March 2007).
		THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; Enhanced Uplink; Overall Description Stage 2 (Release 8)", 3GPP TS 25.319 V8.3.0 (September 2008).
	*	THIRD GENERATION PARTNERSHIP PRORGAM SUPPORT TEAM, "Current Minutes of the 59bis TSG-RAN WG2 Meeting (Shanghai, China, 08-12 October 2007)", TSG-RAN WG2 Meeting #60, R2-7xxxx, (Korea, November 05-09, 2007).

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	APPLICANT Pelletier et al.	
	FILING DATE September 26, 2008	GROUP ~~2617~~ 2464

U.S. PATENT DOCUMENTS							
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

FOREIGN PATENT DOCUMENTS								
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
							YES	NO
		06/043782	04/2006	WO				
		07/078155	07/2007	WO				

OTHER DOCUMENTS		
EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
		ERICSSON, "Implicit release for enhanced uplink in CELL_FACH," 3GPP TSG RAN WG2 #61bis, R2-081501 (March 31-April 8, 2008).
		ERICSSON, "Resource release of common E-DCH in CELL_FACH," 3GPP TSG RAN WG2 #60bis, R2-080044 (January 14-18, 2008).
		HUAWEI, "Release procedure of E-RACH," 3GPP TSG RAN2 #60bis, R2-080262 (January 14-18, 2008).
		INFINEON, "Resource release mechanisms for CELL_FACH E-DCH," 3GPP TSG-RAN WG2 Meeting #60bis, R2-080148 (January 14-18, 2008).
		NOKIA CORPORATION, ET AL., "Introduction of Uplink Enhanced CELL_FACH in 25.321 (Draft CR)", Change Request, 25.23, CR CRNum, Current Version: 8.1.0, 3GPP TSG-RAN WG2 Meeting #62, R2-082371, (Kansas City, USA, May 5-9, 2008).
	*	NOKIA ET AL., "CELL_FACH state E-DCH – coverage comparison," 3GPP TSG-RAN WG1 Meeting #50bis, R1-074302 (October 8-12, 2007).
	*	NOKIA ET AL., "Resource assignment for E-DCH access in CELL_FACH state," 3GPP TSG-RAN WG1 Meeting #50-BIS, R1-074303 (October 8-12, 2007).
		NOKIA SIEMENS NETWORKS ET AL., " Enhanced Uplink For CELL_FACH State In FDD", TSG-RAN #37 Meeting, RP-070677, (Riga, Latvia, September 11-14, 2007).

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		NOKIA SIEMENS NETWORKS, "Draft CR on TS25.435 For Enhanced Uplink In CELL_FACH", Change Request, 25.435, CR, Current Version: 7.8.0, 3GPP TSG-RAN WG3 Meeting #60, R3-081276, (Kansas City, USA, May 5-9, 2008).
		NSN ET AL., "Further Discussion On Enhanded CELL_FACH In REL8", 3GPP TSG-RAN WG2 Meeting #59, R2-073254, (Athens, Greece, August 20-24, 2007).
		QUALCOMM EUROPE, "Layer 1/2 aspects for enhanced UL for CELL_FACH," 3GPP TSG-RAN WG2 #59bis, R2-074390 (Oct 8-12, 2007).
		THIRD GENERATION PARTNERSHIP PROJECT SUPPORT TEAM, "Minutes of The 59bis TSG-WG2 Meeting (Shanghai, China, 08-12 October 2007)", TSG-RAN WG2 meeting #60, R2-075189, (Korea November 05-09, 2007).
		THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams (Release 6)," 3GPP TS 25.425 V6.4.0 (December 2006).
		THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams (Release 6)," 3GPP TS 25.425 V6.5.0 (September 2008).
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	*	2007/0135113	06/2007	Moinet et al.[1]			

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[1] Corresponds to EP 1 796 416.

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		ERICSSON, "Implicit release for enhanced uplink in CELL_FACH," 3GPP TSG RAN WG2 #61bis, R2-081501 (March 31-April 8, 2008).
		ERICSSON, "Resource release of common E-DCH in CELL_FACH," 3GPP TSG RAN WG2 #60bis, R2-080044 (January 14-18, 2008).
		HUAWEI, "Release procedure of E-RACH," 3GPP TSG RAN2 #60bis, R2-080262 (January 14-18, 2008).
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		NOKIA ET AL., "CELL_FACH state E-DCH – coverage comparison," 3GPP TSG-RAN WG1 Meeting #50bis, R1-074302 (October 8-12, 2007).

EXAMINER	DATE CONSIDERED
/Kan Yuen/	06/29/2011

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FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	ATTY. DOCKET NO. IPH-2-1853.01.US	SERIAL NO. 12/238,910
	APPLICANT Pelletier et al.	
	FILING DATE September 26, 2008	GROUP 2617

EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
	*	NOKIA ET AL., "Enhanced CELL_FACH State with E-DCH," 3GPP TSG-RAN WG2 Meeting #59bis, R1-074300 (October 8-12, 2007).
		NOKIA ET AL., "Resource assignment for E-DCH access in CELL_FACH state," 3GPP TSG-RAN WG1 Meeting #50-BIS, R1-074303 (October 8-12, 2007).
		NOKIA SIEMENS NETWORKS ET AL., " Enhanced Uplink For CELL_FACH State In FDD", TSG-RAN #37 Meeting, RP-070677, (Riga, Latvia, September 11-14, 2007).
		NOKIA SIEMENS NETWORKS, "Draft CR on TS25.435 For Enhanced Uplink In CELL_FACH", Change Request, 25.435, CR, Current Version: 7.8.0, 3GPP TSG-RAN WG3 Meeting #60, R3-081276, (Kansas City, USA, May 5-9, 2008).
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	FILING DATE September 26, 2008	GROUP 2617

EXAMINER INITIAL		DESCRIPTION (Including Author, Title, Date, Pertinent Pages, Etc.)
		THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; UTRAN Iur Interface User Plane Protocols for Common Transport Channel Data Streams (Release 8)," 3GPP TS 25.425 V8.0.0 (September 2008).
		THIRD GENERATION PARTNERSHIP PROJECT, "Technical Specification Group Radio Access Network; Medium Access Control (MAC) Protocol Specification (Release 7), 3GPP TS 25.321, V7.3.0, (December 2006).
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	*	THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; UTRAN Iub/Iur interface user plane protocol for DCH data streams (Release 8)," 3GPP TS 25.427 V8.0.0 (March 2008).
	*	THIRD GENERATION PARTNERSHIP PROJECT; "Technical Specification Group Radio Access Network; UTRAN Iub/Iur interface user plane protocol for DCH data streams (Release 7)," 3GPP TS 25.427 V7.3.0 (December 2006).
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		THIRD GENERATION PARTNERSHIP PRORGAM SUPPORT TEAM, "Current Minutes of the 59bis TSG-RAN WG2 Meeting (Shanghai, China, 08-12 October 2007)", TSG-RAN WG2 Meeting #60, R2-7xxxx, (Korea, November 05-09, 2007).
		TSG-RAN-WG2, "Reply LS on Enhanced Uplink for CELL_FACH state in FDD," 3GPP TSG-RAN-WG2 Meeting #60, R2-075472 (November 5-9, 2007).

[1] Corresponds to EP 1 796 416.

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12/238,910		2464	

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **Benoit Pelletier, et al.**	**Confirmation No.: 2438**
Application No.: 12/238,910	**Group Art Unit: 2464**
Filing Date: September 26, 2008	**Examiner: Kan Yuen**

For: Method And Apparatus For Terminating Transmission Of A Message In An Enhanced Random Access Channel

Mail Stop Amendment
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REPLY PURSUANT TO 37 CFR § 1.111

In response to the Official Action dated **July 8, 2011**, reconsideration is respectfully requested in view of the amendments and/or remarks as indicated below:

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

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

☐ **Amendments to the Drawings** begin on page of this paper and include an attached replacement sheet.

☒ **Remarks** begin on page 8 of this paper.

☒ The Commissioner is hereby authorized to charge any fee deficiency, charge any additional fees, or credit any overpayment of fees, associated with this application in connection with this filing, or any future filing, submitted to the U.S. Patent and Trademark Office during the pendency of this application, to Deposit Account No. 09-0435.

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

Listing of Claims:

1. (Currently Amended) A method for terminating an enhanced dedicated ~~random access~~ channel ~~(E-RACH)~~ (E-DCH) ~~message~~ transmission in a cell forward access channel (CELL_FACH) state by a wireless transmit/receive unit (WTRU) ~~an E-RACH transmission~~, the method comprising:

determining that a buffer is empty by the WTRU;

on a condition that the buffer is empty, triggering a transmission by the WTRU of scheduling information (SI) in the E-DCH transmission with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero;

determining a condition of a last hybrid automatic repeat request (HARQ) data transmission; and

on a condition that the buffer is empty and the last HARQ data transmission has finished, releasing a E-DCH resource allocation by the WTRU.

2. (Original) The method as in claim 1, wherein an inactivity timer is started when the buffer is empty.

3. (Original) The method as in claim 2, wherein the transmission of the SI is triggered when the inactivity timer expires.

4. (Currently Amended) The method as in claim 1, wherein an E-DCH transmission occurs on a condition that a response is received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU ~~2, wherein the inactivity timer is restarted upon reception of data~~.

5. (Currently Amended) The method as in claim 1, further comprising terminating the E-DCH transmission ~~E-RACH message~~ in case of cell reselection or radio link failure.

6. (Currently Amended) A wireless transmit/receive unit (WTRU) ~~method~~ for terminating an enhanced dedicated ~~random access~~ channel (E-DCH) ~~(E-RACH)~~ ~~message~~ in a cell forward access channel (CELL_FACH) state ~~an E-RACH transmission~~, the ~~method~~ WTRU

comprising:

~~receiving initial scheduling information (SI) with a total enhanced dedicated channel (E-DCH) buffer status (TEBS);~~

a receiver;

a transmitter; and

a processor in communication with the receiver and the transmitter, the processor configured to:

determine that a buffer is empty;

on a condition that the buffer is empty, trigger a transmission of scheduling information (SI) in a E-DCH transmission with a total E-DCH buffer status (TEBS) equal to zero;

determine a condition of a last hybrid automatic repeat request (HARQ) data transmission being finished;

~~determining that the TEBS is equal to zero; waiting until a hybrid automatic repeat request (HARQ) buffer is empty; and~~ on a condition that the buffer is empty and the last HARQ data transmission being finished, release ~~releasing~~ a E-DCH resource allocation.

7. (Currently Amended) The ~~method~~ WTRU as in claim 6, the processor further ~~comprising~~ configured to terminate~~ing~~ the E-DCH transmission on a condition ~~E-RACH message in case of~~ cell reselection or radio link failure.

8. (Withdrawn) A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

releasing the E-RACH message during transition from cell forward access channel (CELL_FACH) state to cell dedicated channel (CELL_DCH) state.

9. (Withdrawn) The method as in claim 8, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

10. (Withdrawn) A wireless transmit receive unit (WTRU), comprising:

a receiver configured to receive enhanced dedicated channel (E-DCH) resources on an acquisition indication channel (AICH) and an E-DCH AICH (E-AICH); and

a processor configured to access the E-DCH resources in cell forward access channel (CELL_FACH) state, to receive a reconfiguration message indicating to switch to a cell dedicated channel (CELL_DCH) state, and to release the E-DCH resources based on switching to CELL_DCH state.

11. (Withdrawn) A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

receiving an explicit E-DCH termination signal; and

releasing a E-DCH resource.

12. (Withdrawn) The method as in claim 11, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

13. (Withdrawn) The method as in claim 11, wherein the explicit E-DCH termination signal comprises a special value signaled on an E-DCH absolute grant channel (E-AGCH).

14. (Withdrawn) A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

initiating a timer in response to a trigger; and

releasing resource allocation for common control channel (CCCH) when a maximum allowable transmission time for the CCCH has been reached.

15. (Withdrawn) The method as in claim 14, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

16. (Withdrawn) The method as in claim 14, wherein a maximum enhanced dedicated channel (E-DCH) allocation time is allocated to the CCCH transmission when an E-DCH radio network temporary identifier (E-RNTI) is not present.

17. (Withdrawn) The method as in claim 14, wherein the timer starts when a positive acknowledgement (ACK) associated with a transmitted preamble signature is received on an acquisition indication channel (AICH) or an enhanced dedicated channel (E-DCH) AICH (E-AICH).

18. (Withdrawn) The method as in claim 14, wherein the timer starts when radio resource control (RRC) provides timer values to medium access control (MAC), and after receiving resource index of an enhanced dedicated channel (E-DCH).

19. (Withdrawn) The method as in claim 14, wherein the timer starts when a wireless transmit receive unit (WTRU) starts first dedicated physical control channel (DPCCH) preamble transmission.

20. (Withdrawn) The method as in claim 19, wherein the timer starts when the first DPCCH transmission is completed after an enhanced dedicated channel (E-DCH) transmission backoff transmission time intervals (TTIs) or a first medium access control (MAC) protocol data unit (PDU) is passed to a physical layer.

21. (Withdrawn) The method as in claim 14, wherein the timer starts when a wireless transmit receive unit (WTRU) starts an enhanced dedicated channel (E-DCH) transmission.

22. (Withdrawn) The method as in claim 14, wherein a wireless transmit receive unit (WTRU) may initiate the timer when a collision resolution an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH) carrying the WTRU E-DCH radio network temporary identifier (E-RNTI) is received.

23. (Withdrawn) A Node-B comprising:

a processor configured to determine an end of enhanced random access channel (E-RACH) message transmission; and

a transmitter connected to the processor, the transmitter configured to transmit a special value over an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH) indicating the end of transmission.

24. (Withdrawn) A method for releasing enhanced dedicated channel (E-DCH) resources while in cell forward access channel (CELL_FACH) state, the method comprising:

terminating reception procedures for an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH), an E-DCH relative grant channel (E-RGCH), and an E-DCH hybrid automatic repeat request (HARQ) indicator channel (E-HICH); and

terminating transmission procedures for an E-DCH dedicated physical control channel (E-DPCCH) and an enhanced dedicated physical data channel (E-DPDCH); and

resetting the medium access control (MAC) entity.

25. (Withdrawn) The method as in claim 24, wherein the channels are terminated when an enhanced random access channel (E-RACH) transmission signal has been received.

26. (Withdrawn) The method as in claim 24, wherein the channels are terminated when a common control channel (CCCH) timer has expired.

27. (Withdrawn) The method as in claim 24, wherein the channels are terminated when the scheduling information (SI) is equal to zero.

28. (Withdrawn) The method as in claim 24, wherein the MAC reset procedures include flushing the hybrid automatic repeat request (HARQ) processes, discarding remaining segments in segmentation entity of the MAC entity, and resetting a transmission sequence number (TSN) value to zero.

29. (Withdrawn) The method as in claim 24, wherein the resources are released when an inactivity timer expires.

30. (New) The WTRU as in claim 1, wherein the processor starts an inactivity timer when the buffer is empty.

31. (New) The WTRU as in claim 30, wherein the transmission of the SI is triggered when the inactivity timer expires.

32. (New) The WTRU as in claim 1, wherein the E-DCH transmission occurs on a condition that a response is received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU.

REMARKS

In response to a telephone call with Examiner Yuen on June 20, 2011 requesting an election of claims, Applicants elected claims 1-7. Specifically, the Examiner requested an election between claims 1-7 and the remaining claims. It is Applicants' understanding that this election is being made to aid the Examiner in conducting a search and examination of the claimed subjected matter, and is not to be construed as limiting the scope of Applicants' claims. Applicants reserve the right to pursue the subject matter of claims 8-29 in one or more divisional applications and/or to rejoin claims 8-29 pursuant to M.P.E.P. § 821.04. Accordingly, Applicants hereby elect claims 1-7 in Group I; claims 8-29 have been withdrawn.

Claims 1-7 are pending in the present application and were rejected in the office action dated July 8, 2011. Claims 1-7 have been amended, and claims 30-33 have been added. Thus, upon entry of the above amendments, claims 1-32 will be pending. Applicants request reconsideration and withdrawal of the rejections in view of the foregoing amendments and following remarks.

35 U.S.C. § 103 Rejection

Claims 1-7 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. pub. No. 2008/0049669 (hereinafter "Lundby") in view of U.S. patent no. 6,246,692 (hereinafter "Dai"). Applicants have amended the claims and submit that the claims patentably define over Lundby and Dai, alone and in combination, particularly as amended.

As amended, the claims are directed to completing an enhanced dedicated channel (E-DCH) transmission in a CELL_FACH state. When the WTRU determines that a buffer is empty, the WTRU transmits scheduling information in the E-DCH transmission having a total E-DCH buffer status equal to zero. When the buffer is empty and a last hybrid automatic repeat request (HARQ) data transmission has finished, the WTRU releases an E-DCH resource allocation.

As described in the specification, but not by way of limitation, the release of the E-DCH resource allocation by the WTRU is in contrast to the network releasing such resources (Application, para. 7). For example, the Node B may want to immediately stop a WTRU transmission and will not wait for a HARQ process to finish.

Lundy and Dai, alone or in combination, nowhere address the release of E-DCH resources based on a determination ***by the WTRU*** while using an enhanced dedicated channel (E-DCH) in the CELL_FACH state. Lundby is directed to the conventional manner of a network message directing the UE to stop monitoring a grant channel in response to the transmission that TEBS = 0 (Lundby, para. 63). In other words, Lundby explicitly teaches that the UE stops monitoring the grant channels in response to a notification ***from the serving cell***. Lundby's methods are described in the background section of the present application (Application, para. 4-5). Dai is directed to managing bandwidth resources of a data ring in accordance with a resource reservation protocol (Dai, col. 11, ll. 1-65). A channel bandwidth resource manager is used to control such resource allocation. As is known in the prior art, the channel bandwidth resource management is performed by the ***network***, specifically a network port switching device.

By contrast, the claims are directed to a WTRU that determines the trigger for the release of E-DCH resources. In other words, the WTRU determines that the buffer is empty and this determination is what triggers the WTRU to transmit scheduling information in an E-DCH transmission. Upon a determination by the WTRU that the last HARQ data transmission has finished, the WTRU releases a E-DCH resource allocation.

Because neither Lundby or Dai teach or suggest that the WTRU triggers the release of the E-DCH resource allocation based on an empty buffer and a last HARQ transmission, Applicants submit that neither Lundby nor Dai, alone or in combination, teach each and every element of the claims.

Conclusion

In view of the foregoing, applicant respectfully submits that the claims are allowable and that the present application is in condition for allowance. Reconsideration of the application and an early Notice of Allowance are respectfully requested. In the event that the Examiner cannot allow the present application for any reason, the Examiner is encouraged to contact the undersigned attorney, Lori Anne D. Swanson at (215) 558-5716, to discuss resolution of any remaining issues.

Date: October 4, 2011

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First Named Inventor	Benoit Pelletier
Art Unit	2464
Examiner Name	Kan Yuen
Attorney Docket Number	IHSP_2-1853.01.US

ENCLOSURES *(Check all that apply)*

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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:	12238910
Filing Date:	26-Sep-2008
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Filer:	LoriAnne D. Swanson/Marissa Antonelli
Attorney Docket Number:	IPH-2-1853.01.US

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Claims in excess of 20	1202	3	60	180
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**180**

Electronic Acknowledgement Receipt	
EFS ID:	11105732
Application Number:	12238910
International Application Number:	
Confirmation Number:	2438
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Customer Number:	15800
Filer:	LoriAnne D. Swanson/Marissa Antonelli
Filer Authorized By:	LoriAnne D. Swanson
Attorney Docket Number:	IPH-2-1853.01.US
Receipt Date:	04-OCT-2011
Filing Date:	26-SEP-2008
Time Stamp:	11:57:04
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	7828
Deposit Account	090435
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)	
Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)	
Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		IHSP_2_1853_01_US_Response_to_OA_dated_7_8_11.pdf	142874 1e89e36f03e3c1c91007c9b4862908aec50ca0a8	yes	10

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	10

Warnings:					
Information:					
2	Miscellaneous Incoming Letter	IHSP_2_1853_Transmittal_to_OA_dated_7_8_11.pdf	261844 19add20baf36e7e242621aa2c90a7e8179ae0651	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30391 a8d480acaf6cda2da09eb506a516ba6f95538c56	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	435109		

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/80 (11-08)
Approved for use through 11/30/2011. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☑ Practitioners associated with the Customer Number: 15800

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☑ The address associated with Customer Number: 15800

OR

☐ Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:

InterDigital Patent Holdings, Inc.
3411 Silverside Road, Hagley Building, Suite 105
Wilmington, DE 19810

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date	24-Aug-2011
Name	Bradley N. Ditty	Telephone	
Title	Senior Patent Executive		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	11258685
Application Number:	12238910
International Application Number:	
Confirmation Number:	2438
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Customer Number:	15800
Filer:	Vincent J. Roccia/Julia Heuer
Filer Authorized By:	Vincent J. Roccia
Attorney Docket Number:	IHSP_2-1853.01.US
Receipt Date:	25-OCT-2011
Filing Date:	26-SEP-2008
Time Stamp:	13:16:50
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Assignee showing of ownership per 37 CFR 3.73(b).	IHSP_2185301US373bform.pdf	423201 67539ab2358bca7ce3f0caaa558b47c7f1f2dfa8	no	2
Warnings:					
Information:					

2	Power of Attorney	IHSP_2185301USPOA_IPH.pdf	131388 3cb5ee4070e780e6768f73132e4082ed53d864b5	no	1

Warnings:

The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing

Information:

Total Files Size (in bytes):	554589

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/96 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: InterDigital Patent Holdings, Inc.

Application No./Patent No.: 12/238,910 Filed/Issue Date: September 26, 2008

Titled: METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL

InterDigital Patent Holdings, Inc. , 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 in;

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

3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

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 021966, Frame 0202, or for which a copy therefore 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(s).

☐ 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.

/Vincent J. Roccia/ October 25, 2011

Signature Date

Vincent J. Roccia Attorney of Record

Printed or Typed Name Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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.

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/238,910	09/26/2008	Benoit Pelletier	IHSP_2-1853.01.US

CONFIRMATION NO. 2438

15800
Condo Roccia LLP
One Liberty Place
Suite 2200
Philadelphia, PA 19103

POWER OF ATTORNEY NOTICE

OC000000050673486

Date Mailed: 11/01/2011

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 10/25/2011.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/gbien-aime/

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/238,910	09/26/2008	Benoit Pelletier	IHSP_2-1853.01.US

CONFIRMATION NO. 2438

15800
Condo Roccia LLP
One Liberty Place
Suite 2200
Philadelphia, PA 19103

POA ACCEPTANCE LETTER

OC000000050673502

Date Mailed: 11/01/2011

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 10/25/2011.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/gbien-aime/

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

DOCKET NO.: IHSP_2-1853.01.US **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Pelletier, Benoit **Confirmation No.: 2438**

Application No.: 12/238,910 **Group Art Unit: 2464**

Filing Date: September 26, 2008 **Examiner: Yuen, Kan**

For: METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL

Filed Via EFS

INFORMATION DISCLOSURE STATEMENT

Pursuant to 37 CFR § 1.56 and in accordance with 37 CFR §§ 1.97-1.98, information relating to the above-identified application is hereby disclosed. Inclusion of information in this statement is not to be construed as an admission that this information is material as that term is defined in 37 CFR § 1.56(b).

☐ **IDS Filed Under 37 CFR 1.97(b)**

In accordance with § 1.97(b), since this Information Disclosure Statement is being filed either within three months of the filing date of the above-identified application, within three months of the date of entry into the national stage of the above identified application as set forth in § 1.491, before the mailing date of a first Office Action on the merits of the above-identified application, or before the mailing date of a first Office Action after the filing of request for continued examination under § 1.114, no additional fee is required.

☒ **IDS filed Under 37 CFR 1.97(c)**

In accordance with § 1.97(c), this Information Disclosure Statement is being filed after the period set forth in § 1.97(b) above but before the mailing date of either a Final Action under § 1.116 or a Notice of Allowance under § 1.311, or before an action that otherwise closes prosecution in the application, therefore:

☐ Certification in Accordance with § 1.97(e) is attached; or

☒ The fee of **$180.00** as set forth in § 1.17(p) is attached.

☐ **IDS filed Under 37 CFR 1.97(d)**

In accordance with § 1.97(d), this Information Disclosure Statement is being filed after the mailing date of either a Final Action under § 1.113 or a Notice of Allowance under § 1.311 but before, or simultaneously with, the payment of the Issue Fee, therefore included are: Certification in Accordance with § 1.97(e); and the submission fee of **$180.00** as set forth in § 1.17(p).

CONTENT OF IDS PURSUANT TO 37 CFR 1.98

☐ Copies of reference numbers listed on the attached Form PTO-1449 are not required to be submitted pursuant to 37 CFR § 1.98(a)(2)(ii).

☒ Copies of reference numbers 40-43 listed on the attached Form PTO-1449 are enclosed herewith.

☐ Copies of reference numbers are not being submitted because they were previously cited by or submitted to the U.S. Patent and Trademark Office in patent application number , filed for which a claim for priority under 35 U.S.C. § 120 has been made in the instant application.

☐ The month of publication for reference numbers is not available. However, the year of publication for these references is sufficiently earlier than the effective US filing date and any foreign priority date so that the particular month of publication is not in issue pursuant to 37 CFR § 1.98(b).

REFERENCES IN A LANGUAGE OTHER THAN ENGLISH

☐ The following documents are not in the English language. Accordingly, a concise explanation of the relevance of the document was incorporated in the specification passages identified below, the document was identified in a foreign communication as identified below or an English language counterpart application has been provided as indicated below.

Foreign Language Document	Cite No.	Pages of Reference in Specification or Relevance of Document

Foreign Language Document	Cite No.	English Language Counterpart	Cite No.

☐ **CERTIFICATION IN ACCORDANCE WITH § 1.97(e)**

I hereby certify that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement.

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

Please charge any deficiency or credit any overpayment to Deposit Account No. 09-0435.

Date: November 4, 2011

/Lori Anne D. Swanson/
Lori Anne D. Swanson
Registration No. 59,048

CONDO ROCCIA LLP
One Liberty Place, Suite 2200
1650 Market Street
Philadelphia, PA 19103
Telephone: (215) 558-5740

Substitute for 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*				***Complete if Known***	
				Application Number	12/238,910
				Filing Date	September 26, 2008
				First Named Inventor	Pelletier, Benoit
				Art Unit	2464
				Examiner Name	Yuen, Kan
Sheet	1	of	1	**Attorney Docket Number**	IHSP_2-1853.01.US

FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Foreign Patent Document Country Code- Number - Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	T
	40	EP 1796416 A1	06-13-2007	Evolium Sas	

NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.	Include name of the author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), Volume-issue Number(s), publisher, city and/or country where published.	T
	41	International Patent Application No. PCT/US2008/077904: Written Opinion dated October 6, 2009, 10 pages	
	42	International Patent Application No. PCT/US2008/077904: International Search Report dated October 6, 2009, 7 pages	
	43	International Patent Application No. PCT/US2008/077904: Notification of Transmittal of International Preliminary Report on Patentability, March 15, 2010, 9 pages	

Examiner Signature		**Date Considered**	

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43*bis*.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2008/077904	26.09.2008	28.09.2007

International Patent Classification (IPC) or both national classification and IPC
INV. H04W76/06

Applicant
INTERDIGITAL PATENT HOLDINGS, INC.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notifed the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:	Date of completion of this opinion	Authorized Officer
European Patent Office Gitschiner Str. 103 D-10958 Berlin Tel. +49 30 25901 - 0 Fax: +49 30 25901 - 840	see form PCT/ISA/210	López Pérez, Mariano Telephone No. +49 30 25901-496

Form PCT/ISA/237 (Cover Sheet) (April 2005)

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

      ☐ a sequence listing

      ☐ table(s) related to the sequence listing

   b. format of material:

      ☐ on paper

      ☐ in electronic form

   c. time of filing/furnishing:

      ☐ contained in the international application as filed.

      ☐ filed together with the international application in electronic form.

      ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of

☐ the entire international application

☒ claims Nos. 11-22, 24-29

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international search *(specify)*:

☐ the description, claims or drawings *(indicate particular elements below)* or said claims Nos. are so unclear that no meaningful opinion could be formed *(specify)*:

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed *(specify)*:

☒ no international search report has been established for the whole application or for said claims Nos. 11-22, 24-29

☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

- ☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.
- ☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.
- ☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rules 13*ter*.1(a) or (b).

☐ a meaningful opinion could not be formed without the tables related to the sequence listings; the applicant did not, within the prescribed time limit, furnish such tables in electronic form complying with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions, and such tables were not available to the International Searching Authority in a form and manner acceptable to it.

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in electronic form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.

☐ See Supplemental Box for further details

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has, within the applicable time limit:

   ☒ paid additional fees

   ☐ paid additional fees under protest and, where applicable, the protest fee

   ☐ paid additional fees under protest but the applicable protest fee was not paid

   ☐ not paid additional fees

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

   ☐ complied with

   ☒ not complied with for the following reasons:

   see separate sheet

4. Consequently, this report has been established in respect of the following parts of the international application:

   ☐ all parts.

   ☒ the parts relating to claims Nos. 1-10,23

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	
	No:	Claims	1-10, 23
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-10, 23
Industrial applicability (IA)	Yes:	Claims	1-10,23
	No:	Claims	

2. Citations and explanations

   see separate sheet

Re Item III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

Since this International Search Authority considers that this international application does not comply with the requirement of unity of invention (Rules 13.1, 13.2 and 13.3 PCT), an opinion on claims 8-22, 24-29 cannot be established.

Re Item IV

Lack of unity of invention

The separate inventions are:

Group I. claims 1-7,23:

A method for terminating an E-RACH message in an E-RACH transmission, the trigger for the termination and release of the E-RACH message being supplied by the WTRU to the Node-B after determining that the transmission buffer is empty.

Group II: claims 8-10:

A method for terminating an E-RACH message in an E-RACH transmission, the trigger for the termination and release of the E-RACH message being the transition from CELL_FACH to CELL_DCH state.

Group III: claims 11-13:

A method for terminating an E-RACH message in an E-RACH transmission, the trigger for the termination and release of the E-DCH resource being an explicit E-DCH termination signal.

Group IV: claims 14-22:

A method for terminating an E-RACH message in an E-RACH transmission, whereby a timer is initiated in response to a trigger, and resource allocation for CCCH is released after a maximum allowable transmission time for the CCCH.

Group V: claims 24-29:

A method for releasing E-DCH resources while in CELL_FACH state, whereby reception procedures for E-AGCH, E-RGCH and E-HICH are terminated;

transmission procedures for E-DPCCH and E-DPDCH are terminated, and the MAC entity is reset.

The International Search Authority considers therefore that the international application does not comply with the requirements of unity of invention (Rules 13.1, 13.2 and 13.3 PCT).

Reasons for lack of unity:

The only technical feature in common between claims of groups I, II, III, IV and V is the existence of triggers for terminating the messages.

This feature is known from the prior art (see WO 2006/043782).

The special technical features according to Rule 13.2 PCT are the following:

Group I: the trigger for the termination and release of the E-RACH message is supplied by the WTRU to the Node-B after determining that the transmission buffer is empty.

Group II: the trigger for the termination and release of the E-RACH message is the transition from CELL_FACH to CELL_DCH state.

Group III: the trigger for the termination and release of the E-DCH resource is an explicit E-DCH termination signal.

Group IV: a timer is initiated in response to a trigger, and resource allocation for CCCH is released after a maximum allowable transmission time for the CCCH.

Group V: the release of E-DCH resources while in CELL_FACH state puts up with the termination of reception procedures for E-AGCH, E-RGCH and E-HICH; with the termination of transmission procedures for E-DPCCH and E-DPDCH; and with the resetting of the MAC entity.

Although one might define a common general concept as optimizing the termination and release of E-RACH and E-DCH messages, the prior art shows that such a concept is not new and therefore cannot bear the label of inventive as required by Rule 13.1

PCT.

Therefore the requirement of Rule 13.2 PCT is not fulfilled for these groups of claims.

Hence, Rule 13.1 PCT is not satisfied and the subject-matter of the groups of claims are not linked by a single inventive concept.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 Reference is made to the following documents (D1-D9):

D1: WO 2006/043782 A (SAMSUNG ELECTRONICS CO LTD [KR]) 27 April 2006 (2006-04-27)

D2: WO 2007/078155 A (LG ELECTRONICS INC [KR]; LEE YOUNG DAE [KR]; CHUN SUNG DUCK [KR]; JUNG) 12 July 2007 (2007-07-12)

D3: ERICSSON: "Resource release of common E-DCH in CELL_FACH" 3GPP DRAFT; R2-080044, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. Sevilla, Spain; 20080114, 7 January 2008 (2008-01-07), XP050137944

D4: INFINEON: "Resource release mechanisms for CELL_FACH E-DCH" 3GPP DRAFT; R2-080148, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. Sevilla, Spain; 20080114, 8 January 2008 (2008-01-08), XP050138028

D5: QUALCOMM EUROPE: "Layer 1/2 aspects for enhanced UL for CELL_FACH" 3GPP DRAFT; R2-074390, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. Shanghai, China; 20071008, 1 October 2007 (2007-10-01), XP050136960

D6: HUAWEI: "Release procedure of E-RACH" 3GPP DRAFT; R2-080262 E-RACH RELEASE PROCEDURE, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN

WG2, no. Sevilla, Spain; 20080114, 8 January 2008 (2008-01-08), XP050138125

D7: ERICSSON: "Implicit release for enhanced uplink in CELL_FACH" 3GPP DRAFT; R2-081501_IMPLICIT_RELEASE, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. Shenzhen, China; 20080331, 25 March 2008 (2008-03-25), XP050139242

D8: US 2005/250504 A1 (MIKOLA JUHA [FI]) 10 November 2005 (2005-11-10)

D9: EP-A-1 796 416 (EVOLIUM SAS [FR] ALCATEL LUCENT [FR]) 13 June 2007 (2007-06-13)

1.1 Documents D3-D7 have been published after the priority date of the present application. It should be noted that in case the priority of the application is deemed not valid, these documents could also be used to judge its patentability.

2 The present invention does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-10, 23 is not new in the sense of Article 33(2) PCT.

2.1 Using the wording of claim 1, document D2 discloses (the references in parentheses applying to this document):

"A method for terminating an enhanced random access channel message in an enhanced random access channel transmission (page 4, lines 3-5; page 10, lines 2-8), the method comprising:

determining that a buffer is empty (page 13, line 12 - page 14, line 9);

triggering a transmission of scheduling information with a total enhanced dedicated channel buffer status equal to zero (page 14, lines 10-12);

determining a last hybrid automatic repeat request data transmission (page 6, line 19 - page 7, line 14); and

releasing an enhanced dedicated channel resource allocation (page 16, line 11 - page 17, line 6)."

The subject-matter of claim 1 is therefore not new (Article 33(1) and (2) PCT).

2.2 It should be noted that the above analysis could also have been based on documents D1, D3, D4, D5, D6 or D7. The subject-matter of claim 1 is therefore not new (Article 54(1) and (2) EPC).

2.3 Independent method claim 6 describes the complementary procedure of the one cited in claim 1 (namely, the method in the Node-B). Its subject-matter, for the same reasons explained above, is not new (Article 33(1) and (2) PCT).

2.4 Independent apparatus claim 23 describes the Node-B adapted to perform the method described in claims 1 and 6. Its subject-matter, for the same reasons explained above, is not new (Article 33(1) and (2) PCT).

2.5 The additional features of the dependent claims 2-5, 7 are also known from D1, D2, D3, D4, D5, D6 or D7. In particular:
- claims 2-4: see document D2, page 16, lines 3-16;
- claims 5, 7: the enhanced random access channel message is terminated in care of a cell reselection or link failure: in document D2 it is clear (see page 10, lines 9-23) that once a message indicating that the radio access resources are not any longer needed is received, they are released. The case of a message indicating a cell reselection or link failure would be implicitly included in these. These claims are therefore not new.
The subject-matter of claims 2-5, 7 is therefore not new (Article 33(1) and (2) PCT).

2.6 Using the wording of claim 8, document D8 discloses (the references in parentheses applying to this document):
"A method for terminating an enhanced random access channel message in an enhanced random access channel transmission (paragraphs [0002]-[0004]), the method comprising:
releasing the enhanced random access channel message during transition from cell forward access channel state to cell dedicated channel state (paragraphs [0019], [0020])".
The subject matter of claim 8 is therefore not new (Article 33(1) and (2) PCT).

2.7 It should be noted that the above analysis could also have been based on document D9. The subject-matter of claim 8 is therefore not new (Article 33(1) and (2) PCT).

2.8 Independent apparatus claim 10 defines substantially the same subject matter as independent method claim 1, in terms of features of a wireless transmit receiving

unit adapter for performing said method. Its subject matter, for the same reasons explained above, is not new (Article 33(1) and (2) PCT).

2.9 The additional features of claim 9 are also known from D8 or D9. In particular, see document D8, paragraphs [0021]-[0023], [0030].
The subject matter of claim 9 is therefore not new (Article 33(1) and (2) PCT).

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION**	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
IPH2185301WO		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US2008/077904	26/09/2008	28/09/2007
Applicant		
INTERDIGITAL PATENT HOLDINGS, INC.		

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

This international search report consists of a total of 7 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report:

1. **Basis of the report**
   a. With regard to the **language,** the international search was carried out on the basis of:
      [X] the international application in the language in which it was filed
      [ ] a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
   b. [ ] This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).
   c. [ ] With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. [ ] **Certain claims were found unsearchable** (See Box No. II)

3. [X] **Unity of invention is lacking** (see Box No III)

4. With regard to the **title,**
   [X] the text is approved as submitted by the applicant
   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**
   [X] the text is approved as submitted by the applicant
   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the **drawings,**
   a. the figure of the **drawings** to be published with the abstract is Figure No. 6
      [X] as suggested by the applicant
      [ ] as selected by this Authority, because the applicant failed to suggest a figure
      [ ] as selected by this Authority, because this figure better characterizes the invention
   b. [ ] none of the figures is to be published with the abstract

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2008/077904

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04W76/06

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)
H04W

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2006/043782 A (SAMSUNG ELECTRONICS CO LTD [KR]) 27 April 2006 (2006-04-27) page 5, line 5 - line 16 page 8, line 12 - line 18 page 11, line 12 - page 13, line 27 page 14, line 8 - page 15, line 15	1-7,23
X	WO 2007/078155 A (LG ELECTRONICS INC [KR]; LEE YOUNG DAE [KR]; CHUN SUNG DUCK [KR]; JUNG) 12 July 2007 (2007-07-12) page 4, line 3 - line 6 page 6, line 19 - page 7, line 14 page 8, line 8 - page 10, line 23 page 13, line 12 - page 17, line 6	1-7,23

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
30 September 2009	06/10/2009

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	López Pérez, Mariano

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

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	ERICSSON: "Resource release of common E-DCH in CELL_FACH" 3GPP DRAFT; R2-080044, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. Sevilla, Spain; 20080114, 7 January 2008 (2008-01-07), XP050137944 the whole document	1-7,23
P,X	INFINEON: "Resource release mechanisms for CELL_FACH E-DCH" 3GPP DRAFT; R2-080148, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. Sevilla, Spain; 20080114, 8 January 2008 (2008-01-08), XP050138028 the whole document	1-7,23
P,X	QUALCOMM EUROPE: "Layer 1/2 aspects for enhanced UL for CELL_FACH" 3GPP DRAFT; R2-074390, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. Shanghai, China; 20071008, 1 October 2007 (2007-10-01), XP050136960 the whole document	1-7,23
P,X	HUAWEI: "Release procedure of E-RACH" 3GPP DRAFT; R2-080262 E-RACH RELEASE PROCEDURE, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. Sevilla, Spain; 20080114, 8 January 2008 (2008-01-08), XP050138125 the whole document	1-7,23

-/--

2

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2008/077904

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	ERICSSON: "Implicit release for enhanced uplink in CELL_FACH" 3GPP DRAFT; R2-081501_IMPLICIT_RELEASE, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. Shenzhen, China; 20080331, 25 March 2008 (2008-03-25), XP050139242 the whole document	1-7,23
X	US 2005/250504 A1 (MIKOLA JUHA [FI]) 10 November 2005 (2005-11-10) the whole document	8-10
X	EP 1 796 416 A (EVOLIUM SAS [FR] ALCATEL LUCENT [FR]) 13 June 2007 (2007-06-13) the whole document	8-10

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

IPR2023-01267 Page 331

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/077904

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search reportcovers only those claims for which fees were paid, specifically claims Nos.:

1-10, 23

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-7,23

   A method for terminating an E-RACH message in an E-RACH transmission, the trigger for the termination and release of the E-RACH message being supplied by the WTRU to the Node-B after determining that the transmission buffer is empty

   ---

2. claims: 8-10

   A method for terminating an E-RACH message in an E-RACH transmission, the trigger for the termination and release of the E-RACH message being the transition from CELL_FACH to CELL_DCH state.

   ---

3. claims: 11-13

   A method for terminating an E-RACH message in an E-RACH transmission, the trigger for the termination and release of the E-DCH resource being an explicit E-DCH termination signal.

   ---

4. claims: 14-22

   A method for terminating an E-RACH message in an E-RACH transmission, whereby a timer is initiated in response to a trigger, and resource allocation for CCCH is released after a maximum allowable transmission time for the CCCH.

   ---

5. claims: 24-29

   A method for releasing E-DCH resources while in CELL_FACH state, whereby reception procedures for E-AGCH, E-RGCH and E-HICH are terminated; transmision procedures for E-DPCCH and E-DPDCH are terminated, and the MAC entity is resetted.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2008/077904

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2006043782 A	27-04-2006	JP 2008517551 T	22-05-2008
		KR 20060054117 A	22-05-2006
		US 2006140154 A1	29-06-2006
WO 2007078155 A	12-07-2007	EP 1969784 A2	17-09-2008
		KR 20070073578 A	10-07-2007
		US 2009219868 A1	03-09-2009
US 2005250504 A1	10-11-2005	NONE	
EP 1796416 A	13-06-2007	AT 411723 T	15-10-2008
		CN 1980476 A	13-06-2007
		FR 2894761 A1	15-06-2007
		US 2007135113 A1	14-06-2007

Form PCT/ISA/210 (patent family annex) (April 2005)

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 IPH-2-1853.01.WO	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/US2008/077904	International filing date *(day/month/year)* 26.09.2008	Priority date *(day/month/year)* 28.09.2007
International Patent Classification (IPC) or national classification and IPC INV. H04W76/06		
Applicant INTERDIGITAL PATENT HOLDINGS, INC.		

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 9 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 5 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
2010-01-06	15.03.2010
Name and mailing address of the international preliminary examining authority: European Patent Office Gitschiner Str. 103 D-10958 Berlin Tel. +49 30 25901 - 0 Fax: +49 30 25901 - 840	Authorized officer López Pérez, Mariano Telephone No. +49 30 25901-496

Form PCT/IPEA/409 (Cover Sheet) (April 2005)

Box No. I Basis of the report

1. With regard to the **language**, this report is based on

   ☒ 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 (under Rules 12.3(a) and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4(a))
   - ☐ international preliminary examination (under 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)*:

Description, Pages

1-21 as originally filed

Claims, Numbers

1-29 as amended (together with any statement) under Art. 19 PCT

Drawings, Sheets

1/9-9/9 as originally filed

☐ 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 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 sequence listing *(specify)*:

5. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 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 45bis.8(b) and (c)).

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 11-22, 24-29

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination *(specify)*:

☐ the description, claims or drawings *(indicate particular elements below)* or said claims Nos. are so unclear that no meaningful opinion could be formed *(specify)*:

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed *(specify)*.

☒ no international search report has been established for the said claims Nos. 11-22, 24-29

☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rules 13*ter*.1(a) or (b) and 13*ter*.2.

☐ a meaningful opinion could not be formed without the tables related to the sequence listings; the applicant did not, within the prescribed time limit, furnish such tables in electronic form complying with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions, and such tables were not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in electronic form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.

☐ See separate sheet for further details

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation to restrict or pay additional fees, the applicant has, within the applicable time limit:

   ☐ restricted the claims.

   ☒ paid additional fees.

   ☐ paid additional fees under protest and, where applicable, the protest fee.

   ☐ paid additional fees under protest but the applicable protest fee was not paid.

   ☐ neither restricted the claims nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is:

   ☐ complied with.

   ☒ not complied with for the following reasons:

   see separate sheet

4. Consequently, this report has been established in respect of the following parts of the international application:

   ☐ all parts.

   ☒ the parts relating to claims Nos. 1-10, 23 .

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)	Yes:	Claims	
	No:	Claims	1-10, 23
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-10, 23
Industrial applicability (IA)	Yes:	Claims	1-10, 23
	No:	Claims	

2. Citations and explanations (Rule 70.7):

   see separate sheet

Re Item III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

Since this International Search Authority considers that this international application does not comply with the requirement of unity of invention (Rules 13.1, 13.2 and 13.3 PCT), an opinion on claims 11-22, 24-29 cannot be established.

Re Item IV

Lack of unity of invention

The separate inventions are:

Group I. claims 1-7,23:

A method for terminating an E-DCH message in an E-DCH transmission, the trigger for the termination and release of the E-DCH message being supplied by the WTRU to the Node-B after determining that the transmission buffer is empty.

Group II: claims 8-10:

A method for terminating an E-DCH message in an E-DCH transmission, the trigger for the termination and release of the E-DCH message being the transition from CELL_FACH to CELL_DCH state.

Group III: claims 11-13:

A method for terminating an E-DCH message in an E-DCH transmission, the trigger for the termination and release of the E-DCH resource being an explicit E-DCH termination signal.

Group IV: claims 14-22:

A method for terminating an E-DCH message in a CELL_FACH state, whereby a timer is initiated in response to a trigger, and resource allocation for CCCH is released after a maximum allowable transmission time for the CCCH.

Group V: claims 24-29:

A method for releasing E-DCH resources while in CELL_FACH state, whereby reception procedures for E-AGCH, E-RGCH and E-HICH are terminated; transmission procedures for E-DPCCH and E-DPDCH are terminated, and the MAC entity is reset.

The International Search Authority considers therefore that the international application does not comply with the requirements of unity of invention (Rules 13.1, 13.2 and 13.3 PCT).

Reasons for lack of unity:

The only technical feature in common between claims of groups I, II, III, IV and V is the existence of triggers for terminating the messages.

This feature is known from the prior art (see WO 2006/043782).

The special technical features according to Rule 13.2 PCT are the following:

Group I: the trigger for the termination and release of the E-DCH message is supplied by the WTRU to the Node-B after determining that the transmission buffer is empty.

Group II: the trigger for the termination and release of the E-DCH message is the transition from CELL_FACH to CELL_DCH state.

Group III: the trigger for the termination and release of the E-DCH resource is an explicit E-DCH termination signal.

Group IV: a timer is initiated in response to a trigger, and resource allocation for CCCH is released after a maximum allowable transmission time for the CCCH.

Group V: the release of E-DCH resources while in CELL_FACH state puts up with the termination of reception procedures for E-AGCH, E-RGCH and E-HICH; with the termination of transmission procedures for E-DPCCH and E-DPDCH; and with the resetting of the MAC entity.

Although one might define a common general concept as optimizing the termination and release of E-DCH messages, the prior art shows that such a concept is not new and therefore cannot bear the label of inventive as required by Rule 13.1 PCT.

Therefore the requirement of Rule 13.2 PCT is not fulfilled for these groups of claims.

Hence, Rule 13.1 PCT is not satisfied and the subject-matter of the groups of claims are not linked by a single inventive concept.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 Reference is made to the following documents (D1-D9):

D1: WO 2006/043782 A (SAMSUNG ELECTRONICS CO LTD [KR]) 27 April 2006 (2006-04-27)

D2: WO 2007/078155 A (LG ELECTRONICS INC [KR]; LEE YOUNG DAE [KR]; CHUN SUNG DUCK [KR]; JUNG) 12 July 2007 (2007-07-12)

D3: ERICSSON: "Resource release of common E-DCH in CELL_FACH" 3GPP DRAFT; R2-080044, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. Sevilla, Spain; 20080114, 7 January 2008 (2008-01-07), XP050137944

D4: INFINEON: "Resource release mechanisms for CELL_FACH E-DCH" 3GPP DRAFT; R2-080148, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. Sevilla, Spain; 20080114, 8 January 2008 (2008-01-08), XP050138028

D5: QUALCOMM EUROPE: "Layer 1/2 aspects for enhanced UL for CELL_FACH" 3GPP DRAFT; R2-074390, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. Shanghai, China; 20071008, 1 October 2007 (2007-10-01), XP050136960

D6: HUAWEI: "Release procedure of E-RACH" 3GPP DRAFT; R2-080262 E-RACH RELEASE PROCEDURE, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. Sevilla, Spain; 20080114, 8 January 2008 (2008-01-08), XP050138125

D7: ERICSSON: "Implicit release for enhanced uplink in CELL_FACH" 3GPP DRAFT; R2-081501_IMPLICIT_RELEASE, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. Shenzhen, China; 20080331, 25 March 2008 (2008-03-25), XP050139242

D8: US 2005/250504 A1 (MIKOLA JUHA [FI]) 10 November 2005 (2005-11-10)

D9: EP-A-1 796 416 (EVOLIUM SAS [FR] ALCATEL LUCENT [FR]) 13 June 2007 (2007-06-13)

1.1 Documents D3-D7 have been published after the priority date of the present application. It should be noted that in case the priority of the application is deemed not valid, these documents could also be used to judge its patentability.

2 The present invention does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-10, 23 is not new in the sense of Article 33(2) PCT.

2.1 Using the wording of claim 1, document D2 discloses (the references in parentheses applying to this document):

"A method for terminating an enhanced dedicated channel transmission in a cell forward access channel state by a wireless transmit/receive unit (page 4, lines 3-5; page 10, lines 2-8), the method comprising:

determining that a buffer is empty by the wireless transmit/receive unit (page 13, line 12 - page 14, line 9);

on a condition that the buffer is empty, triggering a transmission by the wireless transmit/receive unit of scheduling information in an enhanced dedicated channel transmission with a total enhanced dedicated channel buffer status equal to zero (page 14, lines 10-12);

determining a condition of a last hybrid automatic repeat request data transmission being finished by the wireless transmit/receive unit (page 6, line 19 - page 7, line 14); and

on a condition that the buffer is empty and a last HARQ data transmission being finished, releasing an enhanced dedicated channel resource allocation by the wireless transmit/receive unit (page 16, line 11 - page 17, line 6)."

The subject-matter of claim 1 is therefore not new (Article 33(1) and (2) PCT).

2.2 It should be noted that the above analysis could also have been based on documents D1, D3, D4, D5, D6 or D7. The subject-matter of claim 1 is therefore not new (Article 54(1) and (2) EPC).

2.3 Independent method claim 6 describes the complementary procedure of the one cited in claim 1 (namely, the method in the Node-B). Its subject-matter, for the same reasons explained above, is not new (Article 33(1) and (2) PCT).

2.4 Independent apparatus claim 23 describes the Node-B adapted to perform the method described in claims 1 and 6. Its subject-matter, for the same reasons explained above, is not new (Article 33(1) and (2) PCT).

2.5 The additional features of the dependent claims 2-5, 7 are also known from D1, D2, D3, D4, D5, D6 or D7. In particular:

- claims 2-4: see document D2, page 16, lines 3-16;

- claims 5, 7: the enhanced random access channel message is terminated in case of a cell reselection or link failure: in document D2 it is clear (see page 10, lines 9-23) that once a message indicating that the radio access resources are not any longer needed is received, they are released. The case of a message indicating a cell reselection or link failure would be implicitly included in these. These claims are therefore not new.

The subject-matter of claims 2-5, 7 is therefore not new (Article 33(1) and (2) PCT).

2.6 Using the wording of claim 8, document D8 discloses (the references in parentheses applying to this document):

"A method for terminating enhanced dedicated channel transmissions in a cell forward access channel state by a wireless transmit/receive unit (paragraphs [0002]-[0004]), the method comprising:

releasing the enhanced dedicated channel resource associated with cell forward access channel during transition from the cell forward access channel state to a cell dedicated channel state (paragraphs [0019], [0020])".

The subject matter of claim 8 is therefore not new (Article 33(1) and (2) PCT).

2.7 It should be noted that the above analysis could also have been based on document D9. The subject-matter of claim 8 is therefore not new (Article 33(1) and (2) PCT).

2.8 Independent apparatus claim 10 defines substantially the same subject matter as independent method claim 8, in terms of features of a wireless transmit receiving unit adapter for performing said method. Its subject matter, for the same reasons explained above, is not new (Article 33(1) and (2) PCT).

2.9 The additional features of claim 9 are also known from D8 or D9. In particular, see document D8, paragraphs [0021]-[0023], [0030].

The subject matter of claim 9 is therefore not new (Article 33(1) and (2) PCT).

Espacenet

Bibliographic data: EP 1796416 (A1)

Managing an overload in a radiocommunication network cell

Publication date:	2007-06-13
Inventor(s):	MOINET GREGOIRE [FR]; BLANC PATRICK [FR] +
Applicant(s):	EVOLIUM SAS [FR] +
Classification:	- international: ***H04L12/56; H04W72/08***
	- European: H04L12/56D15E; H04L12/56D2A; H04L12/56D4; H04L12/56D5; H04L12/56R; H04W72/04S6
Application number:	EP20060124955 20061128
Priority number(s):	FR20050053778 20051208
Also published as:	• EP 1796416 (B1) • US 2007135113 (A1) • US 7853266 (B2) • FR 2894761 (A1) • CN 1980476 (A) • more
Cited documents:	US2004132441 (A1) View all

Abstract of EP 1796416 (A1)

The method involves obtaining a current rate of successful transitions for a change from a forward access channel (FACH) Cellfach state to a dedicated channel (DCH) Celldch state, for a cell for each radio access bearer (RAB) request for allocation of radio resources to a given user equipment in an initial state. An overload of the Cellfach state is detected by analyzing current rate of successful transitions. The request is accepted if no overload is detected, and the equipment is switched from the initial state to a final state in which a radio resource is allocated to the equipment., Independent claims are also included for the following: (1) a device for management of overloads in a cell of a cellular radio communication network (2) a computer program comprising program code instructions for the execution of the steps of the method (3) a storage unit readable by a computer, storing a set of instructions that is executed by a computer to implement a method of managing the overload.

Last updated: 12.10.2011 Worldwide Database 5.7.23.2; 92p

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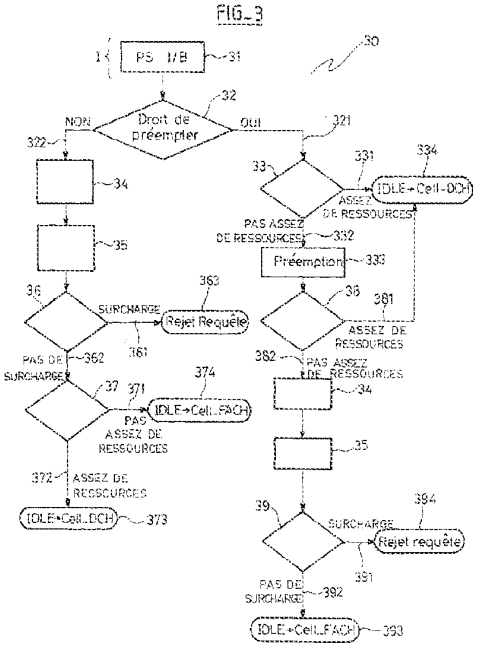
(54) Gestion d'une surcharge dans une cellule d'un réseau de radiocommunication

(57) L'invention concerne un procédé (30) de gestion d'une surcharge dans une cellule d'un réseau de radiocommunication cellulaire comprenant une pluralité d'équipements utilisateur (UE) pouvant chacun commuter entre une pluralité d'états comprenant un état Cell_DCH et un état Cell_FACH.

Selon l'invention, un tel procédé (30) comprend les étapes suivantes, pour chaque requête d'allocation de ressources radio, appelée requête RAB, à un équipement utilisateur (UE) donné se trouvant, avant envoi de la requête, dans un état initial dans lequel aucune ressource radio n'est allouée à l'équipement utilisateur (UE) :

- obtention (34, 35) pour la cellule d'un taux courant de transitions réussies pour le passage de l'état Cell_FACH à l'état Cell_DCH ;
- détection (36) d'une surcharge de l'état Cell_FACH, par analyse du taux courant de transitions réussies ;
- si une surcharge est détectée, rejet de la requête ;
- si aucune surcharge n'est détectée, acceptation (37) de la requête avec passage de l'équipement utilisateur (UE) de l'état initial à un état final dans lequel au moins une ressource radio est allouée à l'équipement utilisateur (UE).

FIG_3



EP 1 796 416 A1

Printed by Jouve, 75001 PARIS (FR)

Description

1. DOMAINE DE L'INVENTION

[0001] Le domaine de l'invention est celui des réseaux de communication. Plus précisément, l'invention concerne les réseaux mobiles de 3ème génération (aussi appelés réseaux 3G) tels que notamment, mais non exclusivement, le GSM/GPRS (« Global System for Mobile / Global Packet Radio Service » en anglais), l'UMTS WCDMA (« Universal Mobile Telecommunications Service Wideband Code-Division Multiple Access » en anglais), l'UMTS TS-CDMA (« Universal Mobile Telecommunications Service Time Slot Code-Division Multiple Access » en anglais),...

[0002] Plus précisément encore, l'invention concerne une technique de « gestion de charge » permettant de faciliter la commutation d'une pluralité d'équipements utilisateur (téléphone mobile 3G, assistant personnel numérique (PDA),...) entre une pluralité d'états de service mise en oeuvre dans de tels réseaux.

[0003] L'invention trouve notamment des applications dans la gestion de surcharge d'une cellule.

2. ART ANTÉRIEUR

[0004] La norme 3GPP (« 3rd Generation Patrnership Project ») définit plusieurs états de service d'un équipement utilisateur.

[0005] Comme illustré par la **figure 1**, un équipement utilisateur (« UE » pour « User Equipment » en anglais) peut commuter entre quatre états :

- un premier état IDLE dans lequel l'équipement utilisateur ne se voit allouer aucun contexte et/ou ressources radio dans le réseau d'accès radio ;
- un deuxième état Cell_DCH dans lequel l'équipement utilisateur se voit allouer des ressources radio dédiées (« DCH » pour « Dedicated Channel » en anglais), destinées au transfert en temps réel de grande quantité de données, dans le cadre d'un appel circuit ou un appel paquet ;
- un troisième état Cell_FACH dans lequel l'équipement utilisateur se voit allouer des ressources radio communes (« FACH » pour « Forward Access Channel » en anglais) (en d'autres termes, l'équipement utilisateur ne se voit pas allouer de ressources radio propres), destinées au transfert de données de petite taille sans contrainte temps réel, dans le cadre d'un appel paquet uniquement ; et
- un quatrième état URA_PCH/CELL_PCH dans lequel l'équipement utilisateur ne se voit allouer aucune ressource radio, mais conserve un contexte (par exemple une identité internationale d'abonné mobile (« IMSI » pour « International Mobile Subscriber Identity » en anglais)) dans le contrôleur de réseau radio (« RNC » pour « Radio Network Controller » en anglais). On rappelle que l'état URA_PCH (« UTRAN Registration Area Paging Channel » en anglais) permet d'économiser de l'énergie d'une part (libération des ressources) et de localiser l'équipement utilisateur au groupe « URA » de cellule près d'autre part.

[0006] De façon générale, le passage dans l'état Cell_FACH d'un équipement utilisateur est obtenu pour trois cas :

- un premier cas correspondant à une fin de période d'activité : l'équipement utilisateur n'a plus ou peu de données à transmettre ;
- un deuxième cas correspondant à un manque de ressources radio dans l'état Cell_DCH : l'équipement utilisateur est mis en attente dans l'état Cell_FACH jusqu'à ce que des ressources radio puissent lui être dédiées ; et
- un troisième cas correspondant à une re-sélection de cellule : l'équipement utilisateur dans une cellule donnée passe dans une autre cellule, tout en restant dans l'état Cell_FACH.

[0007] On discute ci-après les inconvénients de l'art antérieur à travers le cas particulier de l'accès d'un équipement utilisateur à un service à commutation de paquets (« Packet-Switched (PS) service » en anglais).

[0008] Dans le contexte de l'accès à des services paquets, lorsqu'un équipement utilisateur n'a plus ou peu de données à transmettre, il commute (flèche référencée 1 sur la figure 1) de l'état Cell_DCH à l'état Cell_FACH. Dans l'état Cell_FACH, l'équipement utilisateur reçoit et transmet des données sur un canal physique de contrôle commun secondaire (« SCCPCH » pour « Secondary Common Control Physical Channel » en anglais), pour lequel aucune ressource radio n'est réservée par équipement utilisateur.

[0009] Réciproquement, lorsque l'équipement utilisateur a de nouvelles données à transmettre, il commute (flèche référencée 2 sur la figure 1) de l'état Cell_FACH à l'état Cell_DCH.

[0010] Il est important de noter que le passage dans l'état Cell_DCH de l'équipement utilisateur est conditionné par la vérification d'un algorithme d'admission, par exemple de type RAC (« Radio Admission Control » en anglais), consistant à déterminer si on dispose de suffisamment de ressources radio (en terme de puissance) pour l'équipement utilisateur.

[0011] La plupart des algorithmes RAC existants sont « stricts », en ce sens qu'ils n'autorisent que très peu d'équipements utilisateur d'une même cellule à être dans un état Cell_DCH. A titre d'exemple, pour le cas d'un service paquet de 64 kbit/s en voie montante et 384 kbit/s en voie descendante, seulement trois à sept équipements utilisateur par cellule sont acceptés dans l'état Cell_DCH.

[0012] Les inventeurs ont constaté que ces algorithmes d'admission pouvaient êtres inadaptés dans certai-

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nes situations.

[0013] En effet, ils peuvent entraîner une surcharge de l'état Cell_FACH dans une cellule donnée du fait que, pour une «transition aller » (1) un grand nombre d'équipements utilisateur est autorisé à passer de l'état Cell_DCH à l'état Cell_FACH (typiquement dans le cas de consultations de pages web, dans lequel les équipements utilisateur utilisent des services paquet avec un modèle de trafic non continu), alors que pour une « transition retour » (2) seulement un nombre limité d'équipements utilisateur est autorisé à repasser de l'état Cell_FACH à l'état Cell_DCH. Ainsi, l'inconvénient de ces algorithmes est qu'ils maintiennent plus longuement les équipements utilisateur dans l'état Cell_FACH avec un débit binaire (« bit rate » en anglais) et une qualité de service (« QoS » pour « Quality of Service » en anglais) très faible, et se traduit par exemple par des temps de chargements plus longs pour les nouvelles pages web.

[0014] Aujourd'hui aucune technique de « gestion de charge » ou de gestion de qualité de service dans l'état Cell_FACH n'est définie dans la norme 3GPP.

[0015] Néanmoins, une technique bien connue permettant de faciliter le passage (2) d'un équipement utilisateur de l'état Cell_FACH à l'état Cell_DCH repose sur la limitation du nombre d'équipements utilisateur dans l'état Cell_FACH. L'avantage de cette solution est qu'elle permet d'éviter une surcharge de l'état Cell_FACH.

[0016] Cependant, cette technique connue est mal adaptée au cas des surcharges de l'état Cell_DCH. En effet, si plusieurs équipements utilisateur dans une même cellule devenaient très actifs dans le domaine de service paquet (PS) (c'est-à-dire dans le cas de téléchargements et/ou consultations des pages web (« web browsing » en anglais)), alors un nombre limité de ces équipements utilisateur passerait à l'état Cell_FACH, tandis qu'un grand nombre d'entre eux resterait bloqué dans l'état Cell_DCH, dans lequel ils consommeraient inutilement des ressources radio dédiées et empêcheraient des équipements utilisateur dans l'état IDLE de passer dans l'état Cell_DCH.

[0017] Un autre inconvénient majeur de cette solution est qu'elle ne peut pas être adaptée de façon dynamique à la situation du trafic, et de ce fait n'est pas optimale pour les réseaux 3G, dans la mesure où ces réseaux présentent en général des modèles de trafic variables.

[0018] Il existe donc un besoin d'optimisation du contrôle de la charge dans une cellule d'un réseau 3G, notamment pour faciliter la commutation d'un ou plusieurs équipements utilisateur entre les différents états de service précités.

3. OBJECTIFS DE L'INVENTION

[0019] L'invention a notamment pour objectif de pallier ces inconvénients de l'art antérieur. Plus précisément, un objectif de l'invention est de fournir une technique de gestion de surcharge qui soit simple et efficace à mettre en oeuvre, notamment en terme de rapidité de transition de l'état Cell_FACH à l'état Cell_DCH, c'est-à-dire permettant de minimiser les temps d'attente dans l'état Cell_FACH.

[0020] Un autre objectif de l'invention est de fournir une telle technique qui, dans un mode de réalisation particulier, facilite le passage d'un équipement utilisateur de l'état Cell_DCH à l'état Cell_FACH.

[0021] Un autre objectif de l'invention, dans au moins un mode de réalisation, est de proposer une telle technique qui permette de réduire le temps d'attente d'un équipement utilisateur pour le passage de l'état IDLE à l'état Cell_FACH ou Cell_DCH.

[0022] Un autre objectif de l'invention, dans au moins un mode de réalisation, est de proposer une telle technique qui permette de réduire le temps d'attente d'un équipement utilisateur pour le passage de l'état URA_PCH/CELL_PCH à l'état Cell_FACH.

[0023] Un autre objectif de l'invention, dans au moins un mode de réalisation, est de fournir une telle technique qui supprime, ou tout le moins limite, les risques de coupures de communication en cours (« call drops » en anglais).

[0024] L'invention a encore pour objectif de fournir une telle technique qui, dans un mode de réalisation particulier, soit notamment bien adaptée à tous les réseaux 3G existants.

[0025] L'invention a également pour objectif de fournir une telle technique qui, dans un mode de réalisation particulier, ne conduise pas à une modification lourde ou complexe des stations mobiles actuelles.

4. EXPOSÉ DE L'INVENTION

[0026] Ces objectifs, ainsi que d'autres qui apparaîtront par la suite, sont atteints à l'aide d'un procédé de gestion d'une surcharge dans une cellule d'un réseau de radiocommunication cellulaire comprenant une pluralité d'équipements utilisateur pouvant chacun commuter entre une pluralité d'états comprenant un état Cell_DCH et un état Cell_FACH. Selon l'invention, un tel procédé comprend les étapes suivantes, pour chaque requête d'allocation de ressources radio, appelée requête RAB, à un équipement utilisateur donné se trouvant, avant envoi de ladite requête, dans un état initial dans lequel aucune ressource radio n'est allouée audit équipement utilisateur :

- obtention pour ladite cellule d'un taux courant de transitions réussies pour le passage de l'état Cell_FACH à l'état Cell_DCH ;
- détection d'une surcharge de l'état Cell_FACH, par analyse dudit taux courant de transitions réussies ;
- si une surcharge est détectée, rejet de ladite requête ;
- si aucune surcharge n'est détectée, acceptation de ladite requête avec passage dudit équipement utilisateur dudit état initial à un état final dans lequel au moins une ressource radio est allouée audit équipe-

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ment utilisateur.

[0027] Ainsi, l'invention repose sur une approche tout à fait nouvelle et inventive pour la gestion de la charge dans une cellule d'un réseau de radiocommunication. En effet, l'invention s'appuie sur le calcul d'un taux courant de transitions réussies pour le passage de l'état Cell_FACH à l'état Cell-DCH, qui n'impose donc aucune restriction fixe sur le nombre d'équipements utilisateur dans l'état Cell_FACH.

[0028] En outre, l'invention propose d'automatiser tout ou partie de l'allocation des ressources radio d'une cellule, en utilisant les informations de surcharge de l'état Cell_FACH qui sont obtenues par le traitement du taux courant de transitions réussies.

[0029] Il est à noter qu'on prévoit avantageusement de ne pas refuser le passage d'un équipement utilisateur de l'état Cell_DCH à l'état Cell_FACH, de façon à éviter d'empêcher la libération des ressources radio dédiées.

[0030] De façon avantageuse, ledit état initial est un état IDLE, et ladite étape d'acceptation comprend les étapes suivantes :

- détection d'une quantité suffisante de ressources radio pouvant être allouées de façon dédiée audit équipement utilisateur ;
- si une quantité suffisante de ressources radio est détectée, passage dudit équipement utilisateur dudit état IDLE audit état Cell_DCH;
- sinon, passage dudit équipement utilisateur dudit état IDLE audit état Cell_FACH.

[0031] De façon préférentielle, ledit état initial est un état URA_PCH/CELL_PCH, et ledit état final est l'état Cell_FACH.

[0032] Avantageusement, ladite étape d'obtention pour ladite cellule d'un taux courant de transitions réussies pour le passage de l'état Cell_FACH à l'état Cell_DCH comprend les étapes suivantes :

- détermination d'un taux de succès immédiat RiT, égal au rapport entre un nombre de transitions réussies et un nombre de transitions essayées pendant une période courante T ;
- détermination dudit taux courant de transitions réussies, noté RT, en fonction dudit taux de succès immédiat RiT et d'un taux précédent de transitions réussies noté RT-1 et obtenu à l'issue d'une période précédente T-1.

[0033] Préférentiellement, $RT = \alpha.RiT + (1-\alpha).RT-1$; avec $\alpha \in [0 ; 1]$.

[0034] Il est à noter que cette formule mathématique est généralement appelée équation de filtrage à facteur d'oubli.

[0035] De façon avantageuse, ladite étape de détection d'une surcharge de l'état Cell_FACH comprend les étapes suivantes :

- comparaison dudit taux courant de transitions réussies à un seuil déterminé;
- si ledit taux courant est inférieur audit seuil déterminé, on estime qu'une surcharge est détectée ;
- sinon, on estime qu'aucune surcharge n'est détectée.

[0036] Ainsi, il est possible pour un opérateur de réseau d'ajuster la valeur du seuil de façon à optimiser le compromis entre la qualité de service (en terme de réactivité) et la charge du réseau.

[0037] Dans un mode de réalisation avantageux de l'invention, ledit procédé comprend en outre les étapes suivantes :

- première détection d'une capacité de préemption associée audit équipement utilisateur ;
- en cas de première détection positive, deuxième détection d'une quantité suffisante de ressources radio pouvant être allouées de façon dédiée audit équipement utilisateur ;
- si une quantité suffisante de ressources radio est détectée, passage dudit équipement utilisateur dudit état IDLE audit état Cell_DCH;
- sinon, réalisation de la préemption de ressources radio pour ledit équipement utilisateur.

[0038] De façon avantageuse, ledit procédé comprend en outre les étapes suivantes, dans le cas où la préemption de ressources radio est réalisée :

- troisième détection d'une quantité suffisante de ressources radio pouvant être allouées de façon dédiée audit équipement utilisateur ;
- si une quantité suffisante de ressources radio est détectée, passage dudit équipement utilisateur dudit état IDLE audit état Cell_DCH;
- sinon :
  - o obtention pour ladite cellule d'un taux courant de transitions réussies pour le passage de l'état Cell_FACH à l'état Cell-DCH ;
  - o détection d'une surcharge de l'état Cell_FACH, par analyse dudit taux courant de transitions réussies ;
  - o si une surcharge est détectée, rejet de ladite requête ;
  - o si aucune surcharge n'est détectée, acceptation de ladite requête avec passage dudit équipement utilisateur dudit état IDLE audit état Cell_FACH

[0039] L'invention concerne également une utilisation du procédé précité, dans le cas où chaque équipement utilisateur, quand il est dans l'état Cell_DCH, utilise un canal dédié DTCH.

[0040] L'invention concerne aussi une utilisation du procédé précité, dans le cas où chaque équipement uti-

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lisateur, quand il est dans l'état Cell_DCH, utilise un canal dédié HS-DSCH.

[0041] L'invention concerne en outre un dispositif de gestion d'une surcharge dans une cellule d'un réseau de radiocommunication cellulaire comprenant une pluralité d'équipements utilisateur pouvant chacun commuter entre une pluralité d'états comprenant un état Cell_DCH et un état Cell_FACH. Selon l'invention, un tel dispositif comprend :

- des moyens de réception d'une requête d'allocation de ressources radio, appelée requête RAB, à un équipement utilisateur donné se trouvant, avant envoi de ladite requête, dans un état initial dans lequel aucune ressource radio n'est allouée audit équipement utilisateur ;
- des moyens d'obtention pour ladite cellule d'un taux courant de transitions réussies pour le passage de l'état Cell_FACH à l'état Cell_DCH ;
- des moyens de détection d'une surcharge de l'état Cell-FACH, par analyse dudit taux courant de transitions réussies ;
- des moyens de traitement de ladite requête et des moyens de commutation dudit équipement utilisateur dudit état initial à un état final dans lequel au moins une ressource radio est allouée audit équipement utilisateur, si aucune surcharge n'est détectée.

[0042] Plus généralement, le dispositif selon l'invention comprend des moyens de mise en oeuvre du procédé de gestion d'une surcharge tel que décrit précédemment (dans l'un quelconque de ses modes de réalisation).

[0043] Préférentiellement, le dispositif précité est compris dans un contrôleur de réseau radio.

[0044] L'invention concerne encore un programme informatique comprenant des instructions de code de programme pour l'exécution des étapes du procédé précité, lorsque ledit programme est exécuté dans ou par un microprocesseur.

[0045] L'invention concerne aussi un moyen de stockage, éventuellement totalement ou partiellement amovible, lisible par un ordinateur, stockant un jeu d'instructions exécutables par ledit ordinateur pour mettre en oeuvre le procédé précité.

5. LISTE DES FIGURES

[0046] D'autres caractéristiques et avantages de l'invention apparaîtront plus clairement à la lecture de la description suivante d'un mode de réalisation préférentiel, donné à titre de simple exemple illustratif et non limitatif, et des dessins annexés, parmi lesquels :

- la figure 1, déjà commentée en relation avec l'art antérieur, présente les quatre états de service d'un équipement utilisateur de la norme 3GPP ;
- la figure 2 présente un schéma simplifié d'un système d'accès à des services paquet selon un mode de réalisation particulier de l'invention ;
- la figure 3 représente un organigramme d'un mode de réalisation particulier du procédé de gestion de l'invention, pour le cas d'un équipement utilisateur venant d'un état initial IDLE ; et
- la figure 4 représente un organigramme d'un mode de réalisation particulier du procédé de gestion de l'invention, pour le cas d'un équipement utilisateur venant d'un état initial URA_PCH/CELL_PCH.

6. DESCRIPTION DÉTAILLÉE

[0047] La figure 2 illustre de façon schématique un mode de réalisation particulier d'un système d'accès 20 à des services paquet selon l'invention, permettant de mettre en oeuvre le procédé de gestion d'une surcharge selon un mode de réalisation particulier de l'invention.

[0048] On suppose qu'un équipement utilisateur UE dans une cellule donnée (non représentée) souhaite accéder à un ou plusieurs services 3GPP à commutation de paquets (« 3GPP Packet Services » en anglais) offerts via un réseau coeur CN (« Core Network » en anglais) relié à un contrôleur de réseau radio RNC (« Radio Network Controller » en anglais).

[0049] De façon classique, l'équipement utilisateur UE est relié à une station de base, appelée Node B (dans le cadre des réseaux 3G) (ou BTS pour « Base Transceiver Station » en anglais, dans le cadre des réseaux GSM), via une interface Uu. La station de base Node B est reliée au contrôleur de réseau radio RNC, via une interface Iub. Le contrôleur de réseau radio RNC est relié au réseau coeur CN, via une interface Iu-Ps.

[0050] Dans toute la suite de ce document, on entend par « établissement d'un RAB » (pour « Radio Access Bearer » en anglais, ou « tunnel de communication » en français) un établissement complet comprenant :

- non seulement l'établissement d'un RAB en tant que tel (c'est-à-dire l'établissement d'un canal dédié DTCH (« Dedicated Transport Channel » en anglais) ou HS-DCH (« High Speed Downlink Shared Channel » en anglais) ;
- mais aussi l'établissement préalable d'une connexion RRC («Radio Resource Control » en anglais).

[0051] De la même façon, on entend par « requête RAB » (aussi appelée requête d'allocation de ressources radio) une requête, transmise depuis le réseau coeur CN vers le contrôleur de réseau radio RNC, en vue de l'établissement d'un RAB au sens précité (c'est-à-dire au sens d'un établissement complet).

[0052] Une telle requête RAB est traitée par le contrôleur de réseau radio RNC.

[0053] Selon un mode de réalisation particulier de l'invention, le traitement de cette requête RAB repose sur la détection d'une surcharge dans la cellule donnée, par

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l'analyse d'un taux courant de transitions réussies. Le traitement de la requête RAB est présenté en détail par la suite, en relation avec les figures 3 et 4, correspondant à deux états de départ (aussi appelés par la suite états initiaux) distincts de l'équipement utilisateur UE.

[0054] On décrit maintenant, en relation avec **la figure 3**, l'enchaînement successif des différentes étapes du procédé 30 selon l'invention, pour un premier mode de réalisation dans lequel un équipement utilisateur dans une cellule donnée se trouve, avant envoi de la requête RAB, dans un état IDLE.

[0055] Une phase d'identification, référencée I, comprend une première étape 31, au cours de laquelle le contrôleur de réseau radio RNC détermine la classe de service de la requête RAB, de sorte qu'en présence d'une classe de service PS Interactive/Background (« Service Paquet interactive/transfert long » en français) on passe à une étape 32, en revanche, s'il ne s'agit pas d'une classe de service PS Interactive/Background, on exécute la procédure classique d'établissement d'appel, c'est-à-dire sans faire intervenir le mécanisme selon l'invention de détection d'une surcharge dans une cellule, tel que décrit ci-dessous.

[0056] Lors de l'étape 32, le contrôleur de réseau radio RNC vérifie les droits associés à l'équipement utilisateur UE. Si une capacité de préemption associée à l'équipement utilisateur UE est détectée (321), on passe à une étape 33, sinon (322) on passe à une étape 34.

[0057] Lors de l'étape 34, on détermine un taux de succès immédiat, noté RiT, égal au rapport entre un nombre de transitions réussies et un nombre de transitions essayées pendant une période courante T.

[0058] Ensuite, lors de l'étape 35 on calcule un taux courant de transitions réussies, noté RT, en fonction du taux de succès immédiat RiT obtenu à l'étape 34 et d'un taux précédent de transitions réussies, noté RT-1, obtenu à l'issue d'une période précédente T-1.

[0059] Dans un mode de réalisation particulier de l'invention, le taux courant de transitions réussies RT est obtenu avec l'équation suivante:

$$RT = \alpha.RiT + (1-\alpha).RT\text{-}1$$

avec $\alpha \in [0; 1]$.

[0060] Lors de l'étape 36, on compare le taux courant de transitions réussies RT obtenu à l'étape 35 à un seuil déterminé, de sorte que si le taux courant RT est inférieur au seuil déterminé, alors on estime qu'une surcharge est détectée (361) ; dans le cas contraire, on estime qu'aucune surcharge n'est détectée (362) puis on passe à une étape 37.

[0061] On rappelle que lorsqu'une surcharge est détectée (361), la requête est rejetée (363), ce qui entraîne le maintien de l'équipement utilisateur UE dans l'état IDLE.

[0062] Enfin, lors de l'étape 37, le contrôleur de réseau radio RNC met en oeuvre un algorithme (par exemple du type RAC, CAC, CEAC,...) permettant de détecter si une quantité suffisante de ressources radio et de bande passante sur des interfaces peut être allouées de façon dédiée à l'équipement utilisateur UE. En cas de détection positive (372) (ressources radio et bande passante sur des interfaces dédiées suffisantes), l'équipement utilisateur UE bascule (flèche référencée 3 sur la figure 1) de l'état IDLE à l'état Cell_DCH (373) ; dans le cas contraire (371), l'équipement utilisateur UE bascule (flèche référencée 4 sur la figure 1) de l'état IDLE à l'état Cell_FACH (374).

[0063] On décrit ci-après l'enchaînement successif des différentes étapes du procédé 30 selon l'invention pour le cas où une capacité de préemption associée à l'équipement utilisateur UE est détectée à l'étape 32 précitée.

[0064] Lors de l'étape 33 (identique à l'étape 37), le contrôleur de réseau radio RNC met en oeuvre un algorithme (par exemple du type RAC, CAC, CEAC,...) permettant de détecter si une quantité suffisante de ressources radio peut être allouées de façon dédiée à l'équipement utilisateur UE. En cas de détection positive (331) (ressources radio dédiées suffisantes), l'équipement utilisateur UE (en référence à la figure 1) bascule 3 de l'état IDLE à l'état Cell_DCH (334) ; dans le cas contraire (332), on réalise la préemption de ressources radio (333) pour l'équipement utilisateur UE puis on passe à une étape 38.

[0065] Lors de l'étape 38 (identique à l'étape 37), le contrôleur de réseau radio RNC met en oeuvre un algorithme (par exemple du type RAC, CAC, CEAC,...) permettant de détecter si une quantité suffisante de ressources radio peut être allouées de façon dédiée à l'équipement utilisateur UE. En cas de détection positive (381) (ressources radio dédiées suffisantes), l'équipement utilisateur UE (en référence à la figure 1) bascule (3) de l'état IDLE à l'état Cell_DCH (334) ; dans le cas contraire (382), on réalise successivement les étapes 34 et 35 précitées, puis on passe à une étape 39.

[0066] Enfin, lors de l'étape 39, on compare le taux courant de transitions réussies RT obtenu à l'étape 35 à un seuil déterminé, de sorte que si le taux courant RT est inférieur au seuil déterminé, alors on estime qu'une surcharge est détectée (391) ; dans le cas contraire (392), l'équipement utilisateur UE (en référence à la figure 1) bascule (4) de l'état IDLE à l'état Cell_FACH (393).

[0067] On rappelle que lorsqu'une surcharge est détectée (391), la requête est rejetée (394), ce qui entraîne le maintien de l'équipement utilisateur UE dans l'état IDLE.

[0068] On décrit maintenant, en relation avec **la figure 4**, l'enchaînement successif des différentes étapes du procédé 40 selon l'invention, pour un deuxième mode de réalisation dans lequel un équipement utilisateur dans une cellule donnée se trouve, avant envoi de la requête RAB, dans un état URA_PCH/CELL_PCH.

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[0069] Une phase d'identification, référencée II, comprend une première étape 41, au cours de laquelle le contrôleur de réseau radio RNC détermine la classe de service de la requête RAB, de sorte qu'en présence des classes de services « interactive » ou « transfert long » (dit « background » en anglais) on passe à une étape 42, en revanche, en présence d'un autre type de classe de service (par exemple « streaming ») on rejette la requête, c'est-à-dire qu'on maintien l'équipement utilisateur dans l'état URA_PCH/CELL_PCH.

[0070] Lors de l'étape 42 (identique à l'étape 34), on détermine un taux de succès immédiat, noté RIT, égal au rapport entre un nombre de transitions réussies et un nombre de transitions essayées pendant une période courante T.

[0071] Ensuite, lors de l'étape 43 (identique à l'étape 35) on calcule un taux courant de transitions réussies, noté RT, en fonction du taux de succès immédiat RIT obtenu à l'étape 42 et d'un taux précédent de transitions réussies, noté RT-1, obtenu à l'issue d'une période précédente T-1.

[0072] Enfin, lors de l'étape 44, on compare le taux courant de transitions réussies RT obtenu à l'étape 43 à un seuil déterminé, de sorte que si le taux courant RT est inférieur au seuil déterminé, alors on estime qu'une surcharge est détectée (441) ; dans le cas contraire (442), l'équipement utilisateur UE bascule (flèche référencée 5 sur la figure 1) de l'état URA_PCH/CELL_PCH à l'état Cell_FACH (443).

[0073] On rappelle que lorsqu'une surcharge est détectée (441), la requête est rejetée (444), ce qui entraîne le maintien de l'équipement utilisateur UE dans l'état URA_PCH/CELL_PCH.

[0074] La technique de l'invention présente de nombreux avantages, dont une liste non exhaustive est donnée ci-dessous :

- amélioration du passage de l'état Cell_FACH à l'état Cell_DCH. En effet, l'invention permet à un équipement utilisateur de ne pas être bloqué dans l'état Cell_FACH et de sortir rapidement de cet état, sans devoir repasser par l'état IDLE.
- amélioration de l'ergonomie pour la gestion de la charge d'un réseau. En effet, l'invention est basée sur la détection d'une surcharge de l'état Cell_FACH. Cette information de surcharge s'adapte automatiquement aux évolutions du réseau (variation du nombre d'équipements utilisateur sur le réseau, évolution des modèles de trafic,...).

[0075] L'invention s'applique notamment, mais non exclusivement, au cas où :

- chaque équipement utilisateur, quand il est dans l'état Cell_DCH, utilise un canal dédié DTCH ;
- chaque équipement utilisateur, quand il est dans l'état Cell_DCH, utilise un canal dédié HS-DSCH.

Revendications

1. Procédé (30) de gestion d'une surcharge dans une cellule d'un réseau de radiocommunication cellulaire comprenant une pluralité d'équipements utilisateur (UE) pouvant chacun commuter entre une pluralité d'états comprenant un état Cell_DCH et un état Cell-FACH,
caractérisé en ce que ledit procédé (30) comprend les étapes suivantes, pour chaque requête d'allocation de ressources radio, appelée requête RAB, à un équipement utilisateur (UE) donné se trouvant, avant envoi de ladite requête, dans un état initial dans lequel aucune ressource radio n'est allouée audit équipement utilisateur (UE) :

   - obtention (34, 35) pour ladite cellule d'un taux courant de transitions réussies pour le passage de l'état Cell_FACH à l'état Cell_DCH;
   - détection (36) d'une surcharge de l'état Cell_FACH, par analyse dudit taux courant de transitions réussies ;
   - si une surcharge est détectée, rejet de ladite requête ;
   - si aucune surcharge n'est détectée, acceptation (37) de ladite requête avec passage dudit équipement utilisateur (UE) dudit état initial à un état final dans lequel au moins une ressource radio est allouée audit équipement utilisateur (UE).

2. Procédé (30) selon la revendication 1, **caractérisé en ce que** ledit état initial est un état IDLE, et **en ce que** ladite étape d'acceptation (37) comprend les étapes suivantes :

   - détection d'une quantité suffisante de ressources radio pouvant être allouées de façon dédiée audit équipement utilisateur (UE);
   - si une quantité suffisante de ressources radio est détectée (372), passage dudit équipement utilisateur (UE) dudit état IDLE audit état Cell_DCH (373) ;
   - sinon (371), passage dudit équipement utilisateur (UE) dudit état IDLE audit état Cell_FACH (374).

3. Procédé (30) selon la revendication 1, **caractérisé en ce que** ledit état initial est un état URA_PCH/CELL_PCH, et **en ce que** ledit état final est l'état Cell_FACH.

4. Procédé (30) selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** ladite étape d'obtention pour ladite cellule d'un taux courant de transitions réussies pour le passage de l'état Cell_FACH à l'état Cell_DCH comprend les étapes suivantes :

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- détermination (34) d'un taux de succès immédiat RiT, égal au rapport entre un nombre de transitions réussies et un nombre de transitions essayées pendant une période courante T ;
- détermination (35) dudit taux courant de transitions réussies, noté RT, en fonction dudit taux de succès immédiat RiT et d'un taux précédent de transitions réussies noté RT-1 et obtenu à l'issue d'une période précédente T-1.

5. Procédé (30) selon la revendication 4, **caractérisé en ce que** :

$$RT = \alpha.RiT + (1-\alpha).RT\text{-}1$$

avec $\alpha \in [0 ; 1]$.

6. Procédé (30) selon l'une quelconque des revendications 1 à 5, **caractérisé en ce que** ladite étape de détection (36) d'une surcharge de l'état Cell_FACH comprend les étapes suivantes :

- comparaison dudit taux courant de transitions réussies à un seuil déterminé ;
- si ledit taux courant est inférieur audit seuil déterminé, on estime qu'une surcharge est détectée (361) ;
- sinon, on estime qu'aucune surcharge n'est détectée (362).

7. Procédé (30) selon la revendication 2, **caractérisé en ce que** ledit procédé comprend en outre les étapes suivantes :

- première détection (32) d'une capacité de préemption associée audit équipement utilisateur (UE) ;
- en cas de première détection positive (321), deuxième détection (33) d'une quantité suffisante de ressources radio pouvant être allouées de façon dédiée audit équipement utilisateur (UE) ;
- si une quantité suffisante de ressources radio est détectée (331), passage dudit équipement utilisateur (UE) dudit état IDLE audit état Cell_DCH (334) ;
- sinon (332), réalisation de la préemption de ressources radio (333) pour ledit équipement utilisateur (UE).

8. Procédé (30) selon la revendication 7, **caractérisé en ce que** ledit procédé comprend en outre les étapes suivantes, dans le cas où la préemption de ressources radio (333) est réalisée :

- troisième détection (38) d'une quantité suffisante de ressources radio pouvant être allouées de façon dédiée audit équipement utilisateur (UE) ;
- si une quantité suffisante de ressources radio est détectée (381), passage dudit équipement utilisateur (UE) dudit état IDLE audit état Cell_DCH (334) ;
- sinon (382) :

  o obtention (34, 35) pour ladite cellule d'un taux courant de transitions réussies pour le passage de l'état Cell_FACH à l'état Cell_DCH ;
  o détection (39) d'une surcharge de l'état Cell_FACH, par analyse dudit taux courant de transitions réussies ;
  o si une surcharge est détectée (391), rejet de ladite requête (394) ;
  o si aucune surcharge n'est détectée (392), acceptation de ladite requête avec passage dudit équipement utilisateur (UE) dudit état IDLE audit état Cell_FACH (393).

9. Utilisation d'un procédé de gestion d'une surcharge selon l'une quelconque des revendications 1 à 8, dans le cas où chaque équipement utilisateur (UE), quand il est dans l'état Cell_DCH, utilise un canal dédié DTCH.

10. Utilisation d'un procédé de gestion d'une surcharge selon l'une quelconque des revendications 1 à 8, dans le cas où chaque équipement utilisateur (UE), quand il est dans l'état Cell_DCH, utilise un canal dédié HS-DSCH.

11. Dispositif de gestion d'une surcharge dans une cellule d'un réseau de radiocommunication cellulaire comprenant une pluralité d'équipements utilisateur (UE) pouvant chacun commuter entre une pluralité d'états comprenant un état Cell_DCH et un état Cell FACH, **caractérisé en ce qu'**il comprend :

- des moyens de réception d'une requête d'allocation de ressources radio, appelée requête RAB, à un équipement utilisateur (UE) donné se trouvant, avant envoi de ladite requête, dans un état initial dans lequel aucune ressource radio n'est allouée audit équipement utilisateur (UE) ;
- des moyens d'obtention pour ladite cellule d'un taux courant de transitions réussies pour le passage de l'état Cell_FACH à l'état Cell_DCH ;
- des moyens de détection d'une surcharge de l'état Cell_FACH, par analyse dudit taux courant de transitions réussies ;
- des moyens de traitement de ladite requête et des moyens de commutation dudit équipement utilisateur (UE) dudit état initial à un état final dans lequel au moins une ressource radio est

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allouée audit équipement utilisateur (UE), si aucune surcharge n'est détectée.

12. Dispositif selon la revendication 11, **caractérisé en ce qu'**il est compris dans un contrôleur de réseau radio (RNC).

13. Programme informatique **caractérisé en ce qu'**il comprend des instructions de code de programme pour l'exécution des étapes du procédé d'au moins une des revendications 1 à 8, lorsque ledit programme est exécuté dans ou par un microprocesseur.

14. Moyen de stockage, éventuellement totalement ou partiellement amovible, lisible par un ordinateur, stockant un jeu d'instructions exécutables par ledit ordinateur pour mettre en oeuvre le procédé d'au moins une des revendications 1 à 8.

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FIG_1

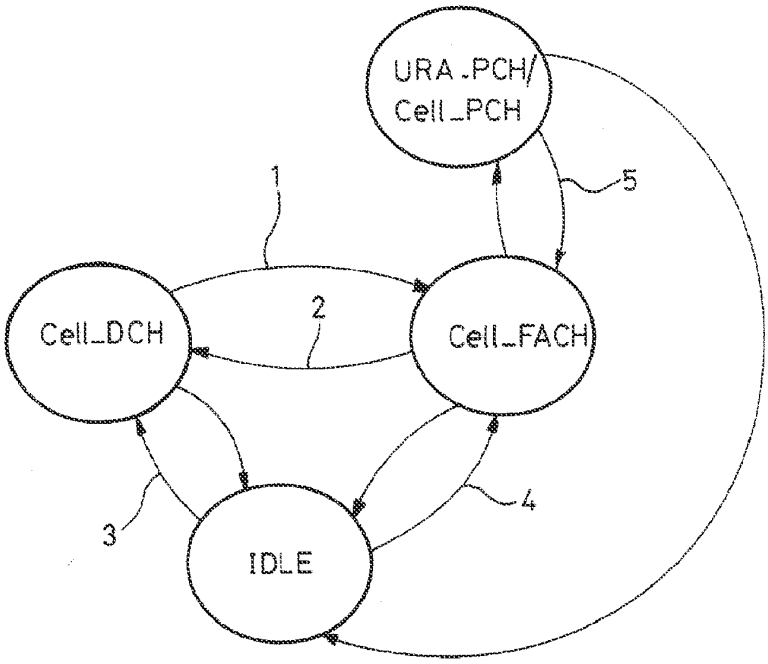

URA_PCH/
Cell_PCH
1
5
Cell_DCH
2
Cell_FACH
3
4
IDLE

FIG_2

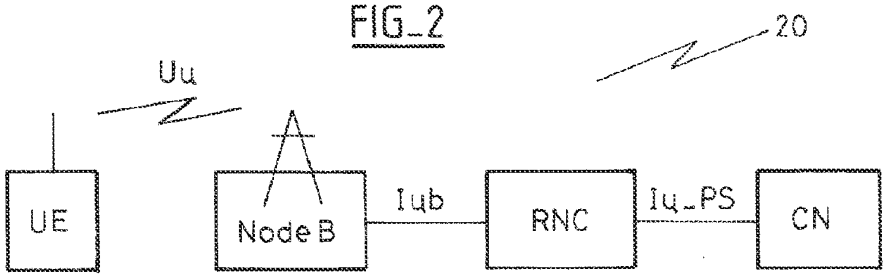
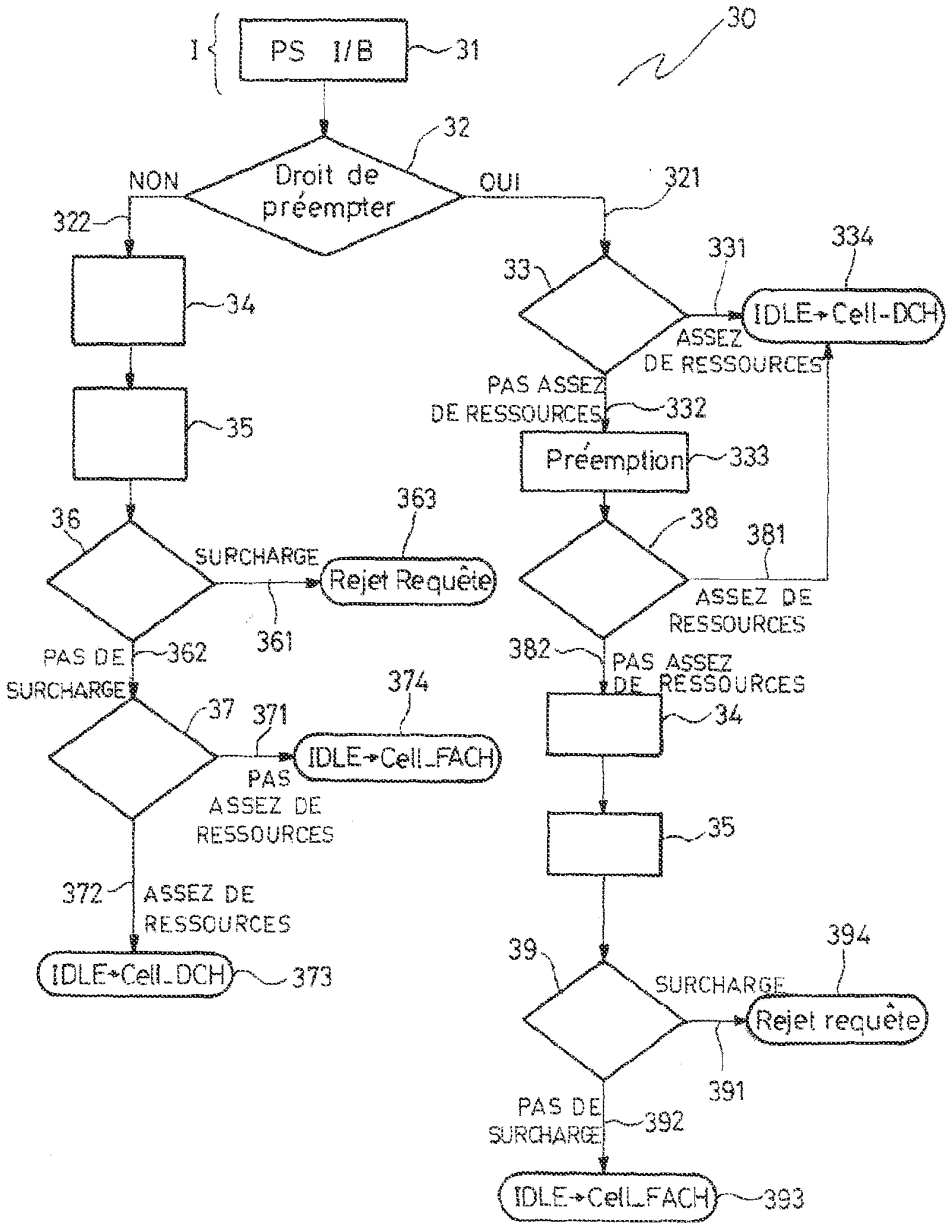
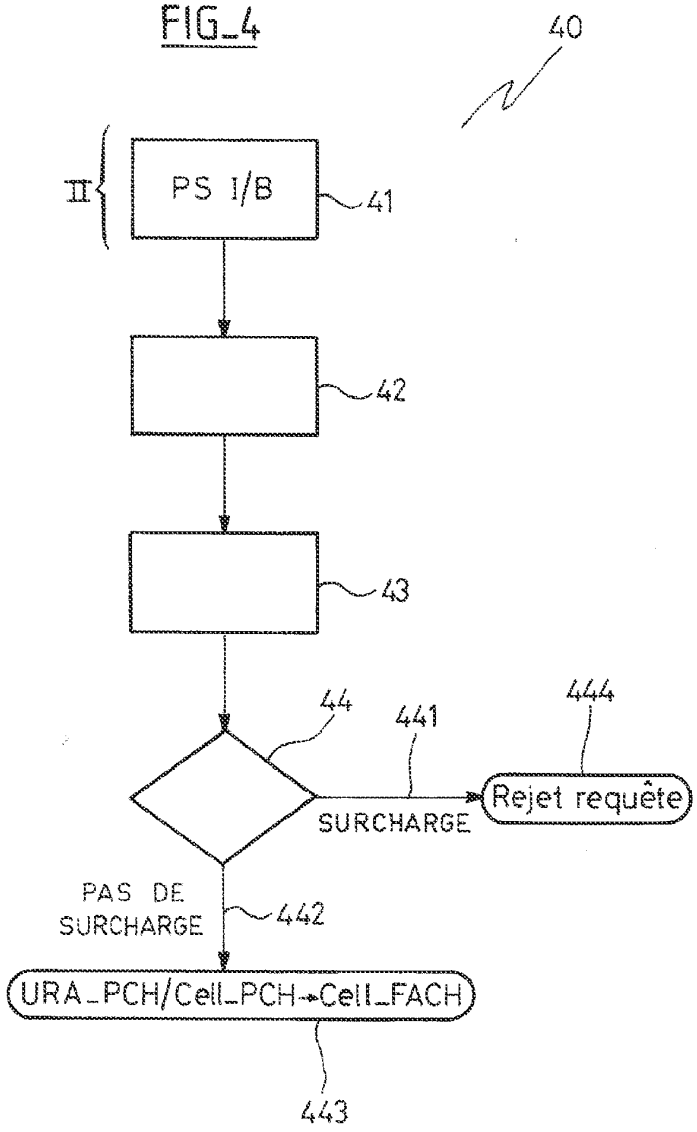

20
Uu
UE
Node B
Iub
RNC
Iu_PS
CN

FIG_3



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FIG_4


40
II
PS I/B
41
42
43
44
441
444
Rejet requête
SURCHARGE
PAS DE SURCHARGE
442
URA_PCH/Cell_PCH→Cell_FACH
443

Office européen des brevets

RAPPORT DE RECHERCHE EUROPEENNE

Numéro de la demande
EP 06 12 4955

DOCUMENTS CONSIDERES COMME PERTINENTS

Catégorie	Citation du document avec indication, en cas de besoin, des parties pertinentes	Revendication concernée	CLASSEMENT DE LA DEMANDE (IPC)
A	US 2004/132441 A1 (LIVET CATHERINE ET AL) 8 juillet 2004 (2004-07-08) * alinéa [0014] - alinéa [0018] *	1-14	INV. H04Q7/38 H04L12/56
A	VIRTEJ L ET AL: "Radio resource control for GSM/EDGE radio access network (GERAN) - inter radio access technology and inter-mode procedures" VTC FALL 2001. IEEE 54TH. VEHICULAR TECHNOLOGY CONFERENCE. PROCEEDINGS. ATLANTIC CITY, NJ, OCT. 7 - 11, 2001, IEEE VEHICULAR TECHNOLGY CONFERENCE, NEW YORK, NY : IEEE, US, vol. VOL. 1 OF 4. CONF. 54, 7 octobre 2001 (2001-10-07), pages 1417-1421, XP010562195 ISBN: 0-7803-7005-8 * le document en entier *	1-14	

DOMAINES TECHNIQUES RECHERCHES (IPC)

H04Q
H04L

Le présent rapport a été établi pour toutes les revendications

Lieu de la recherche	Date d'achèvement de la recherche	Examinateur
La Haye	11 avril 2007	Chassatte, Remy

CATEGORIE DES DOCUMENTS CITES

X : particulièrement pertinent à lui seul
Y : particulièrement pertinent en combinaison avec un autre document de la même catégorie
A : arrière-plan technologique
O : divulgation non-écrite
P : document intercalaire

T : théorie ou principe à la base de l'invention
E : document de brevet antérieur, mais publié à la date de dépôt ou après cette date
D : cité dans la demande
L : cité pour d'autres raisons

& : membre de la même famille, document correspondant

EPO FORM 1503 03.82 (P04C02)

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ANNEXE AU RAPPORT DE RECHERCHE EUROPEENNE RELATIF A LA DEMANDE DE BREVET EUROPEEN NO. EP 06 12 4955

La présente annexe indique les membres de la famille de brevets relatifs aux documents brevets cités dans le rapport de recherche européenne visé ci-dessus.
Lesdits members sont contenus au fichier informatique de l'Office européen ces brevets à la date du
Les renseignements fournis sont donnés à titre indicatif et n'engagent pas la responsabilité de l'Office européen des brevets.

11-04-2007

Document brevet cité au rapport de recherche	Date de publication	Membre(s) de la famille de brevet(s)	Date de publication
US 2004132441 A1	08-07-2004	US 2006166664 A1	27-07-2006

EPO FORM P0460

Pour tout renseignement concernant cette annexe : voir Journal Officiel de l'Office européen des brevets, No.12/82

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Electronic Patent Application Fee Transmittal	
Application Number:	12238910
Filing Date:	26-Sep-2008
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Filer:	LoriAnne D. Swanson/Marissa Antonelli
Attorney Docket Number:	IHSP_2-1853.01.US
Filed as Large Entity	

Utility under 35 USC 111(a) Filing Fees

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

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt	
EFS ID:	11339903
Application Number:	12238910
International Application Number:	
Confirmation Number:	2438
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Customer Number:	15800
Filer:	LoriAnne D. Swanson/Marissa Antonelli
Filer Authorized By:	LoriAnne D. Swanson
Attorney Docket Number:	IHSP_2-1853.01.US
Receipt Date:	04-NOV-2011
Filing Date:	26-SEP-2008
Time Stamp:	15:12:26
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$180
RAM confirmation Number	12060
Deposit Account	090435
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IHSP_2_185301US_SIDS_Trans_IDCC.pdf	101480 43cff2a5e07cd919e47ec2590f529d3f5b91f08d	no	3
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
2	Transmittal Letter	IHSP_2_185301US_SIDS_1449.pdf	121447 26d8813eb71df48573ac273b58e7ccd298124d6a	no	1
Warnings:					
Information:					
3	Non Patent Literature	WO_2009045909_WrittenOpinion_10_06_2009.pdf	457284 823a8b0b858f2ecc532ec1174a2512962c47dd60	no	10
Warnings:					
Information:					
4	Non Patent Literature	WO_2009045909_ISR_10_06_2009.pdf	311961 60bb31cec0a6a1a284aa840a5ccc71e76f54666b	no	7
Warnings:					
Information:					
5	Non Patent Literature	WO_2009045909_IPRP_03_15_2010.pdf	433590 fe96b60058180b3a88aa2a3072b357a87f4067b4	no	9
Warnings:					
Information:					
6	Foreign Reference	2EP_1796416.pdf	16418163 fa43f775fbbd3d2c1eba92304a2d9654e4a3abdb	no	15
Warnings:					
Information:					
7	Fee Worksheet (SB06)	fee-info.pdf	30512 b57caad63d54108c636857e6362bcdeb54bc812f	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	17874437		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/238,910	09/26/2008	Benoit Pelletier	IHSP_2-1853.01.US	2438

15800 7590 12/06/2011

Condo Roccia LLP
One Liberty Place
Suite 2200
Philadelphia, PA 19103

EXAMINER	
YUEN, KAN	
ART UNIT	**PAPER NUMBER**
2464	

MAIL DATE	DELIVERY MODE
12/06/2011	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.

Office Action Summary	Application No.	Applicant(s)	
	12/238,910	PELLETIER ET AL.	
	Examiner	Art Unit	
	KAN YUEN	2464	

-- 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 *04 October 2011*.

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) *1-7 and 30-32* 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) *1-7 and 30-32* 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: _____.

Response to Arguments

1. Applicant's arguments with respect to claims 1-7 and 30-32 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

2. Claims 30-32 are objected to because of the following informalities:

In claims 30 and 32, the applicant is suggested to change the claim decency to claim 6. Appropriate correction is required.

Claim Rejections - 35 USC § 102

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

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

4. Claims 1, 4, 6 and 32 are rejected under 35 U.S.C. 102(e) as being anticipated by Wager et al. (Pub No.: 2009/025709).

Regarding claim 6, Wager et al. disclosed a wireless transmit/receive unit (WTRU) (fig. 5A; UE 10) for terminating an enhanced dedicated channel (E-DCH) in a cell forward access channel (CELL FACH) state, the WTRU comprising:

a receiver (fig. 5A; transceiver 22);

a transmitter (fig. 5A; transceiver 22); and

a processor (fig. 5A; UE 10) **in communication with the receiver and the transmitter, the processor configured to:**

determining that a buffer (fig. 5a; buffer 14) **is empty** (Wager et al. see fig. 6; a decision is made in step S16 whether there is any more data in the RLC buffer 14);

on a condition that the buffer is empty, triggering a transmission by the WTRU of scheduling information (SI) in the E-DCH transmission with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero (Wager et al. see fig. 6; paragraph 0046; if there is no more data in the buffer 14, the controller 18 creates a MAC-PDU that includes an indicator indicating that the mobile's buffer is empty). The indicator is the scheduling information (SI) which indicates the buffer status equals zero;

determining a condition of a last hybrid automatic repeat request (HARQ) data transmission (Wager et al. see paragraph 0046; a decision is made in the UE in step S26 whether all of the HARQ processes for this UE uplink transmission have been completed); and

on a condition that the buffer is empty and the last HARQ data transmission has finished, releasing a E-DCH resource allocation (Wager et al. see paragraph 0046; if they are, the UE releases the common E-DCH resource as step S28). Thus, the E-DCH resource is released based on the WTRU buffer status 14 and the HARQ processes as shown in fig. 6.

Claim 1 is rejected similar to claim 6.

Regarding claims 4 and 32, Wager et al. disclosed the feature wherein an E-DCH transmission occurs on a condition that a response is received on an E-DCH acquisition indication channel (E- AICH) to a preamble transmitted by the WTRU (Wager et al. see paragraph 0025; the AICH echoes/response back an identical signature sequence as received on the RACH. In the AICH acknowledgement, the base station echoed back the same second preamble signature sequence and informed the UE which common E-DCH resource it has assigned to the UE).

5. Claims 2 and 30 rejected under 35 U.S.C. 103(a) as being unpatentable over Wager et al. (Pub No.: 2009/025709) in view of Lin (Pub No.: 2010/0091652).

Regarding claims 2 and 30, Wager et al. failed to disclose the feature wherein an inactivity timer is started when the buffer is empty.

Lin from the same or similar fields of endeavor disclosed the feature wherein an inactivity timer is started when the buffer is empty (Lin see paragraph 0038; when a queue becomes empty, the timer corresponding to the queue starts counting).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the disclosure of Wager et al. and to implement the feature as disclosed by Lin to provide the feature wherein an inactivity timer is started when the buffer is empty.

The motivation would be to increase the transmission efficiency by providing indication on how long the queue is empty.

6. Claims 3 and 31 rejected under 35 U.S.C. 103(a) as being unpatentable over Wager et al. (Pub No.: 2009/025709) in view of Lin (Pub No.: 2010/0091652) as applied to claim 2 above, and further in view of Lee et al. (Pub No.: 2009/0168704).

Regarding claims 3 and 31, Wager et al. in view of Lin failed to disclose the feature wherein the transmission of the SI is triggered when the inactivity timer expires.

Lee et al. from the same or similar fields of endeavor disclosed the feature wherein the transmission of the SI is triggered when the inactivity timer expires (Lee et al. see paragraphs 0077 and 0078; the SI is sent each time the timer expires).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the disclosure of Wager et al. in view of Lin and to implement the feature as disclosed by Lee et al. to provide the feature wherein the transmission of the SI is triggered when the inactivity timer expires.

The motivation would be to improve transmission reliability by sending scheduling information from a UE to control an uplink radio resource.

7. Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wager et al. (Pub No.: 2009/025709) in view of Fisher (Pub No.: 2005/0026623).

Regarding claims 5 and 7, Wager et al. failed to disclose the feature for terminating the E-DCH transmission in case of cell reselection or radio link failure.

Fisher from the same or similar fields of endeavor disclosed the feature for terminating the E-DCH transmission in case of cell reselection or radio link failure (Fisher see paragraph 0027; a determination is whether all of the dedicated channels

are NRT. If all the DCHs are not NRT, then this indicates a failure, and the procedure is terminated).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the disclosure of Wager et al. and to implement the feature as disclosed by Fisher et al. to provide the feature for terminating E-DCH when failure is detected.

The motivation would be to reduce transmission error.

Examiner's Note:

8. Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

In the case of amending the claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on for proper interpretation and also to verify and ascertain the metes and bounds of the claimed invention.

The Applicant is welcome to request a telephonic interview if the Applicant has any questions or requires any additional information that would further or expedite the prosecution of the application.

Conclusion

9. 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 KAN YUEN whose telephone number is (571)270-1413. The examiner can normally be reached on Monday-Friday 11:00a.m-6:00p.m EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky O. Ngo can be reached on 571-272-3139. 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.

/Kan Yuen/
Examiner, Art Unit 2464

/Ricky Ngo/
Supervisory Patent Examiner, Art Unit 2464

KY

Notice of References Cited	Application/Control No. 12/238,910	Applicant(s)/Patent Under Reexamination PELLETIER ET AL.	
	Examiner KAN YUEN	Art Unit 2464	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2005/0026623 A1	02-2005	Fisher, Xiaochun Xu	455/452.2
*	B	US-2009/0225709 A1	09-2009	Wager et al.	370/329
	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.	Applicant(s)/Patent Under Reexamination
	12238910	PELLETIER ET AL.
	Examiner	**Art Unit**
	KAN YUEN	2464

SEARCHED			
Class	**Subclass**	**Date**	**Examiner**
370	328,329,338,341,348	12/1/2011	KY
455	450,464	12/1/2011	KY
709	226,229	12/1/2011	KY

SEARCH NOTES		
Search Notes	**Date**	**Examiner**
EAST SEARCH CONSULTED WITH SPE	12/1/2011	KY
MANUAL SEARCH CLASS 370 SUBCLASS 329	12/1/2011	KY
INVENTORSHIP SEARCH	12/1/2011	KY

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

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	3	(US-20100188969-$ or US-20090086671-$ or US-20090225709-$). did.	US-PGPUB	AND	ON	2011/12/01 14:05
L3	3	2 (tim$4 same buffer)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/12/01 14:10
L4	132	(buffer$4 near9 (empty or zero or "0")) with (trigger$4 or start$4) near9 (timer$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/12/01 14:15
L5	73	(SI or (schedul$4 adj3 information)) with (timer near8 (expir$6))	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/12/01 14:17
L6	4	4 5	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/12/01 14:17
L7	2	2 aich	US-PGPUB	AND	ON	2011/12/01 14:27
L8	2	2 (e-dch or dch) same (terminat$4)	US-PGPUB	AND	ON	2011/12/01 14:33
L9	16	(e-dch or dch) same (terminat$4 or stop $4 or suspend$4 or disconnect$4) with (reselection or re $1select$4 or fail$4 or fault$4)	US-PGPUB	AND	ON	2011/12/01 14:35
L10	2	2 (e-dch or dch or (dedicat$4 near3 channel)) same (terminat$4)	US-PGPUB	AND	ON	2011/12/01 14:38

L11	555	(e-dch or dch or (dedicat$4 near3 channel)) same (terminat$4)	US-PGPUB	AND	ON	2011/12/01 14:38
L12	49	(e-dch or dch or (dedicat$4 near3 channel)) same (terminat$4 or stop $4 or suspend$4 or disconnect$4 or clos $4 or halt$4) with (reselection or re $1select$4 or fail$4 or fault$4)	US-PGPUB	AND	ON	2011/12/01 14:39
S1	1	12/238910	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/27 16:56
S2	1	12/238910 si	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/27 17:01
S3	1	12/238910 (schedul $4 near3 information)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/27 17:01
S6	4239	(dedicated near4 channel near4 buffer near4 status) or tebs	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/27 17:10
S9	129	((enhanced adj2 dedicated adj channel) or e-dch or e$1dch) same (buffer$4 or memor $4 or database or stor$3 or queu$4) with (empty or zero or "0" or drain$4 or vacant$4 or clear$4 or delep$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/27 17:15

S10	7559	harq or (Hybrid adj2 automatic adj2 repeat adj2 request) with (empty or zero or "0" or drain$4 or vacant$4 or clear$4 or delep$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/27 17:16
S11	35	S9 S10	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/27 17:16
S12	16	S6 S11	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/27 17:16
S13	350	((enhanced adj2 dedicated adj channel) or e-dch or e$1dch) with (releas $4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/27 17:24
S14	11	S12 S13	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/27 17:24
S15	1	11/842878	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/27 17:27
S17	16	S9 S10 S13	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/27 17:28
S22	9	((enhanced adj2 dedicated adj channel) or e-dch or e$1dch) with (releas $4) same (empty or zero or "0" or drain $4 or vacant$4 or clear$4 or delep$4) with (buffer$4 or queu$4 or database or stor$3 or memory)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/27 17:53

S23	17	S9 S13	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/27 17:59
S24	342756	"370"/.clas. or "455"/.clas.	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/27 17:59
S25	15	S23 S24	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/27 17:59
S32	9	(releas$4) near9 ((enhanced adj2 dedicated adj channel) or e-dch or e$1dch) same (buffer$4 or memor $4 or database or stor$3 or queu$4) with (empty or zero or "0" or drain$4 or vacant$4 or clear$4 or delep$4)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/28 13:48
S33	7	(SI) S32	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/28 14:11
S34	8840	harq or (Hybrid adj2 automatic adj2 repeat adj2 request)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/28 14:11
S35	7	S33 S34	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/28 14:12

S36	8	(releas$4) near9 ((enhanced adj2 dedicated adj channel) or e-dch or e$1dch) same (buffer$4 or memor $4 or database or stor$3 or queu$4) with (empt$4 or zero or "0" or drain $4 or vacant$4 or clear$4 or delep$4) SAME (HARQ)	US-PGPUB; USPAT; USOCR; JPO; DERWENT; IBM_TDB	AND	ON	2011/10/28 14:16

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S26	307	(e-dch).clm.	US-PGPUB; USPAT; UPAD	AND	ON	2011/10/27 17:31
S27	157	tebs.clm.	US-PGPUB; USPAT; UPAD	AND	ON	2011/10/27 17:31
S28	483748	releas$4.clm.	US-PGPUB; USPAT; UPAD	AND	ON	2011/10/27 17:31
S29	3	S26 S27 S28	US-PGPUB; USPAT; UPAD	AND	ON	2011/10/27 17:31
S30	1528	(buffer$4 near4 empty).clm.	US-PGPUB; USPAT; UPAD	AND	ON	2011/10/27 17:32
S31	1	S29 S30	US-PGPUB; USPAT; UPAD	AND	ON	2011/10/27 17:33

12/1/2011 3:42:11 PM
C:\Documents and Settings\kyuen\My Documents\EAST\Workspaces\12238910.wsp

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12238910	PELLETIER ET AL.
	Examiner	**Art Unit**
	KAN YUEN	2464

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	12/01/2011								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	-								
	9	-								
	10	-								
	11	-								
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	27	-								
	28	-								
	29	-								
	30	✓								
	31	✓								
	32	✓								

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **Benoit Pelletier, et al.**	**Confirmation No.: 2438**
Application No.: 12/238,910	**Group Art Unit: 2464**
Filing Date: September 26, 2008	**Examiner: Kan Yuen**

For: Method And Apparatus For Terminating Transmission Of A Message In An Enhanced Random Access Channel

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

Sir:

REPLY PURSUANT TO 37 CFR § 1.116

In response to the Final Action dated **December 6, 2011**, reconsideration is respectfully requested in view of the amendments and/or remarks as indicated below:

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

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

☐ **Amendments to the Drawings** begin on page of this paper and include an attached replacement sheet.

☒ **Remarks** begin on page 8 of this paper.

☒ The Commissioner is hereby authorized to charge any fee deficiency, charge any additional fees, or credit any overpayment of fees, associated with this application in connection with this filing, or any future filing, submitted to the U.S. Patent and Trademark Office during the pendency of this application, to Deposit Account No. 09-0435.

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

Listing of Claims:

1. (Currently Amended) A method for ~~terminating~~ completing an enhanced dedicated channel (E-DCH) transmission in a cell forward access channel (CELL_FACH) state by a wireless transmit/receive unit (WTRU), the method comprising:

the WTRU determining that a buffer is empty ~~by the WTRU~~;

on a condition that the buffer is empty, triggering a transmission by the WTRU of scheduling information (SI) in the E-DCH transmission with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero;

~~determining a condition of a last hybrid automatic repeat request (HARQ) data transmission;~~ and

on a condition that the buffer is empty ~~and the last HARQ data transmission has finished~~, the WTRU releasing a E-DCH resource allocation ~~by the WTRU~~.

2. (Original) The method as in claim 1, wherein an inactivity timer is started when the buffer is empty.

3. (Original) The method as in claim 2, wherein the transmission of the SI is triggered when the inactivity timer expires.

4. (Currently Amended) The method as in claim 1, wherein an E-DCH transmission occurs on a condition that a response is received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU.

5. (Currently Amended) The method as in claim 1, further comprising terminating the E-DCH transmission in case of cell reselection or radio link failure.

6. (Currently Amended) A wireless transmit/receive unit (WTRU) ~~method~~ for terminating an enhanced dedicated ~~random access~~ channel (E-DCH) in a cell forward access channel (CELL_FACH) state ~~an E-RACH transmission~~, the WTRU comprising:

a receiver;

a transmitter; and

a processor in communication with the receiver and the transmitter, the processor configured to:

determine that a buffer is empty;

on a condition that the buffer is empty, trigger a transmission of scheduling information (SI) in a E-DCH transmission with a total E-DCH buffer status (TEBS) equal to zero; and

on a condition that the buffer is empty, release a E-DCH resource allocation.

7. (Currently Amended) The WTRU as in claim 6, the processor further ~~comprising~~ configured to terminate~~ing~~ the E-DCH transmission on a condition cell reselection or radio link failure.

8. (Withdrawn) A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

releasing the E-RACH message during transition from cell forward access channel (CELL_FACH) state to cell dedicated channel (CELL_DCH) state.

9. (Withdrawn) The method as in claim 8, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

10. (Withdrawn) A wireless transmit receive unit (WTRU), comprising:

a receiver configured to receive enhanced dedicated channel (E-DCH) resources on an acquisition indication channel (AICH) and an E-DCH AICH (E-AICH); and

a processor configured to access the E-DCH resources in cell forward access channel (CELL_FACH) state, to receive a reconfiguration message indicating to switch to a cell dedicated channel (CELL_DCH) state, and to release the E-DCH resources based on switching to CELL_DCH state.

11. (Withdrawn) A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

receiving an explicit E-DCH termination signal; and

releasing a E-DCH resource.

12. (Withdrawn) The method as in claim 11, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

13. (Withdrawn) The method as in claim 11, wherein the explicit E-DCH termination signal comprises a special value signaled on an E-DCH absolute grant channel (E-AGCH).

14. (Withdrawn) A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

initiating a timer in response to a trigger; and

releasing resource allocation for common control channel (CCCH) when a maximum allowable transmission time for the CCCH has been reached.

15. (Withdrawn) The method as in claim 14, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

16. (Withdrawn) The method as in claim 14, wherein a maximum enhanced dedicated channel (E-DCH) allocation time is allocated to the CCCH transmission when an E-DCH radio network temporary identifier (E-RNTI) is not present.

17. (Withdrawn) The method as in claim 14, wherein the timer starts when a positive acknowledgement (ACK) associated with a transmitted preamble signature is received on an acquisition indication channel (AICH) or an enhanced dedicated channel (E-DCH) AICH (E-AICH).

18. (Withdrawn) The method as in claim 14, wherein the timer starts when radio resource control (RRC) provides timer values to medium access control (MAC), and after receiving resource index of an enhanced dedicated channel (E-DCH).

19. (Withdrawn) The method as in claim 14, wherein the timer starts when a wireless transmit receive unit (WTRU) starts first dedicated physical control channel (DPCCH) preamble transmission.

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20. (Withdrawn) The method as in claim 19, wherein the timer starts when the first DPCCH transmission is completed after an enhanced dedicated channel (E-DCH) transmission backoff transmission time intervals (TTIs) or a first medium access control (MAC) protocol data unit (PDU) is passed to a physical layer.

21. (Withdrawn) The method as in claim 14, wherein the timer starts when a wireless transmit receive unit (WTRU) starts an enhanced dedicated channel (E-DCH) transmission.

22. (Withdrawn) The method as in claim 14, wherein a wireless transmit receive unit (WTRU) may initiate the timer when a collision resolution an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH) carrying the WTRU E-DCH radio network temporary identifier (E-RNTI) is received.

23. (Withdrawn) A Node-B comprising:

a processor configured to determine an end of enhanced random access channel (E-RACH) message transmission; and

a transmitter connected to the processor, the transmitter configured to transmit a special value over an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH) indicating the end of transmission.

24. (Withdrawn) A method for releasing enhanced dedicated channel (E-DCH) resources while in cell forward access channel (CELL_FACH) state, the method comprising:

terminating reception procedures for an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH), an E-DCH relative grant channel (E-RGCH), and an E-DCH hybrid automatic repeat request (HARQ) indicator channel (E-HICH); and

terminating transmission procedures for an E-DCH dedicated physical control channel (E-DPCCH) and an enhanced dedicated physical data channel (E-DPDCH); and

resetting the medium access control (MAC) entity.

25. (Withdrawn) The method as in claim 24, wherein the channels are terminated when an enhanced random access channel (E-RACH) transmission signal has been received.

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26. (Withdrawn) The method as in claim 24, wherein the channels are terminated when a common control channel (CCCH) timer has expired.

27. (Withdrawn) The method as in claim 24, wherein the channels are terminated when the scheduling information (SI) is equal to zero.

28. (Withdrawn) The method as in claim 24, wherein the MAC reset procedures include flushing the hybrid automatic repeat request (HARQ) processes, discarding remaining segments in segmentation entity of the MAC entity, and resetting a transmission sequence number (TSN) value to zero.

29. (Withdrawn) The method as in claim 24, wherein the resources are released when an inactivity timer expires.

30. (Currently Amended) The WTRU as in claim 6 ~~1~~, wherein the processor starts an inactivity timer when the buffer is empty.

31. (Previously Presented) The WTRU as in claim 30, wherein the transmission of the SI is triggered when the inactivity timer expires.

32. (Currently Amended) The WTRU as in claim 6 ~~1~~, wherein the E-DCH transmission occurs on a condition that a response is received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU.

REMARKS

Claims 1-7 and 30-32 are pending in the present application and stand rejected in the office action dated December 6, 2011. Claims 1, 4-7, 30, and 32 are presently amended, and claims 8-29 were previously withdrawn. Applicants request reconsideration and withdrawal of the rejections in view of the foregoing amendments and following remarks.

Claim Objections

Applicants have amended claims 30 and 32 to correct the claim dependency. Applicants thank the examiner for pointing out the informalities and request withdrawal of the objection in view of the amendments.

35 U.S.C. § 102 Rejection

Claims 1, 4, 6, and 32 stand rejected under 35 U.S.C. §102(e) as allegedly anticipated by U.S. pub. No. 2009/025709 (hereinafter "Wager publication").

The outstanding rejection is based on 35 U.S.C. §102(e). Under 35 U.S.C. §102(e), the critical reference date of a U.S. application publication is entitled to the benefit of the filing date of a provisional application ***if the provisional application properly supports the subject matter relied upon to make the rejection*** in compliance with 35 U.S.C. §112, first paragraph. See M.P.E.P 2136.03, Sec. III. As shown by the timeline below, the filing date of the Wager application (that corresponds to the Wager publication), shown as (4) below, post-dates the filing date of the present application, shown as (3) below. Thus, the subject matter from the Wager application used to reject the claims must be supported by the earlier filed Wager provisional application, shown as (2) below, to be proper prior art.

Timeline of applications:

(1) Present application provisional 60/975,985 filed Sep. 28, 2007

(2) Wager provisional application 61/015,316 filed Dec. 20, 2007

(3) Present application 12/238,910 filed Sept 26, 2008

(4) Wager application 12/314,247 filed Dec. 5, 2008; published as U.S. pub. No. 2009/025709

Without prejudice or disclaimer, Applicants have amended the claims as shown above to capture subject matter disclosed in at least one of the provisional applications to which the present application claims priority, shown as (1) above. Because the Wager priority date of Dec. 20, 2007 does not pre-date the September 28, 2007 priority date of the pending claims, Applicants respectfully submit that neither the Wager application nor the Wager publication is proper prior art against the pending claims.

In particular, the claims are directed to completing an enhanced dedicated channel (E-DCH) transmission in a CELL_FACH state. When the WTRU determines that a buffer is empty, the WTRU transmits scheduling information in the E-DCH transmission having a total E-DCH buffer status equal to zero. When the buffer is empty, the WTRU releases an E-DCH resource allocation.

As described in the specification, but not by way of limitation, the release of the E-DCH resource allocation by the WTRU is in contrast to the network ordering the release of such resources (Application, para. 7). Applicants have disclosed a manner for notifying the network of the WTRU-initiated release, while also releasing such resources by the WTRU. In particular, the WTRU, on a condition that the buffer is empty, triggers transmission of scheduling information (SI) in the E-DCH transmission with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero.

In contrast to the claimed embodiments, the Wager provisional merely describes the known manner of releasing of resources by the network (Wager, p. 4, ll. 10-14). Specifically, Wager nowhere teaches or suggests that ***the WTRU*** releases the E-DCH resources or notifies the network in any manner that it is releasing such resources. Rather, Wager maintains that the Node B is responsible for releasing the common E-DCH resource.

35 U.S.C. § 103(a) Rejection

Claims 2 and 30 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Wager in view of U.S. pub. no. 2010/0091652 ("Lin"). Claims 3 and 31 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Wager in view of Lin and further in view of U.S. pub. no. 2009/0168704 ("Lee"). Claims 5 and 7 stand rejected under 35 U.S.C.

§103(a) as allegedly being unpatentable over Wager in view of U.S. pub. no. 2005/0026623 ("Fisher").

Claims 2, 3, 5, 7, 30, and 31 depend from at least one of independent claims 1 and 6. Thus, for at least the foregoing reasons for patentability of independent claims 1 and 6, Applicants submit that claims 2, 3, 5, 7, 30, and 31 patentably define over the cited references at least by virtue of their dependency from patentable independent claims 1 and 6. Accordingly, Applicants respectfully request withdrawal of the §103(a) rejections of claims 2, 3, 5, 7, 30, and 31.

Conclusion

In view of the foregoing, applicant respectfully submits that the claims are allowable and that the present application is in condition for allowance. Reconsideration of the application and an early Notice of Allowance are respectfully requested. In the event that the Examiner cannot allow the present application for any reason, the Examiner is encouraged to contact the undersigned attorney, Lori Anne D. Swanson at (215) 558-5716, to discuss resolution of any remaining issues.

Date: April 6, 2012

/Lori Anne D. Swanson/
Lori Anne D. Swanson
Registration No. 59,048

Condo Roccia LLP
One Liberty Place, Suite 2200
1650 Market Street
Philadelphia, PA 19103
Telephone: 215-558-5740
Facsimile: 215-558-5676

Electronic Acknowledgement Receipt

EFS ID:	12488326
Application Number:	12238910
International Application Number:	
Confirmation Number:	2438
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Customer Number:	15800
Filer:	LoriAnne D. Swanson/Ginola Johnson
Filer Authorized By:	LoriAnne D. Swanson
Attorney Docket Number:	IHSP_2-1853.01.US
Receipt Date:	06-APR-2012
Filing Date:	26-SEP-2008
Time Stamp:	14:53:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	IHSP_2_1853_01_USTransmittal.pdf	262614 2b678e7b820679e5d5750653c17ad67b5929850f	no	2
Warnings:					
Information:					

2	Extension of Time	IHSP_2_1853_01_US_ExtentionofTme.pdf	286911 8c8a7c921222e2c6f848f029870506af1261f71b	no	2
Warnings:					
Information:					
3		IHSP_2_1853_01_US_Response2_to_Final_OA_Dated_12_6_11.pdf	143740 e198566f178e663385327161ef24e2f141148c0a	yes	9

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment After Final	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	9

Warnings:	
Information:	
Total Files Size (in bytes):	693265

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.

Doc Code: TRAN.LET
Document Description: Transmittal Letter

PTO/SB/21 (07-09)
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission	11

Application Number	12/238,910
Filing Date	September 26, 2008
First Named Inventor	Benoit Pelletier, et al.
Art Unit	2464
Examiner Name	Kan Yuen
Attorney Docket Number	IHSP_2-1853.01.US

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☑ Amendment/Reply
  - ☑ After Final
  - ☐ Affidavits/declaration(s)
- ☑ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☐ Other Enclosure(s) (please Identify below):

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Condo Roccia LLP		
Signature	/Lori Anne D. Swanson/		
Printed name	Lori Anne D. Swanson		
Date	April 6, 2012	Reg. No.	59,048

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name		Date	

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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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.

PTO/SB/22 (09-11)
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)	Docket Number (Optional) IHSP_2-1853.01.US
Application Number 12/238,910	Filed September 26, 2008
For Method And Apparatus For Terminating Transmission Of A Message In An Enhanced Random Access	
Art Unit 2464	Examiner Kan Yuen

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
☐ Two months (37 CFR 1.17(a)(2))	$560	$280	$
☐ Three months (37 CFR 1.17(a)(3))	$1270	$635	$
☐ Four months (37 CFR 1.17(a)(4))	$1980	$990	$
☐ Five months (37 CFR 1.17(a)(5))	$2690	$1345	$

☐ 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 09-0435.

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.
Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☑ attorney or agent of record. Registration Number 59,048

☐ attorney or agent under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34 _____

/Lori Anne D. Swanson/	April 6, 2012
Signature	Date
Lori Anne D. Swanson	215-558-5740
Typed or printed name	Telephone Number

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☑ Total of 1 (one) forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/06 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
12/238,910	09/26/2008	

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	04/06/2012	(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))	* 32	Minus	** 32	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	* 8	Minus	***8	=	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	

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:
/PEGGY YARBOROUGH/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	12/238,910	Filing Date	2008-09-26	Docket Number (if applicable)	IHSP_2-1853.01.US	Art Unit	2464
First Named Inventor	Pelletier, Benoit			Examiner Name	Yuen, Kan		

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 PTO-1449; 8 references

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 090435

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
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Lori Anne D. Swanson/	Date (YYYY-MM-DD)	2012-04-20
Name	Lori Anne D. Swanson	Registration Number	59048

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

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4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **Benoit Pelletier, et al.**	**Confirmation No.: 2438**
Application No.: 12/238,910	**Group Art Unit: 2464**
Filing Date: September 26, 2008	**Examiner: Kan Yuen**

For: Method And Apparatus For Terminating Transmission Of A Message In An Enhanced Random Access Channel

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

Sir:

SUPPLEMENTAL REPLY

Supplemental to the Reply filed on **April 6, 2011**, reconsideration is respectfully requested in view of the amendments and/or remarks as indicated below:

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

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

☐ **Amendments to the Drawings** begin on page of this paper and include an attached replacement sheet.

☒ **Remarks** begin on page 7 of this paper.

☒ The Commissioner is hereby authorized to charge any fee deficiency, charge any additional fees, or credit any overpayment of fees, associated with this application in connection with this filing, or any future filing, submitted to the U.S. Patent and Trademark Office during the pendency of this application, to Deposit Account No. 09-0435.

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

Listing of Claims:

1. (Currently Amended) A method for ~~terminating~~ completing an enhanced dedicated channel (E-DCH) transmission in a cell forward access channel (CELL_FACH) state by a wireless transmit/receive unit (WTRU), the method comprising:

the WTRU determining that a buffer is empty ~~by the WTRU~~;

on a condition that the buffer is empty, triggering a transmission by the WTRU of scheduling information (SI) in the E-DCH transmission with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero;

~~determining a condition of a last hybrid automatic repeat request (HARQ) data transmission;~~ and

on a condition that the buffer is empty ~~and the last HARQ data transmission has finished~~, the WTRU releasing a E-DCH resource allocation ~~by the WTRU~~.

2. (Original) The method as in claim 1, wherein an inactivity timer is started when the buffer is empty.

3. (Original) The method as in claim 2, wherein the transmission of the SI is triggered when the inactivity timer expires.

4. (Previously Amended) The method as in claim 1, wherein an E-DCH transmission occurs on a condition that a response is received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU.

5. (Currently Amended) The method as in claim 1, further comprising ~~terminating~~ completing the E-DCH transmission in case of cell reselection or radio link failure.

6. (Currently Amended) A wireless transmit/receive unit (WTRU) ~~method~~ for ~~terminating~~ completing an enhanced dedicated channel (E-DCH) in a cell forward access channel (CELL_FACH) state, the WTRU comprising:

a receiver;

a transmitter; and

a processor in communication with the receiver and the transmitter, the processor configured to:

determine that a buffer is empty;

on a condition that the buffer is empty, trigger a transmission of scheduling information (SI) in a E-DCH transmission with a total E-DCH buffer status (TEBS) equal to zero;

determine a condition of a last hybrid automatic repeat request (HARQ) data transmission being finished; and

on a condition that the buffer is empty ~~and the last HARQ data transmission being finished~~, release a E-DCH resource allocation.

7. (Currently Amended) The WTRU as in claim 6, the processor further configured to ~~terminate~~ complete the E-DCH transmission on a condition of cell reselection or radio link failure.

8. (Withdrawn) A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

releasing the E-RACH message during transition from cell forward access channel (CELL_FACH) state to cell dedicated channel (CELL_DCH) state.

9. (Withdrawn) The method as in claim 8, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

10. (Withdrawn) A wireless transmit receive unit (WTRU), comprising:

a receiver configured to receive enhanced dedicated channel (E-DCH) resources on an acquisition indication channel (AICH) and an E-DCH AICH (E-AICH); and

a processor configured to access the E-DCH resources in cell forward access channel (CELL_FACH) state, to receive a reconfiguration message indicating to switch to a cell dedicated channel (CELL_DCH) state, and to release the E-DCH resources based on switching to CELL_DCH state.

11. (Withdrawn) A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

receiving an explicit E-DCH termination signal; and

releasing a E-DCH resource.

12. (Withdrawn) The method as in claim 11, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

13. (Withdrawn) The method as in claim 11, wherein the explicit E-DCH termination signal comprises a special value signaled on an E-DCH absolute grant channel (E-AGCH).

14. (Withdrawn) A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

initiating a timer in response to a trigger; and

releasing resource allocation for common control channel (CCCH) when a maximum allowable transmission time for the CCCH has been reached.

15. (Withdrawn) The method as in claim 14, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

16. (Withdrawn) The method as in claim 14, wherein a maximum enhanced dedicated channel (E-DCH) allocation time is allocated to the CCCH transmission when an E-DCH radio network temporary identifier (E-RNTI) is not present.

17. (Withdrawn) The method as in claim 14, wherein the timer starts when a positive acknowledgement (ACK) associated with a transmitted preamble signature is received on an acquisition indication channel (AICH) or an enhanced dedicated channel (E-DCH) AICH (E-AICH).

18. (Withdrawn) The method as in claim 14, wherein the timer starts when radio resource control (RRC) provides timer values to medium access control (MAC), and after receiving resource index of an enhanced dedicated channel (E-DCH).

19. (Withdrawn) The method as in claim 14, wherein the timer starts when a wireless transmit receive unit (WTRU) starts first dedicated physical control channel (DPCCH) preamble transmission.

20. (Withdrawn) The method as in claim 19, wherein the timer starts when the first DPCCH transmission is completed after an enhanced dedicated channel (E-DCH) transmission backoff transmission time intervals (TTIs) or a first medium access control (MAC) protocol data unit (PDU) is passed to a physical layer.

21. (Withdrawn) The method as in claim 14, wherein the timer starts when a wireless transmit receive unit (WTRU) starts an enhanced dedicated channel (E-DCH) transmission.

22. (Withdrawn) The method as in claim 14, wherein a wireless transmit receive unit (WTRU) may initiate the timer when a collision resolution an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH) carrying the WTRU E-DCH radio network temporary identifier (E-RNTI) is received.

23. (Withdrawn) A Node-B comprising:

a processor configured to determine an end of enhanced random access channel (E-RACH) message transmission; and

a transmitter connected to the processor, the transmitter configured to transmit a special value over an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH) indicating the end of transmission.

24. (Withdrawn) A method for releasing enhanced dedicated channel (E-DCH) resources while in cell forward access channel (CELL_FACH) state, the method comprising:

terminating reception procedures for an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH), an E-DCH relative grant channel (E-RGCH), and an E-DCH hybrid automatic repeat request (HARQ) indicator channel (E-HICH); and

terminating transmission procedures for an E-DCH dedicated physical control channel (E-DPCCH) and an enhanced dedicated physical data channel (E-DPDCH); and

resetting the medium access control (MAC) entity.

25. (Withdrawn) The method as in claim 24, wherein the channels are terminated when an enhanced random access channel (E-RACH) transmission signal has been received.

26. (Withdrawn) The method as in claim 24, wherein the channels are terminated when a common control channel (CCCH) timer has expired.

27. (Withdrawn) The method as in claim 24, wherein the channels are terminated when the scheduling information (SI) is equal to zero.

28. (Withdrawn) The method as in claim 24, wherein the MAC reset procedures include flushing the hybrid automatic repeat request (HARQ) processes, discarding remaining segments in segmentation entity of the MAC entity, and resetting a transmission sequence number (TSN) value to zero.

29. (Withdrawn) The method as in claim 24, wherein the resources are released when an inactivity timer expires.

30. (Currently Amended) The WTRU as in claim 6 ~~1~~, wherein the processor starts an inactivity timer when the buffer is empty.

31. (Previously Presented) The WTRU as in claim 30, wherein the transmission of the SI is triggered when the inactivity timer expires.

32. (Currently Amended) The WTRU as in claim 6 ~~1~~, wherein the E-DCH transmission occurs on a condition that a response is received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU.

REMARKS

This response shall substitute the response filed on April 6, 2012 in its entirety. The present response is filed with an RCE and IDS.

Claims 1-7 and 30-32 are pending in the present application and stand rejected in the office action dated December 6, 2011. Claims 1, 5, 6, 7, 30, and 32 are presently amended and claims 8-29 were previously withdrawn. Applicants request reconsideration and withdrawal of the rejections in view of the foregoing amendments and following remarks.

Claim Objections

Applicants have amended claims 30 and 32 to correct the claim dependency. Applicants thank the examiner for pointing out the informalities and request withdrawal of the objections in view of the amendments.

35 U.S.C. § 102 Rejection

Claims 1, 4, 6, and 32 stand rejected under 35 U.S.C. §102(e) as allegedly anticipated by U.S. pub. No. 2009/025709 (hereinafter "Wager publication").

The outstanding rejection is based on 35 U.S.C. §102(e). Under 35 U.S.C. §102(e), the critical reference date of a U.S. application publication is entitled to the benefit of the filing date of a provisional application ***if the provisional application properly supports the subject matter relied upon to make the rejection*** in compliance with 35 U.S.C. §112, first paragraph. See M.P.E.P 2136.03, Sec. III. As shown by the timeline below, the filing date of the Wager application (that corresponds to the Wager publication), shown as (4) below, post-dates the filing date of the present application, shown as (3) below. Thus, the subject matter from the Wager application used to reject the claims must be supported by the earlier filed Wager provisional application, shown as (2) below, to be proper prior art.

Timeline of applications:

(1) Present application provisional 60/975,985 filed Sep. 28, 2007

(2) Wager provisional application 61/015,316 filed Dec. 20, 2007

(3) Present application 12/238,910 filed Sept 26, 2008

(4) Wager application 12/314,247 filed Dec. 5, 2008; published as U.S. pub. No. 2009/025709

Without prejudice or disclaimer, Applicants have amended the claims as shown above to capture subject matter disclosed in at least one of the provisional applications to which the present application claims priority, shown as (1) above. Because the Wager priority date of Dec. 20, 2007 does not pre-date the September 28, 2007 priority date of the pending claims, Applicants respectfully submit that neither the Wager application nor the Wager publication is proper prior art against the claims, particularly as amended.

In particular, the claims are directed to completing an enhanced dedicated channel (E-DCH) transmission in a CELL_FACH state. When the WTRU determines that a buffer is empty, the WTRU transmits scheduling information in the E-DCH transmission having a total E-DCH buffer status equal to zero. When the buffer is empty, the WTRU releases an E-DCH resource allocation.

As described in the specification, but not by way of limitation, the release of the E-DCH resource allocation by the WTRU is in contrast to the network ordering the release of such resources (Application, para. 7). Applicants have disclosed a manner for notifying the network of the WTRU-initiated release, while also releasing such resources by the WTRU. In particular, the WTRU, on a condition that the buffer is empty, triggers transmission of scheduling information (SI) in the E-DCH transmission with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero.

In contrast to the claimed embodiments, the Wager provisional merely describes the known manner of releasing of resources by the network (Wager, p. 4, ll. 10-14). Specifically, Wager nowhere teaches or suggests that ***the WTRU*** releases the E-DCH resources or notifies the network in any manner that it is releasing such resources. Rather, Wager maintains that the Node B is responsible for releasing the common E-DCH resource.

Thus, for at least the foregoing reasons, Applicants submit that claims 1, 4, 6, and 32 patentably define over the cited reference(s). Accordingly, Applicants respectfully request withdrawal of the §102(e) rejections of claims 1, 4, 6, and 32.

35 U.S.C. § 103(a) Rejection

Claims 2 and 30 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Wager in view of U.S. pub. no. 2010/0091652 ("Lin"). Claims 3 and 31 stand rejected

under 35 U.S.C. §103(a) as allegedly being unpatentable over Wager in view of Lin and further in view of U.S. pub. no. 2009/0168704 ("Lee"). Claims 5 and 7 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Wager in view of U.S. pub. no. 2005/0026623 ("Fisher").

Claims 2, 3, 5, 7, 30, and 31 depend from at least one of independent claims 1 and 6. Thus, for at least the foregoing reasons for patentability of independent claims 1 and 6, Applicants submit that claims 2, 3, 5, 7, 30, and 31 patentably define over the cited references at least by virtue of their dependency from patentable independent claims 1 and 6. Accordingly, Applicants respectfully request withdrawal of the §103(a) rejections of claims 2, 3, 5, 7, 30, and 31.

Conclusion

In view of the foregoing, applicant respectfully submits that the claims are allowable and that the present application is in condition for allowance. Reconsideration of the application and an early Notice of Allowance are respectfully requested. In the event that the Examiner cannot allow the present application for any reason, the Examiner is encouraged to contact the undersigned attorney, Lori Anne D. Swanson at (215) 558-5716, to discuss resolution of any remaining issues.

Date: April 20, 2012

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DOCKET NO.: IHSP_2-1853.01.US **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Pelletier, Benoit **Confirmation No.: 2438**

Application No.: 12/238,910 **Group Art Unit: 2464**

Filing Date: September 26, 2008 **Examiner: Yuen, Kan**

For: METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL

Filed Via EFS

INFORMATION DISCLOSURE STATEMENT

Pursuant to 37 CFR § 1.56 and in accordance with 37 CFR §§ 1.97-1.98, information relating to the above-identified application is hereby disclosed. Inclusion of information in this statement is not to be construed as an admission that this information is material as that term is defined in 37 CFR § 1.56(b).

☒ **IDS Filed Under 37 CFR 1.97(b)**

In accordance with § 1.97(b), since this Information Disclosure Statement is being filed either within three months of the filing date of the above-identified application, within three months of the date of entry into the national stage of the above identified application as set forth in § 1.491, before the mailing date of a first Office Action on the merits of the above-identified application, or before the mailing date of a first Office Action after the filing of request for continued examination under § 1.114, no additional fee is required.

☐ **IDS filed Under 37 CFR 1.97(c)**

In accordance with § 1.97(c), this Information Disclosure Statement is being filed after the period set forth in § 1.97(b) above but before the mailing date of either a Final Action under § 1.116 or a Notice of Allowance under § 1.311, or before an action that otherwise closes prosecution in the application, therefore:

- ☐ Certification in Accordance with § 1.97(e) is attached; or
- ☐ The fee of **$180.00** as set forth in § 1.17(p) is attached.

☐ **IDS filed Under 37 CFR 1.97(d)**

In accordance with § 1.97(d), this Information Disclosure Statement is being filed after the mailing date of either a Final Action under § 1.113 or a Notice of Allowance under § 1.311 but before, or simultaneously with, the payment of the Issue Fee, therefore included are: Certification in Accordance with § 1.97(e); and the submission fee of **$180.00** as set forth in § 1.17(p).

CONTENT OF IDS PURSUANT TO 37 CFR 1.98

☒ Copies of reference numbers 44-45 listed on the attached Form PTO-1449 are not required to be submitted pursuant to 37 CFR § 1.98(a)(2)(ii).

☒ Copies of reference numbers 46-53 listed on the attached Form PTO-1449 are enclosed herewith.

☐ Copies of reference numbers are not being submitted because they were previously cited by or submitted to the U.S. Patent and Trademark Office in patent application number , filed for which a claim for priority under 35 U.S.C. § 120 has been made in the instant application.

☐ The month of publication for reference numbers is not available. However, the year of publication for these references is sufficiently earlier than the effective US filing date and any foreign priority date so that the particular month of publication is not in issue pursuant to 37 CFR § 1.98(b).

REFERENCES IN A LANGUAGE OTHER THAN ENGLISH

☒ The following documents are not in the English language. Accordingly, a concise explanation of the relevance of the document was incorporated in the specification passages identified below, the document was identified in a foreign communication as identified below or an English language counterpart application has been provided as indicated below.

Foreign Language Document	Cite No.	Pages of Reference in Specification or Relevance of Document
KR 10-2007-0073578 A	46	Cited in an Official Action dated December 9, 2011, issued in related Korean Patent Application No. 10-2010-7009403
RU 2005122724 A	47	Cited in a Decision on Grant dated January 27, 2012, issued in related Russian Patent Application No. 2010116763

Foreign Language Document	Cite No.	English Language Counterpart	Cite No.
KR 10-2007-0073578 A	46	WO 2007/078155 A2	48
RU 2005122724 A	47	US 2006/0023629 A1	45

☐ **CERTIFICATION IN ACCORDANCE WITH § 1.97(e)**

I hereby certify that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement.

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

Please charge any deficiency or credit any overpayment to Deposit Account No. 09-0435.

Date: April 20, 2012

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Substitute for 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	12/238,910
				Filing Date	September 26, 2008
				First Named Inventor	Pelletier, Benoit
				Art Unit	2464
(use as many sheets as necessary)				**Examiner Name**	Yuen, Kan
Sheet	1	of	1	**Attorney Docket Number**	IHSP_2-1853.01.US

U. S. PUBLICATION AND PATENT DOCUMENTS				
Examiner Initials	Cite No.	Document Number Number – Kind Code (if known)	Publication or Grant Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
	44	2005/0054298 A1	03-10-2005	Chen, Rex Huan-Yueh
	45	2006/0023629 A1	02-02-2006	Kim et al.

FOREIGN PATENT DOCUMENTS					
Examiner Initials	Cite No.	Foreign Patent Document Country Code- Number - Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	T
	46	KR 10-2007-0073578 A	07-10-2007	L.G. Electronics, Inc.	
	47	RU 2005122724 A	01-27-2007	Samsung Electronics Co., Ltd.	
	48	WO 2007/078155 A2	07-12-2007	L.G. Electronics, Inc.	

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), Volume-issue Number(s), publisher, city and/or country where published.	T
	49	3rd Generation Partnership Project (3GPP), R2-071556, "Introduction of Enhanced CELL_FACH state", Change Request 3GPP TS 25.331 Version 7.3.0, 3GPP TSG-2 Meeting #57, St. Julian's Malta, March 26-30, 2007, 76 pages	
	50	3rd Generation Partnership Project (3GPP), R2-080043, "Contention resolution for enhanced uplink in CELL_FACH", Ericsson, 3GPP TSG RAN WG2 #60bis, Seville, Spain, January 14-18, 2008, 4 pages	
	51	3rd Generation Partnership Project (3GPP), R2-080894, "CELL_FACH E-DCH scheduling simplifications", Infineon, 3GPP TSG-RAN WG2 Meeting #61, Sorrento, Italy, February 11-15, 2008, 4 pages	
	52	3rd Generation Partnership Project (3GPP), R2-081581, "Empty Buffer Status reporting and Implicit release for CCCH messages using enhanced uplink in CELL_FACH", Qualcomm Europe, 3GPP TSG-RAN WG2 #61-bis, Shenzhen, China, March 31 - April 4, 2008, 6 pages	
	53	3rd Generation Partnership Project (3GPP), R3-081091, "E-DCH Resource Release in CELL_FACH", Qualcomm Europe, 3GPP TSG-RAN WG3 Meeting#60, Kansas City, USA, May 5-9, 2008, 4 pages	

Examiner Signature		**Date Considered**	

(19) **KOREAN INTELLECTUAL PROPERTY OFFICE**

KOREAN PATENT ABSTRACTS

(11) Publication number: **1020070073578 A**

(43) Publication date: **10.07.2007**

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(22) Application date: **01.11.2006**

(30) Priority: **05.01.2006 US 2006 75706321.06.2006 US 2006 815722**

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- **JUNG, MYUNG CHEUL**

(51) Int. Cl: **H04B 7/26**

(54) **METHOD FOR SCHEDULING RADIO RESOURCES IN A MOBILE COMMUNICATION SYSTEM, ESPECIALLY CONCERNED WITH INCREASING THE EFFICIENCY OF AVAILABLE RADIO RESOURCES FOR MORE SMOOTH COMMUNICATION**

(57) Abstract:

PURPOSE: A method for scheduling radio resources in a mobile communication system is provided to minimize a waste of radio resources by reallocating radio resources, which have been allocated to UE, but still remain after uplink data transmission of the UE, to other UEs(User Equipments) by using a control signal transmitted from the UE.

CONSTITUTION: UE executes uplink data transmission by using the radio resources allocated from a node B(S60,S61). In case some of the allocated radio resources remain even though the UE has completed uplink data transmission, the UE transmits a message containing a specific control signal, or a request for de-allocation of the allocated uplink radio resources, to the node B(S62). Receiving the specific control signal, the node B reallocates the remaining de-allocated radio resources to other UEs(S63).



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IPR2023-01267 Page 414

Legal Status
Date of request for an examination (20111027)
Notification date of refusal decision (00000000)
Final disposal of an application (application)
Date of final disposal of an application (00000000)
Patent registration number ( )
Date of registration (00000000)
Number of opposition against the grant of a patent ( )
Date of opposition against the grant of a patent (00000000)
Number of trial against decision to refuse ( )
Date of requesting trial against decision to refuse ( )
Date of extinction of right ( )

IPR2023-01267 Page 415

공개특허 10-2007-0073578

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60/815,722 2006년06월21일 미국(US)
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심사청구 : 없음

(54) 이동 통신 시스템에서의 무선 자원 스케줄링 방법

요약

본 발명에 따르면 단말이 상향링크로 데이터 전송이 완료된 후에도 여전히 할당된 무선 자원이 남아 있는 경우에, 가지국이 단말로부터 무선 자원 할당해제 요청메시지를 수신하여, 다른 단말들에게 상기 무선 자원을 재할당하는 스케줄링 방법을 제공함으로써, 낭비되는 무선 자원을 최소화하여, 효율성을 높이는 효과가 있다.

대표도

도6

색인어

스케줄링, OFDM, 재할당, 무선 자원 할당

명세서

도면의 간단한 설명

도 1은 종래 및 본 발명에 적용되는 이동통신 시스템인 LTE(Long Term Evolution) 시스템의 망구조를 설명하기 위한 도면이다.

도 2는 3GPP 무선접속망 규격을 기반으로 한 단말과 UTRAN (UMTS Terrestrial Radio Access Network) 사이의 무선 인터페이스 프로토콜 (Radio Interface Protocol) 제어 평면의 구조를 설명하기 위한 도면이다.

도 3은 3GPP 무선접속망 규격을 기반으로 한 단말과 UTRAN (UMTS Terrestrial Radio Access Network) 사이의 무선 인터페이스 프로토콜 (Radio Interface Protocol) 사용자 평면의 구조를 설명하기 위한 도면이다.

도 4는 DFT-S-OFDM 방식의 송신기의 구조에 대한 블록 구성도이다.

도 5는 HARQ (hybrid ARQ) 방식에 대해 설명하기 위한 도면이다.

도 6은 본 발명의 일 실시 형태에 따른 절차 흐름도이다.

도 7은 본 발명의 다른 실시 형태에 따른 절차 흐름도이다.

발명의 상세한 설명

발명의 목적

발명이 속하는 기술분야 및 그 분야의 종래기술

본 발명은 이동 통신 시스템에 관한 것으로 보다 구체적으로는 이동 통신 시스템에서 무선 자원을 스케줄링하는 방법에 관한 것이다.

도 1은 이동 통신 시스템인 LTE(Long Term Evolution) 시스템의 망 구조를 설명하기 위한 도면이다. LTE시스템은 기존 UMTS시스템에서 진화한 시스템으로 현재 3GPP에서 기초적인 표준화 작업을 진행하고 있다.

LTE망은 크게 E-UTRAN과 CN(Core Network)으로 구분할 수 있다. E-UTRAN은 적어도 하나의 기지국(eNode B)을 포함하며 구성된다. 그리고, 망의 종단에 위치하며 외부망과 연결되는 접속 게이트웨이(Access Gateway: 이하 AG로 약칭)를 포함한다. AG는 사용자 트래픽을 처리하는 부분과 제어용 트래픽을 처리하는 부분을 포함하여 이루어진다. 이때는 새로운 사용자 트래픽을 처리하는 AG 부분과 제어용 트래픽을 처리하는 AG 부분 사이에 새로운 인터페이스를 사용하여 서로 통신을 할 수 있다. 하나의 기지국에는 하나 이상의 셀(Cell)을 포함하여 이루어질 수 있다. 기지국 간에는 사용자 트래픽 혹은 제어 트래픽 전송을 위한 인터페이스가 사용된다. CN은 AG와 기타 UE의 사용자 등록 등을 위한 노드 등을 포함한다. 또한, E-UTRAN과 CN을 구분하기 위해 인터페이스가 사용될 수 있다.

도 2 및 도 3은 3GPP 무선접속망 규격을 기반으로 한 단말과 UTRAN (UMTS Terrestrial Radio Access Network) 사이의 무선 인터페이스 프로토콜 (Radio Interface Protocol)의 구조를 나타낸다.

무선 인터페이스 프로토콜은 수평적으로 물리 계층(Physical Layer), 데이터링크 계층(Data Link Layer) 및 네트워크 계층(Network Layer)으로 이루어지며, 수직적으로는 데이터정보 전송을 위한 사용자 평면(User Plane)과 제어신호(Signaling) 전송을 위한 제어 평면(Control Plane)으로 구분된다. 프로토콜 계층들은 통신시스템에서 널리 알려진 개방형 시스템 간 상호접속 (Open System Interconnection: OSI)기준 모델의 하위 3개 계층을 바탕으로 L1 (제1계층), L2 (제2계층), L3(제3계층)로 구분될 수 있다. 이 중에서 제1계층에 속하는 물리계층은 물리채널(Physical Channel)을 이용한 정보 전송 서비스(Information Transfer Service)를 제공하며, 제3계층에 위치하는 무선 자원 제어(Radio Resource Control: 이하 RRC라 약칭함)계층은 단말과 망간에 무선 자원을 제어하는 역할을 수행한다. 이를 위해 RRC계층은 단말과 망간에 RRC메시지를 서로 교환한다. RRC계층은 기지국과 AG 등 망 노드들에 분산되어 위치할 수 있고, 기지국 또는 AG에만 위치할 수도 있다.

이하 도 2를 참조하여 무선 프로토콜 제어 평면을 설명한다. 무선 프로토콜 제어 평면은 물리계층, 매체접속제어(Medium Access Control: 이하 MAC로 약칭)계층, 무선링크제어(Radio Link Control: 이하 RLC로 약칭)계층 및 무선 자원제어(Radio Resource Control: 이하 RRC라 약칭함)계층을 포함하여 이루어진다.

제1계층인 물리계층은 물리 채널(Physical Channel)을 이용하여 상위 계층에게 정보 전송 서비스(Information Transfer Service)를 제공한다. 물리 계층은 상위에 있는 매체접속제어(Medium Access Control)계층과는 전송 채널(Transport Channel)을 통해 연결되어 있으며, 이 전송채널을 통해 매체접속제어계층과 물리계층 사이의 데이터가 이동한다. 그리고, 서로 다른 물리계층 사이, 즉 송신측과 수신측의 물리계층 사이는 물리채널을 통해 데이터가 이동한다.

제2계층의 MAC 계층은 논리 채널(Logical Channel)을 통해 상위계층인 무선링크제어(Radio Link Control)계층에게 서비스를 제공한다. 제2계층의 RLC 계층은 신뢰성 있는 데이터의 전송을 지원한다. RLC 계층의 기능이 MAC내부의 기능 블록으로 구현될 수도 있다. 이러한 경우에는 RLC계층은 존재하지 않을 수도 있다.

제3계층의 가장 상부에 위치한 RRC 계층은 제어 평면에서만 정의되며, 무선베어러 (Radio Bearer: RB라 약칭함)들의 설정(Configuration), 재설정(Re-configuration) 및 해제(Release)와 관련되어 논리 채널, 전송 채널 및 물리 채널들의 제어를 담당한다. 이때, RB는 단말과 UTRAN간의 데이터 전달을 위해 제2계층에 의해 제공되는 서비스를 의미한다.

이하 도 3을 참조하여 무선 프로토콜 사용자 평면의 각 계층을 설명한다. 무선 프로토콜 사용자 평면은 물리계층, MAC 계층, RLC 계층 및 PDCP 계층을 포함하여 이루어진다.

제1계층의 물리계층과 제2계층의 MAC 계층, RLC 계층에 대한 설명은 도 2에서의 설명과 동일하므로 생략한다. 제2계층의 PDCP 계층은 IPv4나 IPv6와 같은 IP 패킷 전송시에 대역폭이 작은 무선 구간에서 효율적으로 전송하기 위하여 상대적으로 크기가 크고 불필요한 제어정보를 담고 있는 IP 패킷 헤더 사이즈를 줄여주는 헤더압축 (Header Compression) 기능을 수행한다.

이하 망과 단말 사이의 데이터 전송하기 위한 상향 및 하향 전송 채널에 대해 설명한다. 망에서 단말로 데이터를 전송하는 하향 전송 채널로는 시스템 정보를 전송하는 BCH(Broadcast Channel)과 그 이외에 사용자 트래픽이나 제어 메시지를 전송하는 하향 SCH(Shared Channel)와 SCCH(Shared Control Channel)이 있다.

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하향 멀티캐스트 또는 방송 서비스의 트래픽 또는 제어메시지의 경우 하향 SCH를 통해 전송될 수도 있고, 또는 별도의 하향 MCH(Multicast Channel)을 통해 전송될 수도 있다. 한편, 단말에서 망으로 데이터를 전송하는 상향 전송 채널로는 초기 제어메시지를 전송하는 RACH(Random Access Channel)와 그 이외에 사용자 트래픽이나 제어 메시지를 전송하는 상향 SCH(Shared Control Channel)가 있다.

이하 제1계층인 물리계층에서 사용하는 OFDM(orthogonal frequency division multiplexing) 방식을 설명한다. OFDM의 기본원리는 고속 전송률(high-rate)을 갖는 데이터 열(data stream)을 낮은 전송률(slow-rate)을 갖는 많은 수의 데이터 열로 나누고, 이들을 다수의 반송파를 사용하여 동시에 전송하는 것이다. 상기 다수의 반송파 각각을 부 반송파(subcarrier)라 한다. 상기 OFDM의 다수의 반송파 사이에 직교성(orthogonality)이 존재하기 때문에, 반송파의 주파수 성분은 상호 중첩되어도 수신 단에서의 검출이 가능하다. 상기 고속 전송률을 갖는 데이터 열은, 직/병렬 변환부(Serial to Parallel converter)를 통해 다수의 낮은 전송률의 데이터 열(data stream)로 변환되고, 상기 병렬로 변환된 다수의 데이터 열에 각각의 부 반송파가 곱해진 후 각각의 데이터 열이 합해져서 수신 단으로 전송된다.

직/병렬 변환부에 의해 생성된 다수의 병렬 데이터 스트림은, IDFT(Inverse Discrete Fourier Transform)에 의하여 다수의 부 반송파로 전송될 수 있으며, 상기 IDFT는 역 고속 푸리에 변환(IFFT: Inverse Fast Fourier Transform)을 사용하여 효율적으로 구현될 수 있다.

낮은 전송률을 갖는 부 반송파의 심볼 구간(symbol duration)은 증가하게 되므로 다중경로 지연확산에 의해 발생하는 시간상에서의 상대적인 신호 분산(dispersion)이 감소한다. OFDM 심볼 사이에 채널의 지연 확산보다 긴 보호구간(guard interval)을 삽입하여 심볼간 간섭(Inter-Symbol Interference)을 줄일 수 있다. 이러한 보호구간에 OFDM 신호의 일부를 복사하여 붙여하면 OFDM 심볼은 순환적으로 확장(cyclically extended)되어 심볼을 보호할 수 있다.

이하 종래 기술에 따른 OFDMA(orthogonal frequency division multiple access)를 설명한다. OFDMA는, OFDM을 변조 방식으로 사용하는 시스템에 있어 이용 가능한 부 반송파(subcarrier)의 일부를 각 사용자에게 제공하여 다중 접속을 실현하는 다중 접속 방법을 말한다. OFDMA는 부 반송파라는 주파수 자원을 각 사용자에게 제공하며, 각각의 주파수 자원은 다수의 사용자에게 서로 독립적으로 제공되어 서로 중첩되지 않는 것이 일반적이다. 결국 주파수 자원은 상호 배타적으로 할당된다.

도 4는 DFT-S-OFDM 방식의 송신기의 구조를 나타내는 도면이다. 이하, 도 4를 참조하여 종래 DFT-S-OFDM 방식을 설명한다. 종래 장치의 동작을 설명하기 위하여 몇 가지 변수를 정의한다. N은 OFDM 신호를 전송하는 부 반송파의 개수를 나타내고, Nb는 임의의 사용자를 위한 부 반송파의 개수를 나타내고, F는 이산 푸리에 변환 행렬, 즉 DFT 행렬을 나타내고, s는 데이터 심볼 벡터를 나타내고, x는 주파수 영역에서 데이터가 분산된 벡터를 나타내고, y는 시간영역에서 전송되는 OFDM 심볼 벡터를 나타낸다.

SC-FDMA에서는 데이터 심볼(s)을 직/병렬 변환부(410)에 의해 병렬 신호로 변환하고, DFT 확산 모듈(420)에 의해 데이터 심볼(s)을 전송하기 전에 DFT 행렬을 이용해서 분산시킨다. 이는 다음 수식으로 표현된다.

$$x = F_{N_b \times N_b} s$$

상기 수학식 1에서 $F_{N_b \times N_b}$는, 데이터 심볼(s)을 분산시키기 위해서 사용된 Nb 크기의 DFT 행렬이다. 여렇게 분산된 벡터(x)에 대하여 부반송파 매핑부(430)에서 일정한 부 반송파 할당 개법에 의해 부 반송파 매핑(subcarrier mapping)이 수행되고, IDFT 모듈(440)에 의해 시간영역으로 변환되어 병/직렬 변환부(450)을 거쳐 수신 측으로 전송하고자 하는 신호가 얻어진다. 상기 수신 측으로 전송되는 전송신호는 아래 식과 같다.

$$y = F_{N \times N}^{-1} x$$

상기 수학식 2에서 $F_{N \times N}^{-1}$는 주파수 영역의 신호를 시간 영역의 신호로 변환하기 위해 사용되는 크기 N의 IDFT 행렬이다. 상술한 방법에 의해 생성된 신호 y는, 순환 전치 삽입부(460)에 의해 순환 전치(cyclic prefix)가 삽입되어 전송된다. 상술한 방법에 의해 전송 신호를 생성하여 수신 측으로 전송하는 방법을 SC-FDMA 방법이라 한다. DFT 행렬의 크기는 특정한 목적을 위해 다양하게 제어될 수 있다.

도 5는 HARQ (hybrid ARQ) 방식에 대해 설명하기 위한 도면이다. 이하 무선 패킷 통신 시스템의 하향 링크 물리 계층에 적용되는 HARQ(hybrid ARQ)의 구체적인 구현 방식에 대해 설명한다.

도 5를 참조하면, 기지국은 패킷을 수신할 단말과 그 단말에 전송할 패킷의 형식(복호화율, 변조방식, 데이터량 등)을 결정하여 이 정보를 먼저 하향 링크 제어 채널(HS-SCCH) 전송을 통하여 그 단말에 알려주고, 이와 연관된 시점에서 해당 데이터 패킷(HS-DSCH)을 전송한다. 해당 단말은 하향 링크 제어 채널을 수신하여 자신에게 전송될 패킷의 형식과 전송 시점을 알게 되고, 해당 패킷을 수신할 수 있다. 만일, 단말이 패킷(data1) 복호화에 실패했을 경우 단말은 NACK 신호를 기지국으로 전송하고, NACK 신호를 수신한 기지국은 해당 단말로의 패킷 전송이 실패했음을 감지하고 적절한 시점에서 동일 데이터를 동일한 패킷 형식, 또는 새로운 패킷 형식으로 재전송할 수 있다. 이때에 단말은 재전송된 패킷(data1)과 이전에 수신했지만 복호화에 실패한 패킷을 다양한 방식으로 결합하여 다시 복호화를 시도하게 된다.

패킷 수신 후에 그 패킷 데이터의 복호화를 거쳐서 만일 복호화에 성공했을 경우 단말은 ACK 신호를 기지

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국으로 전송하고, ACK 신호를 수신한 기지국은 해당 단말로의 패킷 전송이 성공했음을 감지하고 다음 패킷(data2) 전송 작업을 수행할 수 있다.

무선 이동 통신 시스템에서 한정된 무선 통신 자원을 통해 다수의 기지국, 단말들 사이의 통신을 위해서는 상기 무선 통신 자원을 상위 계층에 의한 스케줄링에 의해서 일부를 할당하고, 할당받은 자원을 통해서 통신을 수행하게 된다. 상기 스케줄링은 기지국에 의해서 수행되는 것이 일반적이다.

기지국에서는 단말의 요청이 있거나, 단말의 요청이 없는 경우에도 필요하다고 판단되거나, 미리 할당하고자 하는 경우에는 상기 무선 자원을 단말에 할당한다. 단말들은 기지국으로부터 할당된 지정된 무선 자원을 이용하여 데이터 또는 제어 신호를 전송한다. 상향링크의 전송에서 기지국으로부터 할당된 무선 자원을 본 특정 단말들에게 지정된 무선 자원이다. 이렇기 때문에 만약 상기 특정 단말들이 기지국으로부터 할당받은 무선 자원들을 사용하지 않는다면, 상기 무선 자원은 낭비되는 것이다. 즉, 특정 단말로 이미 할당된 무선 자원들은 다른 단말들이 다시 재사용하기 어렵기 때문에, 무선 자원을 비효율적으로 이용하게 되는 문제점이 있다.

발명이 이루고자 하는 기술적 과제

본 발명은 상술한 바와 같은 종래 기술의 문제점을 해결하기 위해서 안출된 것으로서, 본 발명의 목적은, 이동 통신 시스템에서 사용가능한 무선 자원의 효율을 높여서 보다 원활한 통신을 가능하게 하는 것이다. 또한, 간단한 방법으로 무선 자원의 낭비를 줄일 수 있는 스케줄링 방법을 제공하기 위한 것이다.

발명의 구성 및 작용

본 발명에서는 기지국이 무선 자원을 스케줄링할 때, 단말이 전송의 주체가 되는 상향링크의 경우 상기 단말에서 전송하는 특정 제어 신호를 통하여, 효율적으로 무선 자원을 할당하는 방법을 제안한다.

상기 기지국에 의해서 기 할당된 무선 자원에 대해서 특정 단말이 자신에게 할당된 무선 자원을 통해서 데이터 송수신을 한다. 상기 특정 단말이 데이터 송수신을 완료한 후에도 할당받은 무선 자원을 모두 사용한 것이 아니라 남은 무선 자원이 있는 경우에는 상기 스케줄링을 수행하는 기지국으로 데이터 송수신이 완료되었음을 알리는 정보 또는 전송 완료 후에 남은 무선 자원이 있음을 알리는 정보 등을 전송한다. 상기 정보를 통해 사용되지 않는 무선 자원이 있음을 알게 된 기지국은 적어도 하나 이상의 다른 단말들이 데이터 송수신에 이용할 수 있도록 상기 특정 단말에 의해서 사용되지 않은 무선 자원을 재할당한다.

본 발명의 일 양상으로서, 이동 통신 시스템에서의 무선 자원 스케줄링 방법은, 단말에 대해 무선 자원을 할당하는 단계와, 상기 단말로부터 상기 할당된 무선 자원의 해제 요청을 수신하는 단계 및 상기 해제 요청된 무선 자원을 다른 단말로 재할당하는 단계를 포함하여 이루어진다.

본 발명의 다른 양상으로서, 이동 통신 시스템의 단말에서의 무선 자원 스케줄링 방법은,

네트워크로부터 할당받은 무선 자원을 통해 데이터를 전송하는 단계와, 데이터 전송을 완료한 후 상기 할당받은 무선 자원의 해제 요청을 상기 네트워크로 전송하는 단계 및 상기 해제 요청된 무선 자원에 대한 할당이 해제되었음을 나타내는 정보를 상기 네트워크로부터 수신하는 단계를 포함하여 이루어진다.

상술한 본 발명의 목적, 구성 및 다른 특징들과 관련한 바람직한 실시 형태의 예들을 첨부된 도면을 참조하여 다음의 상세한 설명을 통해서 상세히 설명한다. 첨부된 도면과 함께 이하에 게시될 상세한 설명은 본 발명의 예시적인 실시 형태를 설명하고자 하는 것이며, 본 발명이 실시될 수 있는 유일한 실시 형태를 나타내고자 하는 것이 아니다. 또한, 이하의 설명에서 상향링크 신호를 송신하는 주체로서 "단말"을, 수신 주체로서 "기지국"을 중심으로 설명하나, 이들 용어에 한정될 필요는 없으며 상향링크 송신 주체로서 "사용자 기기(UE)", 수신 주체로서 "노드 B(eNode B)" 등 임의의 용어로서 지칭되는 경우 역시 동일한 의미를 나타낸다. 또한, 본 명세서 전체에서 동일한 구성요소에 대해서는 동일한 도면 부호를 사용하여 설명한다.

이하에서 설명되는 실시 형태들은 본 발명의 기술적 특징이 OFDM을 기반으로 한 LTE 시스템에서의 적용된 경우에 대한 것들이다. OFDM 시스템에서는 CDMA 시스템과는 달리 기지국에서 단말로 상향링크 또는 하향링크의 무선 자원을 스케줄링 하는 경우에, 특정 부 반송파(subcarrier)들과 특정 시간(subframe)으로 구성된 하나의 자원 블록(Resource Block; 이하 "RB")을 할당한다. 즉, 이렇게 할당된 RB들을 통해서 기지국 또는 단말은 데이터를 송수신하게 된다.

도 6은 본 발명의 바람직한 일 실시 형태에 따른 절차 흐름도이다. 데이터 전송 등에 대한 스케줄링은 기지국이 아닌 다른 주체를 통해서도 수행될 수 있지만, 이하 설명되는 본 발명의 일 실시 형태의 경우 기지국에서 수행하는 것으로 가정하여 설명한다.

기지국은 데이터 송수신을 위한 무선 자원들을 연결이 수립된 각 단말에 대해 할당한다. 앞서 언급한 바와 같이 상기 무선 자원은 RB들을 의미한다. 상기 무선 자원은 단말의 요청에 따라 할당할 수 있고, 단말의 요청이 없는 경우라도, 기지국에서 단말에 미리 할당해 둘 수 있다. 상기 단말의 무선 자원 요청은 RACH, CQI, ACK/NACK 그리고 제2계층의 데이터 형식을 통하여 수행된다. 각 단말은 기지국으로부터 할당받은 상향링크의 무선 자원을 가지고 있다(S60).

단말의 전송의 주체가 되는 상향링크 전송에서 각 단말은 상기 할당받은 무선 자원을 이용하여 상향링크의 데이터 전송을 완료한다. 상기 무선 자원을 사용하여 데이터 전송을 완료한 후에도 상기 단말에 할당받은 상향링크의 무선 자원이 남아있을 수 있다(S61). 예를 들면, 기지국이 특정 단말의 상향링크의 무선 자원으로 100 RB들을 할당했다고 가정한다. 실제로 상기 단말이 상향링크의 데이터 전송에 사용한 무선 자원은 80 RB들인 경우에는, 상기 단말에 20 RB만큼의 무선 자원이 남아 있게 된다.

위와 같이 특정 단말이 상향링크 데이터 전송을 완료한 후에 남아 있는 무선 자원이 있는 경우에는 이와 같은 사실을 알리기 위해서 상기 기지국으로 특정 제어 신호를 포함한 메시지를 전송한다. 바람직하게, 상기 특정 제어 신호는 단말에 할당된 무선 자원에 대해 해제하라는 무선 자원 할당 해제 요청(Request for

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de-allocation of the allocated uplink radio resource) 신호이다.

상기 무선 자원 할당 해제 요청 신호는, 도 3을 통해 설명한 제2계층의 데이터 형식으로 전송되거나, 특정 물리채널을 통하여 전송될 수 있다.

먼저 상기의 무선 자원 할당 해제 요청 신호를 포함하는 메시지를 제2계층의 데이터 형식으로 전송하는 방법의 일례에 대해서 설명한다. 상기 무선 자원 할당 해제 요청 신호를 예를 들어, MAC 계층의 PDU(Protocol Data Unit)에 포함하여 상기 기지국으로 전송한다. MAC 계층의 PDU에 상기 무선 자원 할당 해제 요청 신호를 포함하여 전송하는 경우, 상기 무선 자원 할당 해제를 요청하기 위한 메시지는 1 비트의 지시자(Indicator)를 이용할 수 있다. 즉, 상기 1 비트의 지시자가 "1"인 경우에는 상기 특정 단말의 버퍼에 상향링크로 전송할 데이터가 아직 있는 것을 의미한다. 반면에 "0"인 경우에는 상기 특정 단말의 버퍼에 더 이상 전송할 데이터가 없으며 데이터 전송이 완료되었음을 의미한다. 즉 "0"의 지시자를 수신한 경우 기지국에서는 상기 특정 단말의 상향링크 데이터 전송이 완료되었음을 알 수 있다. 반대로, 지시자가 "1"인 경우가 데이터 전송이 완료되었음을 의미하고 "0"인 경우가 상향링크로 전송할 데이터가 아직 있는 것으로 정의할 수도 있음은 자명하다.

다른 방법으로는 전송 채널의 일종인 RACH를 이용할 수도 있다. 상기 RACH은 단말이 망으로 초기 제어메시지를 전송하기 위한 채널이다. 일반적으로 RACH를 이용하는 목적은 단말이 망과 시간 동기를 맞추기 위한 것과 단말이 상향링크로 데이터 전송이 필요한데 상기 데이터를 전송할 상향링크의 무선자원이 없는 경우에 무선자원을 획득하는 것이다. 상기 특정 단말은 무선 자원 할당 해제 요청 신호를 RACH를 통하여 기지국에 전송한다. 이 경우에는 프리앰블(preamble)에 상기 사항을 알리는 지시자가 포함될 수 있다.

또 다른 방법은 상향링크의 제어신호를 이용하는 것이다. 다른 상향링크의 제어신호와 함께 전송될 수도 있다. 상기의 상향링크의 제어신호는 CQI, ACK/NACK등이 있다. 즉, 상기 단말이 CQI, ACK/NACK을 전송할 때, 상기 단말의 데이터 전송이 완료됨을 알리기 위해 상기 제어신호에 상기 무선 자원 할당 해제 요청 신호를 함께 전송한다. 이 경우에도 1 비트의 지시자(Indicator)를 사용하여 상기 무선 자원 할당 해제 요청 신호를 전송할 수 있다.

또 다른 방법으로는 상기 무선 자원 할당 해제 요청 신호의 전송을 위한 전용 물리채널을 이용하여 전송할 수도 있다.

상기 무선 자원 할당 해제 요청 신호를 수신한 기지국은 사용되지 않는 무선 자원이 있음을 알게 된다. 따라서, 상기 남는 무선 자원 즉, 상기 특정 단말에 의해서 할당이 해제된 무선 자원에 대해서 다른 단말에 대해 재할당한다(S63). 상기 기지국은 다른 단말들의 무선 자원 요청이 있는 경우에, 상기의 할당 해제된 무선 자원을 상기 다른 단말의 요청에 따라 할당할 수 있고, 다른 단말의 요청이 없는 경우라도, 기지국에서 단말에 할당할 수 있다. 이 경우에도 상기 다른 단말의 무선 자원 요청은 RACH, CQI, ACK/NACK 그리고 제2계층의 데이터 형식을 통하여 수행된다.

또 7은 본 발명의 다른 실시 형태에 따른 절차 흐름도이다. 도 7을 참조하면, 특정 단말이 기지국으로부터 일부 무선 자원을 할당받아 할당받은 무선 자원을 통해서 데이터를 송수신하는 과정은 동일하게 수행된다(S71, S72). 또한, 상기 데이터 송수신 완료된 후에도 남아 있는 무선 자원이 있는 경우에 상기 기지국으로부터 무선 자원 할당 해제 요청 신호를 전송하는 과정도 동일하게 수행된다(S72). 이 경우에도 상기 무선 자원 할당 해제 요청 신호는 제2계층의 데이터 형식으로 전송될 수 있고, 전송 채널의 일종인 RACH를 통해서 전송될 수 있고, CQI, ACK/NACK 등의 제어 신호를 전송할 때 함께 전송할 수도 있다. 상기 무선 자원 할당 해제 요청 신호에 대해 1 비트의 지시자(Indicator)를 사용하여, 상기 지시자가 "1"인 경우와 "0"인 경우를 각각 단말의 버퍼에 전송할 데이터가 남아있는 경우와 모두 전송한 경우 등의 해나로 설정하여 상기 기지국에 단말의 버퍼에 대한 정보를 알릴 수 있다.

기지국은 단말로부터 전송받은 무선 자원 할당 해제 요청 신호에 따라, 상기 특정 단말로 상기 할당된 무선 자원이 해제되었음을 알리기 위한 무선 자원 할당 해제 완료 메시지를 전송한다(S73). 상기 무선 자원 할당 해제 완료 메시지를 전송하여, 상기 기지국이 상기의 무선 자원을 다른 단말로 재할당하는 경우 상기 특정 단말이 다시 상기 무선 자원을 사용하여 충돌이 발생하는 것을 막을 수 있다. 상기의 무선 자원 할당 해제 완료 메시지는 제1계층 또는 제2계층의 제어 신호를 통하여 전송할 수 있다. 또는, 하향 링크 SCH(DL-SCH)를 통해서 전송될 수도 있다.

상기 기지국은 무선 자원 할당 해제 완료 메시지를 전송한 후, 상기 특정 단말이 전송한 무선 자원 할당 해제 요청 신호에 따라, 할당이 해제된 무선 자원을 다른 단말들에 재할당한다. 상기 다른 단말들에 대해 재할당할 때는 상기 다른 단말들로부터 무선 자원 할당 요청을 수신하여 할당할 수도 있고, 상기 요청이 없는 경우라도 상기 기지국이 할당할 수도 있다.

이상에서 설명한 본 발명이 속하는 기술분야의 당업자는 본 발명이 그 기술적 사상이나 필수적 특징을 변경하지 않고서 다른 구체적인 형태로 실시될 수 있다는 것을 이해할 수 있을 것이다. 그러므로 이상에서 기술한 실시 형태는 모든 면에서 예시적인 것이며 한정적인 것이 아닌 것으로서 이해할 것이다. 본 발명의 범위는 상기 상세한 설명보다는 후술하는 특허청구범위에 의하여 나타내어지며, 특허청구범위의 의미 및 범위 그리고 그 등가한 개념으로부터 도출되는 모든 변경 또는 변형된 형태가 본 발명의 범위에 포함되는 것으로 해석될 것이다.

발명의 효과

본 발명에 따르면 단말이 상향링크로 데이터 전송이 완료된 후에도 여전히 할당된 무선 자원이 남아 있는 경우에, 단말에서 전송되는 제어 신호를 이용하여, 다른 단말들에게 상기 무선 자원을 재할당해 줄 수 있는 방법을 통해, 낭비되는 무선 자원을 최소화할 수 있는 효과가 있고, 또한, 이동 통신 시스템에서의 데이터 송수신의 효율성을 높이는 효과가 있다.

청구의 범위

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청구항 1

이동 통신 시스템에서의 무선 자원 스케줄링 방법에 있어서,

단말에 대해 무선 자원을 할당하는 단계;

상기 단말로부터 상기 할당된 무선 자원의 해제 요청을 수신하는 단계; 및

상기 해제 요청된 무선 자원을 다른 단말로 재할당하는 단계

를 포함하는 것을 특징으로 하는 무선 자원 스케줄링 방법.

청구항 2

제 1 항에 있어서,

상기 단말로 상기 단말에 할당되었던 무선 자원이 해제되었음을 나타내는 정보를 전송하는 단계를 더 포함하는 것을 특징으로 하는 무선 자원 스케줄링 방법.

청구항 3

제 1 항에 있어서,

상기 할당된 무선 자원의 해제 요청에는, 상기 할당받은 무선 자원을 통해 데이터를 전송하고 남아 있는 무선 자원에 대한 정보 및 상기 단말의 버퍼에 더 이상 전송할 데이터가 없음을 알리기 위한 정보 중에서 적어도 하나를 포함하는 것을 특징으로 하는 무선 자원 스케줄링 방법.

청구항 4

제 1 항에 있어서,

상기 무선 자원의 할당을 위해서 상기 단말로부터 무선 자원 할당 요청을 수신하는 단계를 더 포함하는 것을 특징으로 하는 무선 자원 스케줄링 방법.

청구항 5

이동 통신 시스템의 단말에서의 무선 자원 스케줄링 방법에 있어서,

네트워크로부터 할당받은 무선 자원을 통해 데이터를 전송하는 단계;

데이터 전송을 완료한 후 상기 할당받은 무선 자원의 해제 요청을 상기 네트워크로 전송하는 단계; 및

상기 해제 요청된 무선 자원에 대한 할당이 해제되었음을 나타내는 정보를 상기 네트워크로부터 수신하는 단계

를 포함하는 것을 특징으로 하는 무선 자원 스케줄링 방법.

청구항 6

제 5 항에 있어서,

상기 무선 자원 할당 해제 요청은, 제2계층의 데이터 형식으로 전송되는 것을 특징으로 하는 무선 자원 스케줄링 방법.

청구항 7

제 5 항에 있어서,

상기 무선 자원 할당 해제 요청은, 상향 링크 제어 신호와 함께 전송되는 것을 특징으로 하는 무선 자원 스케줄링 방법.

청구항 8

제 5 항에 있어서,

상기 무선 자원 할당 해제 요청은, 전용 물리 채널(Dedicated Physical Channel) 및 RACH(Random Access Channel) 중에서 적어도 하나를 통해 전송되는 것을 특징으로 하는 무선 자원 스케줄링 방법.

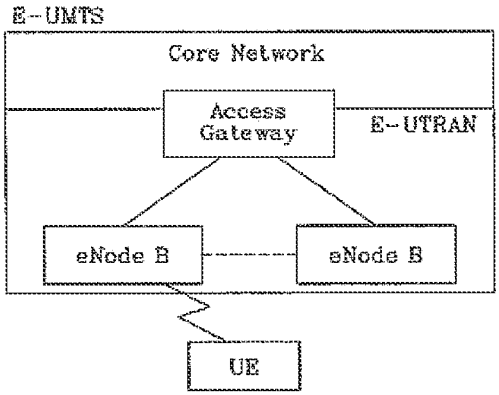
청구항 9

제 5 항에 있어서,

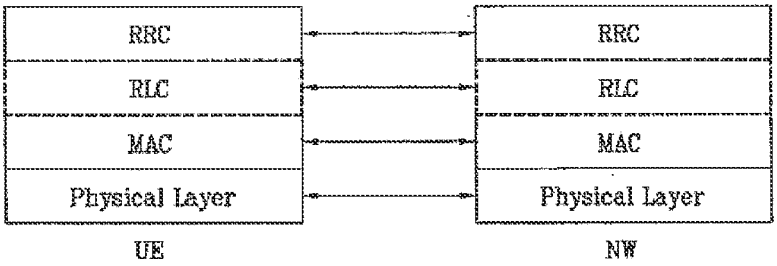
상기 무선 자원 할당 해제 요청은, 일정 비트 수로 구성된 지시자(Indicator)를 이용하는 것을 특징으로 하는 무선 자원 스케줄링 방법.

도면

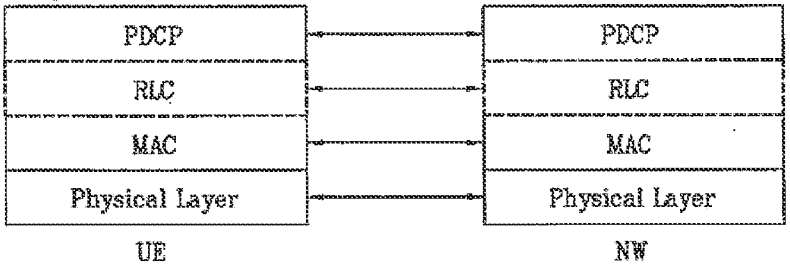
도면1



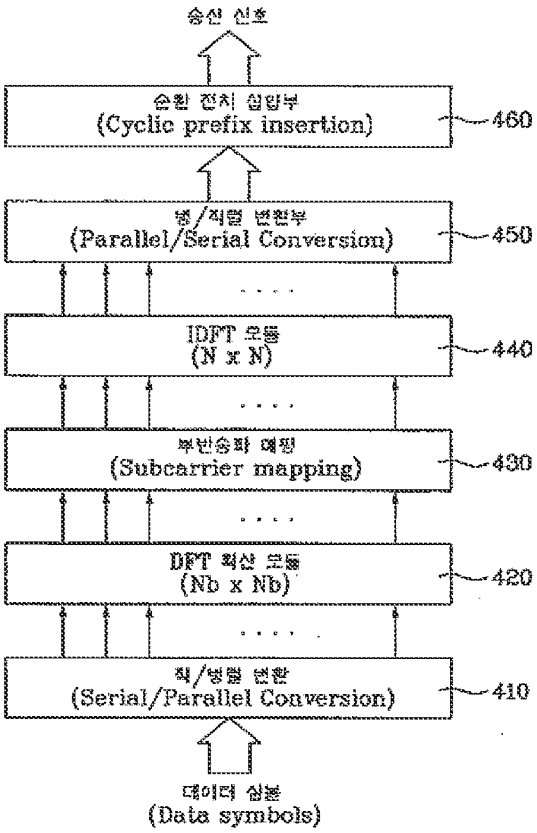
도면2



도면3



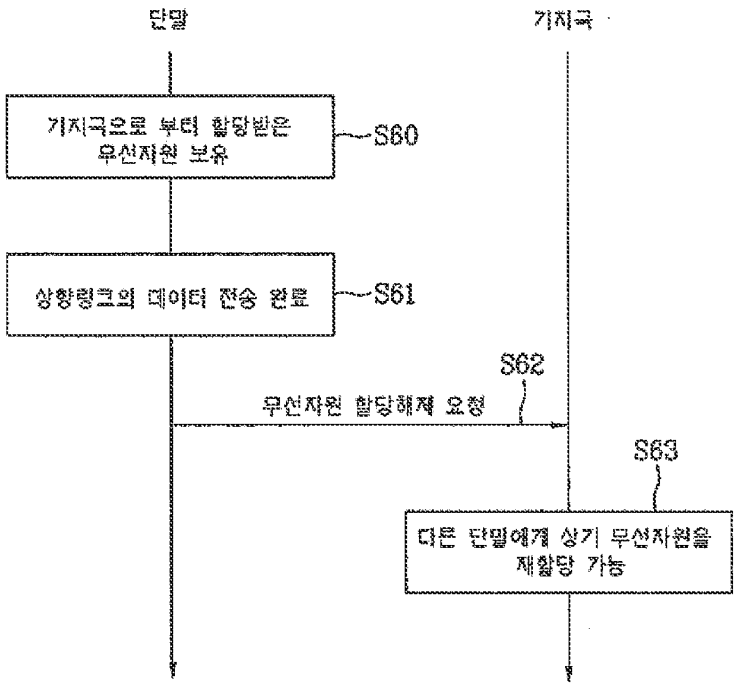
도면4


송신 신호
순환 전치 삽입부
(Cyclic prefix insertion)
460
병/직렬 변환부
(Parallel/Serial Conversion)
450
IDFT 모듈
(N x N)
440
부반송파 매핑
(Subcarrier mapping)
430
DFT 확산 모듈
(Nb x Nb)
420
직/병렬 변환
(Serial/Parallel Conversion)
410
데이터 심볼
(Data symbols)

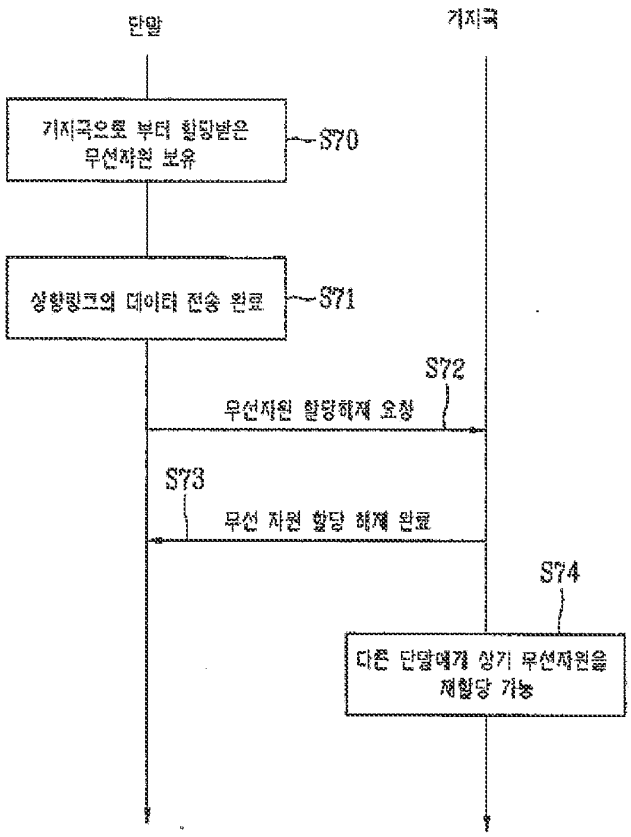
도면

출원번호 10-2007-0073578

도면6


단말
기지국
기지국으로 부터 할당받은 무선자원 보유
S60
상향링크의 데이터 전송 완료
S61
S62
무선자원 할당해제 요청
S63
다른 단말에게 상기 무선자원을 재할당 가능

도면7


단말
기지국
기지국으로 부터 할당받은 무선자원 보유
S70
상향링크의 데이터 전송 완료
S71
S72
무선자원 할당해제 요청
S73
무선 자원 할당 해제 완료
S74
다른 단말에게 상기 무선자원을 재할당 가능

Espacenet

Bibliographic data: RU2005122724 (A) — 2007-01-27

METHOD AND DEVICE FOR EXECUTING UNPLANNED TRANSFER IN MOBILE COMMUNICATION SYSTEM FOR SUPPORTING IMPROVED DEDICATED UPLINK CHANNEL

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Classification:	**- international:** ***H04B7/26; H04W72/12***
	- European: H04W72/12F2
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Also published as:	RU2305371 (C2) EP1617607 (A1) EP1617607 (B1) US2006023629 (A1) US7756087 (B2) more

Abstract of RU2305371 (C2)

FIELD: mobile communications, code division multi-access systems. ^ SUBSTANCE: mobile communication system, using improved dedicated transport channel uplink, transfers data at relatively low efficient data transmission speed by means of an unplanned transmission. Time intervals of data transmission for user equipment units have various values in unplanned transmission and therefore interference in uplink is decreased. Period N of unplanned transmission and number of unplanned transmissions k are determined in such a way, that each user equipment unit realizes an unplanned transmission. Unit B and each user equipment unit are notified about possible time intervals of unplanned transmission, on basis of certain period n of unplanned transmission and certain number of unplanned transmissions k, by means of signal transfer.; User equipment unit transmits data through an uplink without planning by unit B in possible time intervals of unplanned transmission. ^ EFFECT: increased

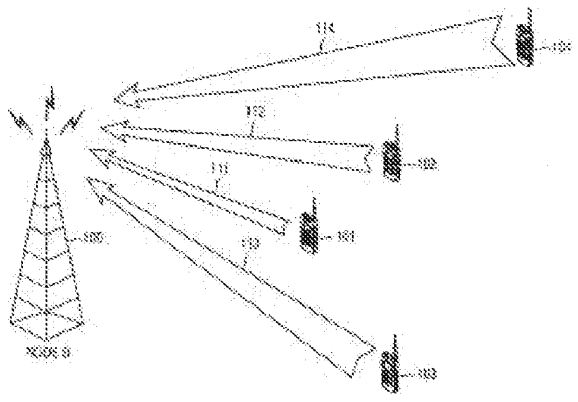


FIG.1

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efficiency of autonomous transfer and decreased interference in the uplink. ^ 6 cl, 9 dwg

Last updated: 14.03.2012 Worldwide Database 5.7.38; 93p

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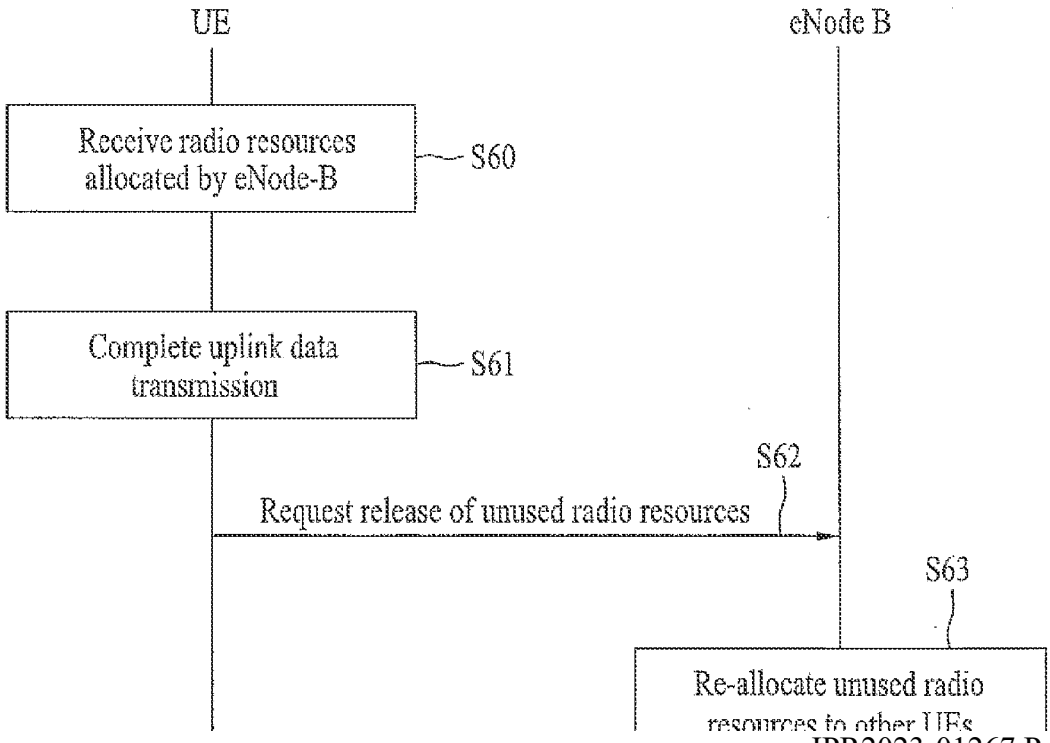
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(81) Designated States *(unless otherwise indicate kind of national protection available)*: AE, A AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, C CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID JP, KE, KG, KM, KN, KP, KZ, LA, LC, LK, LU, LV, LY, MA, MD, MG, MK, MN, MW, M NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, R SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, T TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM,

(84) Designated States *(unless otherwise indicate kind of regional protection available)*: ARIP GM, KE, LS, MW, MZ, NA, SD, SL, SZ, T ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, R European (AT, BE, BG, CH, CY, CZ, DE, DK FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, C GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued o

Title: METHOD FOR SCHEDULING RADIO RESOURCES IN MOBILE COMMUNICATION SYSTEM



TECHNICAL FIELD

The present invention is directed to a mobile communication system, and, specifi method for scheduling radio resources in a mobile communication system.

BACKGROUND ART

FIG. 1 is a structural diagram illustrating a Long Term Evolution (LTE) system v mobile communication system. The LTE system is an evolved version of a convent TS system and has been standardized by the 3GPP (3rd Generation Partnership Proje

The LTE network may be generally classified into an Evolved UMTS Terrestrial R ess Network (E-UTRAN) and a Core Network (CN). The E-UTRAN includes at eNode-B serving as a base station and an Access Gateway (AG) located at the end o ork so that it is connected to an external network.

The AG may be classified into a portion that handles user traffic and a portion les control traffic. A first AG that handles user traffic may communicate with a se that handles control traffic via a new interface. A single eNode-B may include at ell.

A first interface for transmitting user traffic or a second interface for transmi ol traffic may be located between several eNode-Bs. The CN includes the AG a lity of nodes for registering users of User Equipment (UEs). If required, an

cally includes a User Plane for transmitting data and a Control Plane for transmitt
rol signaling.

The protocol layers shown in FIG. 2 may be classified into the first layer (L1)
nd layer (L2), and the third layer (L3) on the basis of three lower layers of an
em Interconnection (OSI) reference model that is well known in the art.

The physical layer which is as the first layer (L1) provides an Information Tra
ice over a physical channel. A radio resource control (RRC) layer located at the
(L3) controls radio resources between the UE and the network.

The RRC layer exchanges RRC messages between the UE and the network for
ose. The RRC layer may be distributed to a plurality of network nodes, such as eNo
AG, and may also be located at the eNode-B or the AG.

A radio protocol control plane will be described with reference to FIG. 2. The
ocol control plane includes a physical layer, a Medium Access Control (MAC) lay
o Link Control (RLC) layer and a Radio Resource Control (RRC) layer.

The physical layer transmits an Information Transfer Service to an upper layer o
ical channel while acting as the first layer (L1). The physical layer is connected
um Access Control (MAC) layer located thereabove via a transport channel.

The MAC layer communicates with the physical layer over the transport channel
data is transferred between the MAC layer and the physical layer. Data is transfe
een respectively different physical layers, such as between a first physical layer

IAC layer, the RLC layer itself may not need to exist.

The RRC (Radio Resource Control) layer located at the lowermost part of the (L3) is only defined in the control plane. The RRC layer handles the control of lo nels, transport channels and physical channels in relation to configura nfiguration and release of Radio Bearers (RBs). An RB refers to a service th ided by the second layer (L2) for data transfer between the UE and the E-UTRAN.

FIG. 3 is a conceptual diagram illustrating a User Plane of a radio interface prot ture between the UE and the UTRAN according to the 3GPP radio access net lard. The radio protocol user plane includes the physical layer, the MAC layer, the and the PDCP layer.

The physical layer of the first layer (L1) and the MAC and RLC layers of the se (L2) are the same as those illustrated in FIG. 2. A PDCP layer of the second layer rms header compression to reduce the size of a relatively-large IP packet he ining unnecessary control information in order to effectively transmit IP packets, v4 or IPv6, within a radio-communication period having a narrow bandwidth.

Uplink and downlink channels for transmitting data between the network and the nereinafter be described in detail. Downlink channels transmit data from the netwo E. Uplink channels transmit data from the UE to the network.

Examples of downlink channels are a Broadcast Channel (BCH) for transmi n information and a downlink Shared Channel (SCH) and a Shared Control Cha

ed channel (SCH) and a shared control channel (SCCH) for transmitting user trai
rol messages.

An orthogonal frequency division multiplexing (OFDM) scheme for use in the phy
r which is the first layer will hereinafter be described in detail. The OFDM sch
les a high-speed data stream into several low-speed data streams and simultaneo
smits the low-speed data streams over a plurality of carriers. Here, each of the plu
arriers is a subcarrier.

The OFDM scheme has orthogonality between several subcarriers. Therefore
uency components of the subcarriers can be detected at the receiving side alth
uency components of the subcarriers overlap each other.

The high-rate data stream is converted into several low-speed data streams b
l/parallel converter, which is also called a "serial to parallel converter." Each o
arriers is multiplied by the parallel data streams generated by the serial/parallel conv
the resultant data streams are summed such that the sum of the data streams is transm
e receiving side.

The parallel data streams generated by the serial/parallel converter may be transm
destination over a plurality of subcarriers according to an Inverse Discrete Fo
sform (IDFT) scheme. The IDFT may be effectively implemented by an Inverse
ier Transform (IFFT) scheme.

Temporal signal dispersion generated by the multi-path delay spreading suc

A conventional Orthogonal Frequency Division Multiple Access (OFDMA) sch hereinafter be described in detail. The OFDMA scheme transmits some part arriers available for a system based on OFDM modulation to individual users such t iple access function may be implemented for the users.

The OFDMA scheme transmits frequency resources called subcarriers to the u frequency resources are transmitted to the users independent of each other such that ot overlap each other. As a result, the frequency resources are exclusively allocate sers such that there is no overlapping.

FIG. 4 is a block diagram illustrating a transmitter based on a Discrete Fou sform Single-Orthogonal Frequency Division Multiple (DFT-S-OFDM) sche nafter referred to as a "DFT-S-OFDM transmitter." A conventional DFT-S-OF me will be described with reference to FIG. 4.

For the convenience of description, a plurality of variables will be defined. Vari is indicative of the number of subcarriers over which OFDM signals are transmi ble "Nb" is indicative of the number of subcarriers for a specific user. Variable "I ative of a Discrete Fourier Transform (DFT) matrix. Variable "s" is indicative of a ol vector. Variable "x" is indicative of a vector generated by data dispersion with ency domain. Variable "y" is indicative of an OFDM-symbol vector.

A Single Carrie-Frequency Division Multiple Access (SC-FDMA) system converts symbol(s) into a parallel signal using the serial/parallel converter 410 and perfo

ersion of the data symbol(s). The subcarrier mapping unit 430 performs subc
ping of the dispersed vector (x) using a specific subcarrier allocation technique.

The IFDT module 440 receives the mapped signal from the subcarrier mapping
and converts the received signal into a time-domain signal to generate a target signa
eceived at the receiving side via the parallel/serial converter 450. The target s
smitted to the receiving side can be represented by Equation 2:

[Equation 2] $y = F_{N\times N}^{-1} x$

With reference to Equation 2, $F_{N\times N}^{-1}$ indicates an N-sized IDFT matrix require
verting a frequency-domain signal to a time-domain signal. The cyclic prefix inse
460 inserts a cyclic prefix into the OFDM-symbol vector (y) such that the resultan
al including the cyclic prefix is transmitted to a destination.

A method for generating a transmission signal and transmitting the signal tc
iving side according to the above-mentioned scheme is referred to as an SC-FI
iod. The size of the DFT matrix can be controlled in various ways to implem
ific object.

FIG. 5 is a conceptual diagram illustrating a hybrid ARQ (HARQ) scheme. A me
mplementing HARQ in the downlink physical layer of a radio packet communic
m will be described with reference to FIG. 5.

Referring to FIG. 5, the eNode-B determines a UE that is to receive packets

gnizes the type and transmission point of the packet and receives the correspor
:et.

The UE transmits a negative acknowledgement (NACK) signal to the eNode-B i
fails to decode a specific packet, such as data1. The eNode-B recognizes that p
;mission has failed and re-transmits the same data, such as data1, using the same p
iat or a new packet format at a suitable time point. The UE combines the re-transm
:et, such as data1, and a previously-received packet for which packet decoding failec
tempts packet decoding.

The UE transmits an acknowledgement (ACK) signal to the eNode-B if the pack
ived and decoded successfully. The eNode-B recognizes successful packet transmis
performs transmission of the next packet, such as data2.

Some parts of the radio resources are allocated according to scheduling of the u
: in order to allow a plurality of eNode-Bs to communicate with a plurality of UEs
ed radio resources using a mobile communication system. The scheduling is gene
uted by the eNode-B(s), which communicate with the UEs using the allocated r
irces.

The eNode-B allocates radio resources to the UE upon receiving a request from th
eNode-B may also allocate the radio resources to the UE if there is a need to allc
resources to the UE in the absence of a request from the UE. The radio resource
allocated to the UE if there is a need to pre-allocate the radio resources to the UE.

resources that were pre-allocated to specific UEs to other UEs, thereby resultin
ective use of radio resources.

Disclosure of invention

Accordingly, the present invention is directed to a method for scheduling r
rces of a mobile communication system that substantially obviates one or r
lems due to limitations and disadvantages of the related art. An object of the pre
ntion is to provide a radio-resource scheduling method for improving efficiency of r
rces available for a mobile communication system, thereby facilitating more effi
munication between the UE and an eNode-B. Another object of the present inventi
rovide a radio-resource scheduling method for reducing an amount of wasted r
rces. Still another object of the present invention is to provide a radio-reso
duling method for effectively allocating radio resources using a message received fr
luring an uplink transmission by the UE.

In one aspect of the present invention, a method for scheduling radio resources
le communication system is provided. The method includes receiving an indicatio
ated radio resources, transmitting information using the allocated radio resources, e
nitting an indication that the radio resources are no longer needed or receivin
ation that the radio resources are no longer allocated and no longer transmi
nation using the radio resources.

ed includes transmitting either an uplink control signal or a preamble over a ran
ss channel (RACH). It is further contemplated that the indication that the radio reso
no longer needed includes an indication that there is no data left for transmission ov
nk path.

In another aspect of the present invention, a method for scheduling radio resources
ile communication system is provided. The method includes allocating radio reso
first mobile communication terminal, determining that the allocated radio resource
onger needed and re-allocating the radio resources to a second mobile communica
inal.

It is contemplated that determining that the allocated radio resources are no lo
led includes receiving an indication that the radio resources are no longer needed.
ner contemplated that receiving the indication that the radio resources are no lo
ed includes receiving either an uplink control signal or a preamble over a random ac
nel (RACH).

It is contemplated that the indication that the radio resources are no longer ne
des an indication that there is no data left for transmission over an uplink path.
er contemplated that determining that the allocated radio resources are no longer ne
des determining that the first mobile communication terminal has no additi
mation to transmit

It is contemplated that the method further includes transmitting an indication to the

ırces to a first mobile communication terminal, the first mobile communication ter
ımitting information using the allocated radio resources, determining that the allo
› resources are no longer needed, the network re-allocating the radio resources
nd mobile communication terminal and the first mobile communication termina
er transmitting information using the radio resources.

It is contemplated that determining that the allocated radio resources are no lc
led includes the first mobile communication terminal transmitting an indication tha
› resources are no longer needed. It is further contemplated that the first m
munication terminal transmits the indication that the radio resources are no longer ne
ther an uplink control signal or a preamble over a random access channel (RACH).

It is contemplated that the method further includes the network transmittin
cation to the first mobile communication terminal that the resources are no lo
cated. It is further contemplated that the indication that the resources are no lo
cated includes a message between a second protocol layer and a first protocol layer.

It is contemplated that determining that the allocated radio resources are no lo
ed includes the network determining that the first mobile communication terminal ha
ional information to transmit. It is further contemplated that the method further incl
ıetwork transmitting an indication to the first mobile communication terminal tha
ırces are no longer allocated. Preferably, the indication that the resources are no lc
ated includes a message between a second protocol layer and a first protocol layer

These and other embodiments will also become readily apparent to those skilled i
from the following detailed description of the embodiments having reference t
ched figures, the invention not being limited to any particular embodiments disclosed

Brief Description of Drawings

The accompanying drawings, which are included to provide a further understandi
invention and are incorporated in and constitute a part of this specification, illus
odiments of the invention and together with the description serve to explain
ciples of the invention. Features, elements, and aspects of the invention that
enced by the same numerals in different figures represent the same, equivalent, or sir
ures, elements, or aspects in accordance with one or more embodiments.

FIG. 1 is a structural diagram illustrating a conventional Long Term Evolution (
em which is a mobile communication system.

FIG. 2 is a conceptual diagram illustrating a Control Plane of a conventional r
face protocol structure between a UE and a UTRAN based on a 3GPP radio ac
ork standard.

FIG. 3 is a conceptual diagram illustrating a User Plane of a conventional r
face protocol structure between a UE and a UTRAN based on a 3GPP radio ac
ork standard.

FIG. 4 is a block diagram illustrating a conventional transmitter based on a DF

nunication system according to another embodiment of the present invention.

best mode for carrying out the inventionReference will now be made in detail t
erred embodiments of the present invention, examples of which are illustrated i
mpanying drawings. Wherever possible, the same reference numbers will be
ughout the drawings to refer to the same or like parts. A method for scheduling r
urces of a mobile communication system according to the present invention
inafter be described with reference to the accompanying drawings.

For the convenience of description and better understanding of the present inven
minal" is used to refer to a transmitter of an uplink signal and "base station" is used
ver of the uplink signal. However, it should be noted that the scope of "terminal"
e station" is not limited to the above-mentioned terms and "terminal" and "base stat
also be used to refer to, respectively, a UE and Node-B or eNode-B.

The following preferred embodiments of the present invention are implemented v
present invention is applied to an OFDM-based LTE system. The OFDM sy
ates a single resource block (RB) composed of both a specific subframe and spe
urrier when the eNode-B performs scheduling of uplink or downlink radio resou
the eNode-B to the UE. This is unlike a Code Division Multiple Access (CDI
m. The UE or the eNode-B can perform transmission/reception of data using
ated RBs.

The eNode-B allocates radio resources for data communication to individual ected to the eNode-B. As previously stated, the radio resources are indicative of RB

The radio resources may be allocated to the UEs upon receiving requests from the eNode-B may also pre-allocate the radio resources to the UEs as necessary ir ıce of requests from the UEs.

The UE radio resource request process is executed according to RACH, (/NACK and data types of a second layer. Each UE receives uplink radio resou ated by the eNode-B (step S60).

Each UE completes uplink data transmission using the allocated radio resources i ık transmission path in which the UE is a transmitter (Step S61). Uplink radio resou be left after the UE completes the data transmission using the radio resources.

For example, it is assumed that the eNode-B allocates 100 RBs as uplink r ırces of a specific UE. If the radio resources used for the uplink data transmission by re only 80 RBs, 20 RBs may be left in the UE.

The specific UE transmits a message including a specific information to the eNoc ler to inform the eNode-B of remaining radio resources (step S62) if there are remai resources after the specific UE completes uplink data transmission. Preferably, fic information is included in a "Request for de-allocation of the allocated uplink r rce" message, hereinafter referred to as a "radio resource allocation release req ıge", for requesting the eNode-B to release the allocated radio resources

For example, the above-mentioned radio resource allocation release request mes be contained in a Protocol Data Unit (PDU) of the MAC layer (hereinafter referred MAC PDU") and transmitted to the eNode-B. The radio resource allocation re est message may employ a 1-bit indicator if the radio resource allocation release re sage is contained in the MAC PDU such that the MAC PDU including the radio resc cation release request message is transmitted to a destination.

The 1-bit indicator is set to "1" to indicate that data for transmission for an up tains in a buffer of the specific UE. The 1-bit indicator is set to "0" to indicate that the more data for transmission left in the buffer of the specific UE.

The eNode-B recognizes the completion of uplink data transmission of the specific e 1-bit indicator set to "0" is received. Otherwise, the eNode-B recognizes that tains to be transmitted for the uplink in the specific UE if the 1-bit indicator set to " ved.

In another example, the RACH which is a representative transport channel may be transmitting the radio resource allocation release request message. The RACH repres nnel for transmitting an initial control message from the UE to the network.

Generally, the RACH is adapted to synchronize between the UE and the netw ermore, the UE can acquire necessary radio resources using the RACH if there i data left for transmission in a UE that desires to transmit data in an uplink direction.

The specific UE transmits a radio resource allocation release request message to

The information of the release request is contained in the CQI or ACK/NACK s
that the UE can inform the eNode-B of the completion of data transmission if th
mits the CQI or ACK/NACK signal. The UE may also transmit the information c
se request to the eNode-B using the 1-bit indicator.

In another example, a dedicated physical channel may be used for transmittin
resource allocation release request message. The eNode-B recognizes the presen
ed radio resources when it receives the radio resource allocation release request mes
eNode-B then re-allocates the unused radio resources, such as radio resources rele
specific UE, to other UEs (step S63).

The eNode-B may re-allocate the unused radio resources to the specific UE.
le-B may allocate the released radio resources to the UEs if it receives radio reso
est messages from other UEs.

The eNode-B may allocate the released radio resources to the other UEs in the abs
request from the other UEs, if required. The radio resource requests of the other
be executed according to random access channel (RACH), CQI, ACK/NACK, and
of the second layer.

FIG. 7 is a flow chart illustrating a method for scheduling radio resources of a m
nunication system according to another embodiment of the present invention.
rate in FIG. 7, the process for controlling the eNode-B to allocate some radio resou
specific UE and a process for controlling the specific UE to transmit/receive da

types of the second layer, may be transmitted over the RACH, or may be transmitte
mission time of the control signals, such as CQI and ACK/NACK. The 1-bit indica
as the radio resource allocation release request message.

Setting the 1-bit indicator to "1" indicates that the buffer of the UE still has data
mitted. Setting the 1-bit indicator to "0" indicates that there is no more dat
mission left in the buffer of the UE. In this way, the UE can inform the eNode-
mation regarding the state of the buffer.

The eNode-B transmits a radio resource allocation release completion message t
ific UE (step S73) upon receiving the radio resource allocation release request mes
a specific UE. The eNode-B can prevent the specific UE from re-using the
rces if the eNode-B re-allocates the radio resources to other UEs after transmittin
resource allocation release completion message, thereby preventing a collision betv
pecific UE and the other UEs from being generated.

The radio-resource allocation release completion message may be transmitted
ol signal of the first or second layer. The radio-resource allocation release compl
age may also be transmitted over a downlink shared channel (DL-SCH).

The eNode-B re-allocates released radio resources to other UEs when it receive
resource allocation release request message from the specific UE after transmittin
resource allocation release completion message. The radio resource allocation re
ages may be received from other UEs such that the released radio resources ca

:ated radio resources remain in the specific UE after it completes uplink
smission. In this way, efficiency of data communication in a mobile communic
em may be enhanced.

It will be apparent to those skilled in the art that various modifications and varia
be made in the present invention without departing from the spirit or scope o
ntions. Therefore, it is intended that the present invention covers the modification
ations of this invention provided they come within the scope of the appended claim
equivalents.

As the present invention may be embodied in several forms without departing fron
t or essential characteristics thereof, it should also be understood that the ab
ribed embodiments are not limited by any of the details of the foregoing descrip
ss otherwise specified, but rather should be construed broadly within its spirit and s
efined in the appended claims. Therefore, all changes and modifications that fall w
netes and bounds of the claims, or equivalence of such metes and bounds are intend
nbraced by the appended claims.

The foregoing embodiments and advantages are merely exemplary and are not t
trued as limiting the present invention. The present teaching can be readily applie
types of apparatuses.

The description of the present invention is intended to be illustrative, and not to
cope of the claims. Many alternatives, modifications, and variations will be appare

The present invention can be applied to a mobile communication system.

receiving an indication of allocated radio resources;

transmitting information using the allocated radio resources;

one of transmitting an indication that the radio resources are no longer needed

ving an indication that the radio resources are no longer allocated; and

no longer transmitting information using the radio resources.

2. The method according to claim 1, further comprising:

receiving an indication that the resources are no longer allocated after transmittin

ation that radio resources are no longer needed.

3. The method according to claim 1, wherein the indication that the resource

nger allocated comprises a message between a second protocol layer and a first prot

.

4. The method according to claim 1, wherein transmitting the indication tha

resources are no longer needed comprises transmitting one of an uplink control si

preamble over a random access channel (RACH).

5. The method according to claim 1, wherein the indication that the

re-allocating the radio resources to a second mobile communication terminal.

7. The method according to claim 6, wherein determining that the allocated r
ırces are no longer needed comprises receiving an indication that the radio resource
ɔnger needed.

8. The method according to claim 7, wherein receiving the indication tha
ɔ resources are no longer needed comprises receiving one of an uplink control signal
ɛamble over a random access channel (RACH).

9. The method according to claim 7, wherein the indication that the r
ırces are no longer needed comprises an indication that there is no data left
ımission over an uplink path.

10. The method according to claim 6, wherein determining that the allocated r
ırces are no longer needed comprises determining that the first mobile communica
inal has no additional information to transmit.

11. The method according to claim 10, further comprising:

transmitting an indication to the first mobile communication terminal that the reso

13. A method for scheduling radio resources in a mobile communication sy

nethod comprising:

a network allocating radio resources to a first mobile communication terminal;

the first mobile communication terminal transmitting information using the allo

) resources;

determining that the allocated radio resources are no longer needed;

the network re-allocating the radio resources to a second mobile communic

inal; and

the first mobile communication terminal no longer transmitting information usin

) resources.

14. The method according to claim 13, wherein determining that the allo

) resources are no longer needed comprises the first mobile communication ter

mitting an indication that the radio resources are no longer needed.

15. The method according to claim 14, wherein the first mobile communic

inal transmits the indication that the radio resources are no longer needed in one

k control signal and a preamble over a random access channel (RACH).

18. The method according to claim 13, wherein determining that the allo
› resources are no longer needed comprises the network determining that the first m
munication terminal has no additional information to transmit.

19. The method according to claim 18, further comprising:

the network transmitting an indication to the first mobile communication terminal
esources are no longer allocated.

20. The method according to claim 19, wherein the indication that the resou
ıo longer allocated comprises a message between a second protocol layer and a
›col layer.

FIG. 1

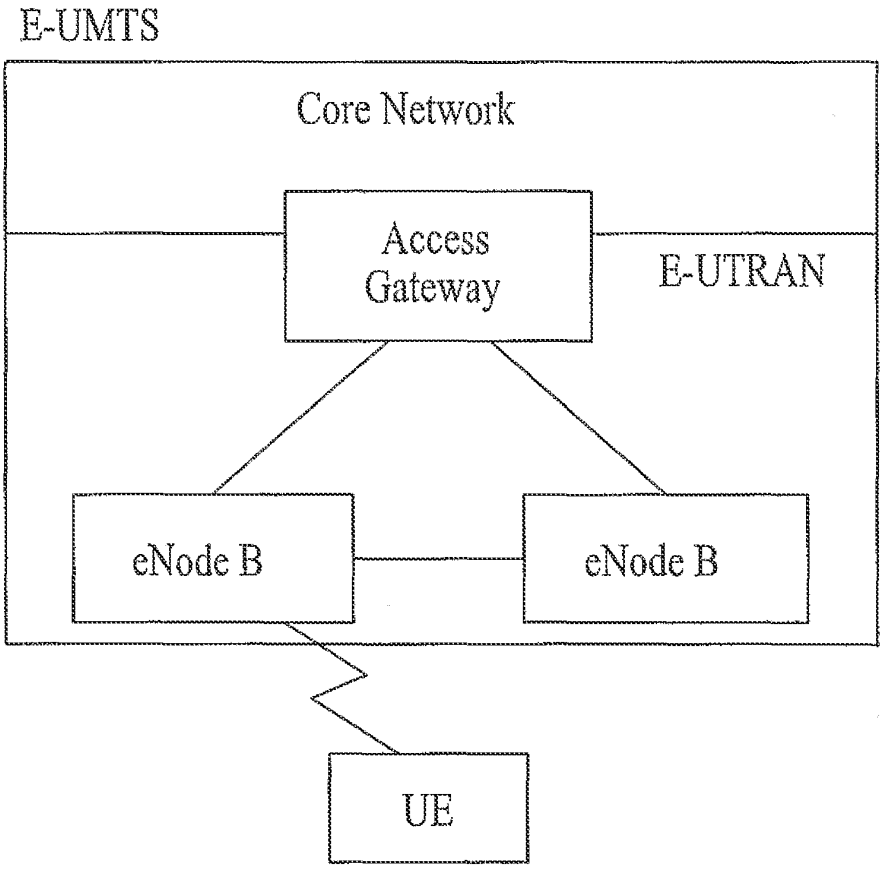


FIG. 2

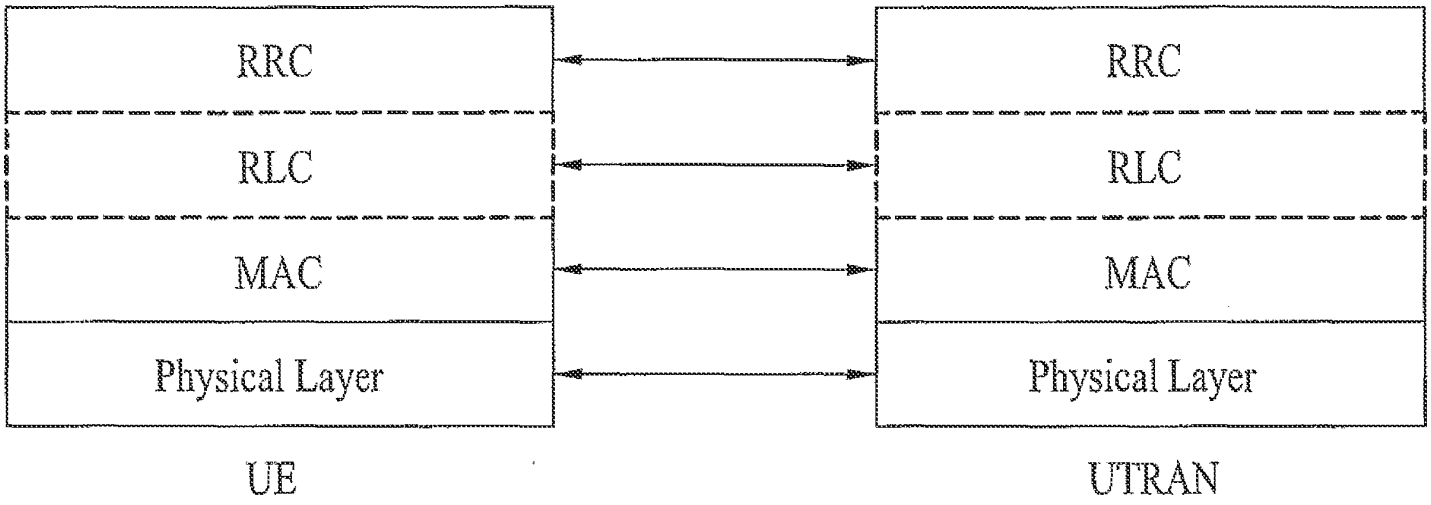

RRC
RLC
MAC
Physical Layer
RRC
RLC
MAC
Physical Layer
UE
UTRAN

FIG. 3

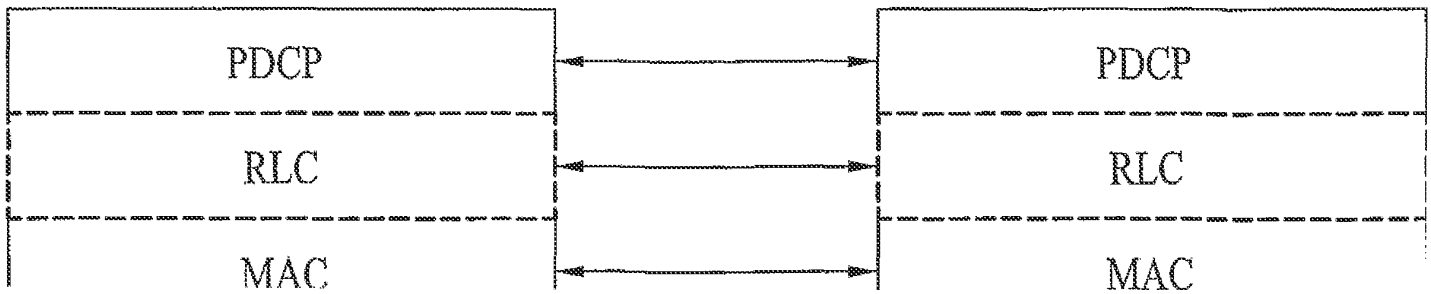

PDCP
RLC
MAC
PDCP
RLC
MAC

FIG. 4

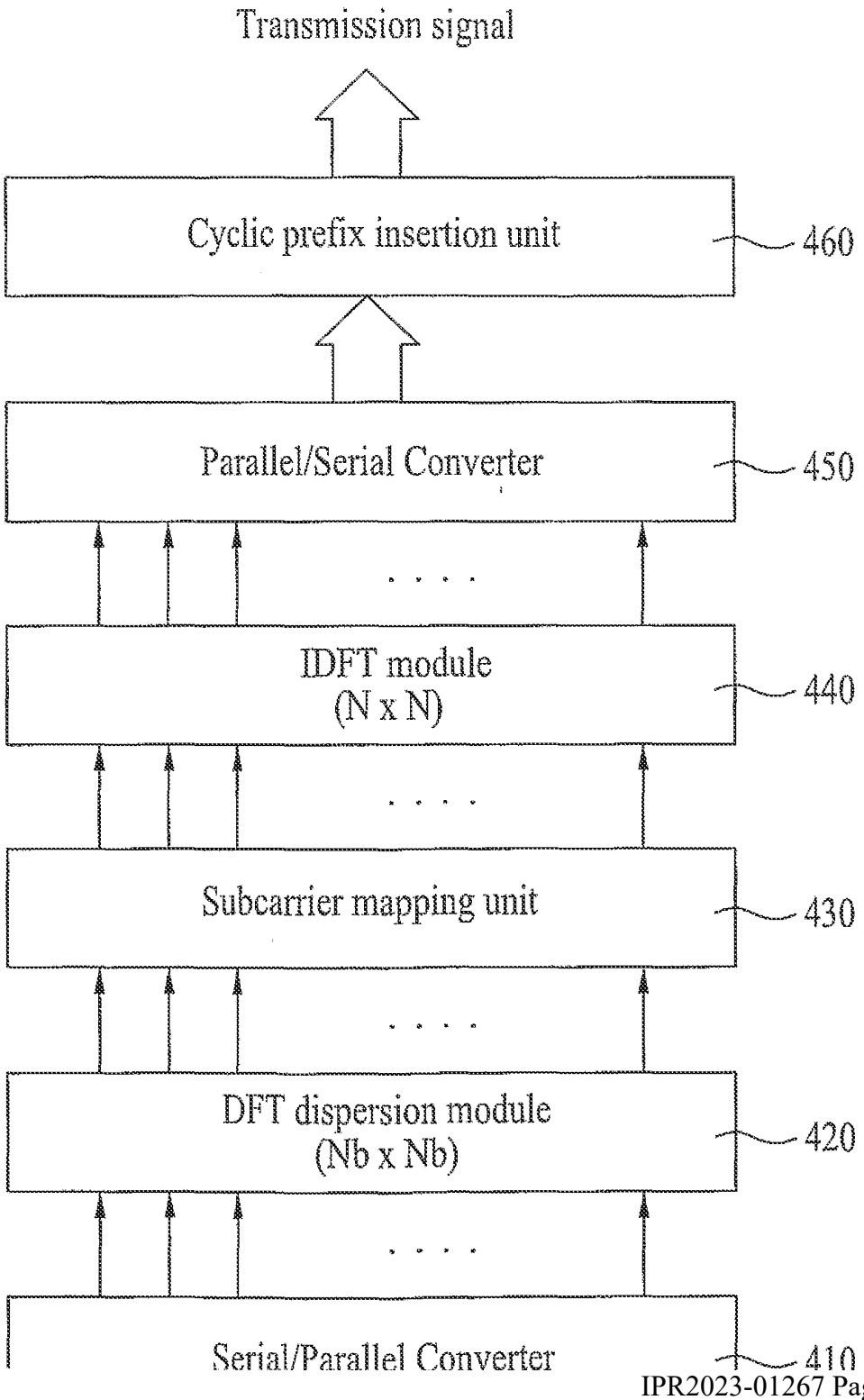
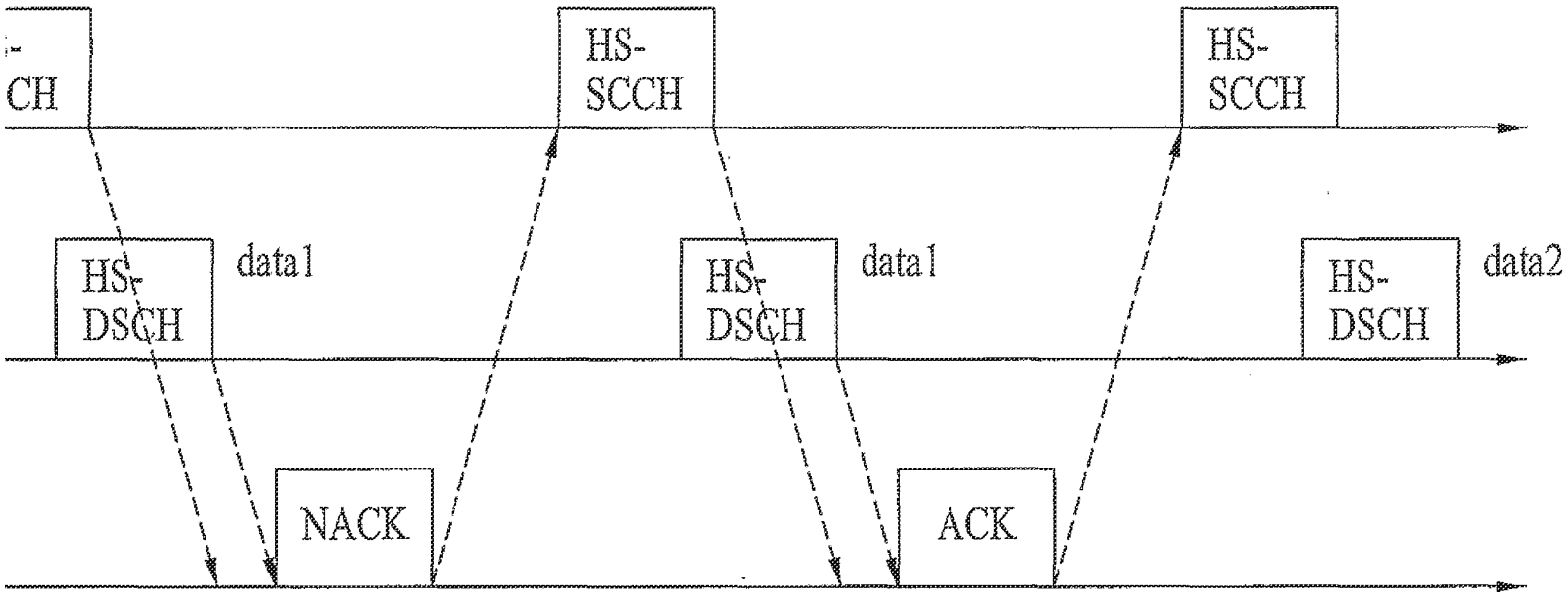

Transmission signal
Cyclic prefix insertion unit
460
Parallel/Serial Converter
450
IDFT module
(N x N)
440
Subcarrier mapping unit
430
DFT dispersion module
(Nb x Nb)
420
Serial/Parallel Converter
410

FIG. 5



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FIG. 6

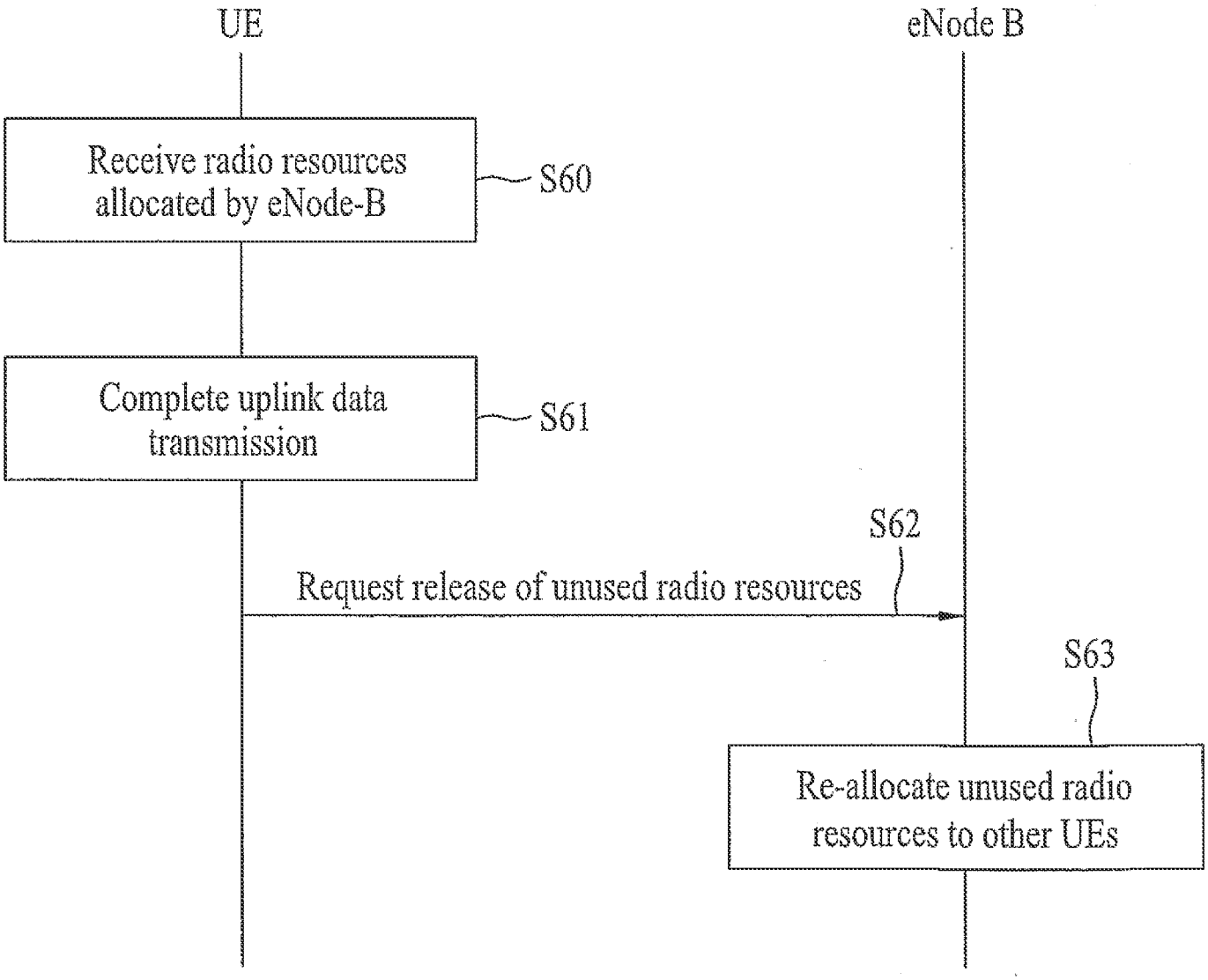
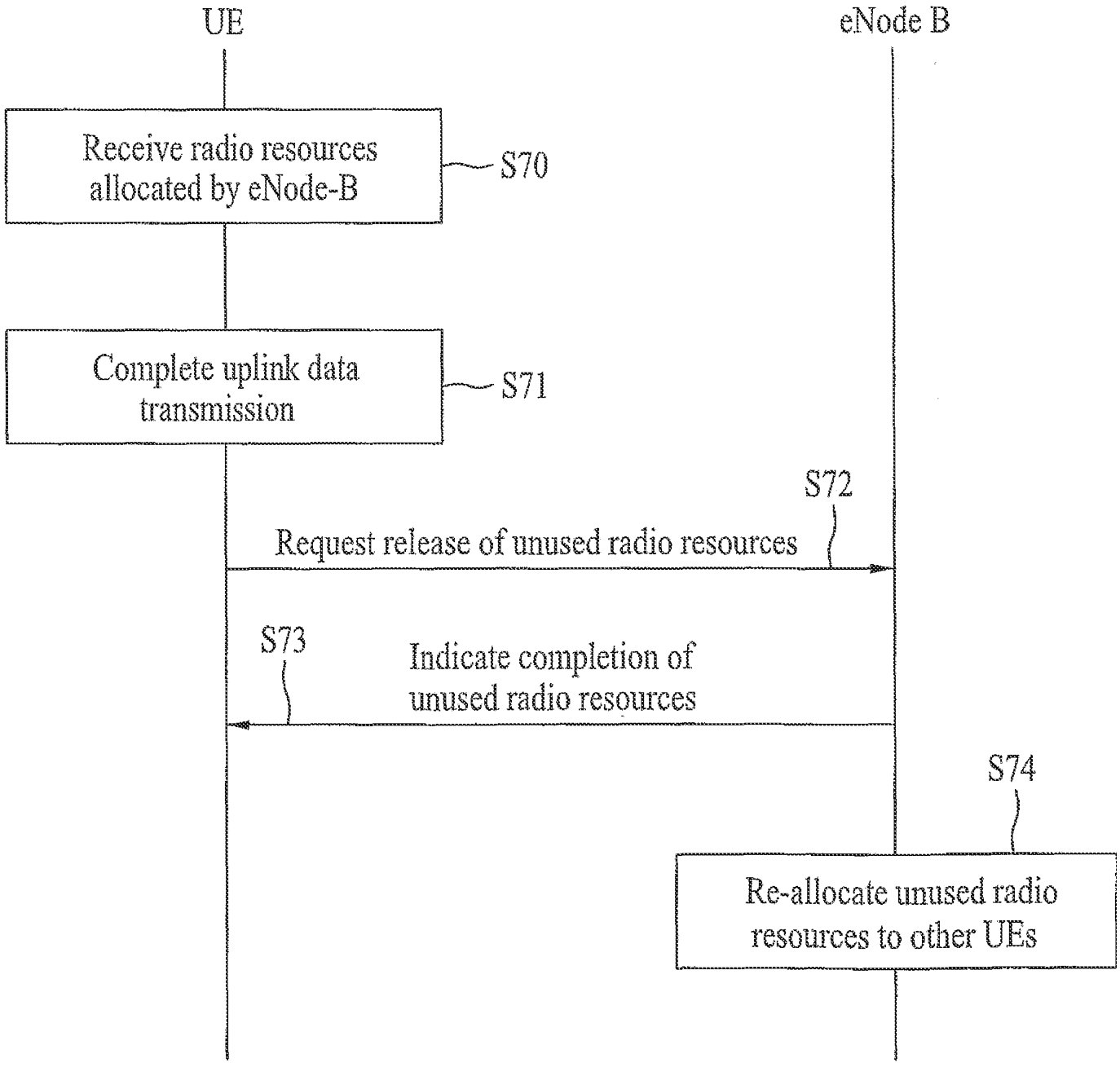

UE
eNode B
Receive radio resources allocated by eNode-B
S60
Complete uplink data transmission
S61
S62
Request release of unused radio resources
S63
Re-allocate unused radio resources to other UEs

FIG. 7


UE
eNode B
Receive radio resources allocated by eNode-B
S70
Complete uplink data transmission
S71
S72
Request release of unused radio resources
S73
Indicate completion of unused radio resources
S74
Re-allocate unused radio resources to other UEs

Electronic Patent Application Fee Transmittal	
Application Number:	12238910
Filing Date:	26-Sep-2008
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Filer:	LoriAnne D. Swanson/Juli Lawrence
Attorney Docket Number:	IHSP_2-1853.01.US
Filed as Large Entity	

Utility under 35 USC 111(a) Filing Fees

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

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	1801	1	930	930
		Total in USD ($)		**930**

Electronic Acknowledgement Receipt	
EFS ID:	12593169
Application Number:	12238910
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Confirmation Number:	2438
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Customer Number:	15800
Filer:	LoriAnne D. Swanson/Juli Lawrence
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Time Stamp:	15:09:03
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RAM confirmation Number	1662
Deposit Account	090435
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	IHSP_2_1853_01_US_RCE.pdf	697881 e1f07cee4aacd0fa98f7018f71a2469dc944c751	no	3
Warnings:					
Information:					
2		IHSP_2_1853_01_US_Supplemental_Reply_to_Final_OA_Dated_12_6_11.pdf	127390 e9537af942919448dee96df57beef5f7870e9c63	yes	9

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment Submitted/Entered with Filing of CPA/RCE	1	1
Claims	2	6
Applicant Arguments/Remarks Made in an Amendment	7	9

Warnings:					
Information:					
3	Transmittal Letter	IHSP_2_1853_01_US_SIDS_Trans_IDCC.pdf	104368 73c18cd04d3d4c1658291ac8cc19f032c88feddc	no	4
Warnings:					
Information:					
4	Information Disclosure Statement (IDS) Form (SB08)	IHSP_2_1853_01_US_SIDS_1449.pdf	126728 49f7351161a74b79306cebb10c475de0f0e4ad31	no	1
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
5	Non Patent Literature	3GPP_R2_071556_TSG_2_March2007_76pp1.pdf	554432 de569bea42d6724c7cd30f509baf6d8fbb09c04c	no	76
Warnings:					
Information:					
6	Non Patent Literature	3GPP_R2_080043_RANWG2_January2008_4pp.pdf	207985 e1719345d1e362f97232802257dfb6354ab1e8b5	no	4

Warnings:					
Information:					
7	Non Patent Literature	3GPP_R2_080894_RANWG2_February2008_4pp.pdf	145228 7abba271d429fd97426cb6ca7e6175b4f7a3c50d	no	4
Warnings:					
Information:					
8	Non Patent Literature	3GPP_R2_081581_RANWG2_MarchApril2008_6pp.pdf	315450 789b29ef2c609589b64b96b20288440e75b95201	no	6
Warnings:					
Information:					
9	Non Patent Literature	3GPP_R3_081091_RANWG3_May2008_4pp.pdf	186519 48116b31f6ce61f261ca7e8dd3617f230bfeceee	no	4
Warnings:					
Information:					
10	Foreign Reference	KR_10_2007_0073578_1.pdf	4029793 7150d4c8b19d15493bee70c88af325a1a038333e	no	13
Warnings:					
Information:					
11	Foreign Reference	RU_2005122724_1.pdf	140476 c7b2802388aa34e0198ba6001b74274bb5e9f98d	no	2
Warnings:					
Information:					
12	Foreign Reference	WO_2007078155_1.pdf	4549109 493a202179130b2d83518c6826177974389551bd	no	30
Warnings:					
Information:					
13	Fee Worksheet (SB06)	fee-info.pdf	30614 24c8152ec3bcf9dcf11a6d58eb5ac481d5816415	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	11215973		

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.

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

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	12/238,910	Filing Date	2008-09-26	Docket Number (if applicable)	IHSP_2-1853.01.US	Art Unit	2464
First Named Inventor	Pelletier, Benoit			Examiner Name	Yuen, Kan		

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 PTO-1449; 8 references

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 090435

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
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Lori Anne D. Swanson/	Date (YYYY-MM-DD)	2012-04-20
Name	Lori Anne D. Swanson	Registration Number	59048

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **Benoit Pelletier, et al.**	**Confirmation No.: 2438**
Application No.: 12/238,910	**Group Art Unit: 2464**
Filing Date: September 26, 2008	**Examiner: Kan Yuen**

For: Method And Apparatus For Terminating Transmission Of A Message In An Enhanced Random Access Channel

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

Sir:

SUPPLEMENTAL REPLY

Supplemental to the Reply filed on **April 6, 2011**, reconsideration is respectfully requested in view of the amendments and/or remarks as indicated below:

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

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

☐ **Amendments to the Drawings** begin on page of this paper and include an attached replacement sheet.

☒ **Remarks** begin on page 7 of this paper.

☒ The Commissioner is hereby authorized to charge any fee deficiency, charge any additional fees, or credit any overpayment of fees, associated with this application in connection with this filing, or any future filing, submitted to the U.S. Patent and Trademark Office during the pendency of this application, to Deposit Account No. 09-0435.

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

Listing of Claims:

1. (Currently Amended) A method for ~~terminating~~ completing an enhanced dedicated channel (E-DCH) transmission in a cell forward access channel (CELL_FACH) state by a wireless transmit/receive unit (WTRU), the method comprising:

the WTRU determining that a buffer is empty ~~by the WTRU~~;

on a condition that the buffer is empty, triggering a transmission by the WTRU of scheduling information (SI) in the E-DCH transmission with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero;

~~determining a condition of a last hybrid automatic repeat request (HARQ) data transmission;~~ and

on a condition that the buffer is empty ~~and the last HARQ data transmission has finished~~, the WTRU releasing a E-DCH resource allocation ~~by the WTRU~~.

2. (Original) The method as in claim 1, wherein an inactivity timer is started when the buffer is empty.

3. (Original) The method as in claim 2, wherein the transmission of the SI is triggered when the inactivity timer expires.

4. (Previously Amended) The method as in claim 1, wherein an E-DCH transmission occurs on a condition that a response is received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU.

5. (Currently Amended) The method as in claim 1, further comprising ~~terminating~~ completing the E-DCH transmission in case of cell reselection or radio link failure.

6. (Currently Amended) A wireless transmit/receive unit (WTRU) ~~method~~ for ~~terminating~~ completing an enhanced dedicated channel (E-DCH) in a cell forward access channel (CELL_FACH) state, the WTRU comprising:

a receiver;

a transmitter; and

a processor in communication with the receiver and the transmitter, the processor configured to:

determine that a buffer is empty;

on a condition that the buffer is empty, trigger a transmission of scheduling information (SI) in a E-DCH transmission with a total E-DCH buffer status (TEBS) equal to zero;

determine a condition of a last hybrid automatic repeat request (HARQ) data transmission being finished; and

on a condition that the buffer is empty ~~and the last HARQ data transmission being finished~~, release a E-DCH resource allocation.

7. (Currently Amended) The WTRU as in claim 6, the processor further configured to ~~terminate~~ complete the E-DCH transmission on a condition of cell reselection or radio link failure.

8. (Withdrawn) A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

releasing the E-RACH message during transition from cell forward access channel (CELL_FACH) state to cell dedicated channel (CELL_DCH) state.

9. (Withdrawn) The method as in claim 8, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

10. (Withdrawn) A wireless transmit receive unit (WTRU), comprising:

a receiver configured to receive enhanced dedicated channel (E-DCH) resources on an acquisition indication channel (AICH) and an E-DCH AICH (E-AICH); and

a processor configured to access the E-DCH resources in cell forward access channel (CELL_FACH) state, to receive a reconfiguration message indicating to switch to a cell dedicated channel (CELL_DCH) state, and to release the E-DCH resources based on switching to CELL_DCH state.

11. (Withdrawn) A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

receiving an explicit E-DCH termination signal; and

releasing a E-DCH resource.

12. (Withdrawn) The method as in claim 11, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

13. (Withdrawn) The method as in claim 11, wherein the explicit E-DCH termination signal comprises a special value signaled on an E-DCH absolute grant channel (E-AGCH).

14. (Withdrawn) A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

initiating a timer in response to a trigger; and

releasing resource allocation for common control channel (CCCH) when a maximum allowable transmission time for the CCCH has been reached.

15. (Withdrawn) The method as in claim 14, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

16. (Withdrawn) The method as in claim 14, wherein a maximum enhanced dedicated channel (E-DCH) allocation time is allocated to the CCCH transmission when an E-DCH radio network temporary identifier (E-RNTI) is not present.

17. (Withdrawn) The method as in claim 14, wherein the timer starts when a positive acknowledgement (ACK) associated with a transmitted preamble signature is received on an acquisition indication channel (AICH) or an enhanced dedicated channel (E-DCH) AICH (E-AICH).

18. (Withdrawn) The method as in claim 14, wherein the timer starts when radio resource control (RRC) provides timer values to medium access control (MAC), and after receiving resource index of an enhanced dedicated channel (E-DCH).

19. (Withdrawn) The method as in claim 14, wherein the timer starts when a wireless transmit receive unit (WTRU) starts first dedicated physical control channel (DPCCH) preamble transmission.

20. (Withdrawn) The method as in claim 19, wherein the timer starts when the first DPCCH transmission is completed after an enhanced dedicated channel (E-DCH) transmission backoff transmission time intervals (TTIs) or a first medium access control (MAC) protocol data unit (PDU) is passed to a physical layer.

21. (Withdrawn) The method as in claim 14, wherein the timer starts when a wireless transmit receive unit (WTRU) starts an enhanced dedicated channel (E-DCH) transmission.

22. (Withdrawn) The method as in claim 14, wherein a wireless transmit receive unit (WTRU) may initiate the timer when a collision resolution an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH) carrying the WTRU E-DCH radio network temporary identifier (E-RNTI) is received.

23. (Withdrawn) A Node-B comprising:

a processor configured to determine an end of enhanced random access channel (E-RACH) message transmission; and

a transmitter connected to the processor, the transmitter configured to transmit a special value over an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH) indicating the end of transmission.

24. (Withdrawn) A method for releasing enhanced dedicated channel (E-DCH) resources while in cell forward access channel (CELL_FACH) state, the method comprising:

terminating reception procedures for an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH), an E-DCH relative grant channel (E-RGCH), and an E-DCH hybrid automatic repeat request (HARQ) indicator channel (E-HICH); and

terminating transmission procedures for an E-DCH dedicated physical control channel (E-DPCCH) and an enhanced dedicated physical data channel (E-DPDCH); and

resetting the medium access control (MAC) entity.

25. (Withdrawn) The method as in claim 24, wherein the channels are terminated when an enhanced random access channel (E-RACH) transmission signal has been received.

26. (Withdrawn) The method as in claim 24, wherein the channels are terminated when a common control channel (CCCH) timer has expired.

27. (Withdrawn) The method as in claim 24, wherein the channels are terminated when the scheduling information (SI) is equal to zero.

28. (Withdrawn) The method as in claim 24, wherein the MAC reset procedures include flushing the hybrid automatic repeat request (HARQ) processes, discarding remaining segments in segmentation entity of the MAC entity, and resetting a transmission sequence number (TSN) value to zero.

29. (Withdrawn) The method as in claim 24, wherein the resources are released when an inactivity timer expires.

30. (Currently Amended) The WTRU as in claim 6 ~~1~~, wherein the processor starts an inactivity timer when the buffer is empty.

31. (Previously Presented) The WTRU as in claim 30, wherein the transmission of the SI is triggered when the inactivity timer expires.

32. (Currently Amended) The WTRU as in claim 6 ~~1~~, wherein the E-DCH transmission occurs on a condition that a response is received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU.

REMARKS

This response shall substitute the response filed on April 6, 2012 in its entirety. The present response is filed with an RCE and IDS.

Claims 1-7 and 30-32 are pending in the present application and stand rejected in the office action dated December 6, 2011. Claims 1, 5, 6, 7, 30, and 32 are presently amended and claims 8-29 were previously withdrawn. Applicants request reconsideration and withdrawal of the rejections in view of the foregoing amendments and following remarks.

Claim Objections

Applicants have amended claims 30 and 32 to correct the claim dependency. Applicants thank the examiner for pointing out the informalities and request withdrawal of the objections in view of the amendments.

35 U.S.C. § 102 Rejection

Claims 1, 4, 6, and 32 stand rejected under 35 U.S.C. §102(e) as allegedly anticipated by U.S. pub. No. 2009/025709 (hereinafter "Wager publication").

The outstanding rejection is based on 35 U.S.C. §102(e). Under 35 U.S.C. §102(e), the critical reference date of a U.S. application publication is entitled to the benefit of the filing date of a provisional application ***if the provisional application properly supports the subject matter relied upon to make the rejection*** in compliance with 35 U.S.C. §112, first paragraph. See M.P.E.P 2136.03, Sec. III. As shown by the timeline below, the filing date of the Wager application (that corresponds to the Wager publication), shown as (4) below, post-dates the filing date of the present application, shown as (3) below. Thus, the subject matter from the Wager application used to reject the claims must be supported by the earlier filed Wager provisional application, shown as (2) below, to be proper prior art.

Timeline of applications:

(1) Present application provisional 60/975,985 filed Sep. 28, 2007

(2) Wager provisional application 61/015,316 filed Dec. 20, 2007

(3) Present application 12/238,910 filed Sept 26, 2008

(4) Wager application 12/314,247 filed Dec. 5, 2008; published as U.S. pub. No. 2009/025709

Without prejudice or disclaimer, Applicants have amended the claims as shown above to capture subject matter disclosed in at least one of the provisional applications to which the present application claims priority, shown as (1) above. Because the Wager priority date of Dec. 20, 2007 does not pre-date the September 28, 2007 priority date of the pending claims, Applicants respectfully submit that neither the Wager application nor the Wager publication is proper prior art against the claims, particularly as amended.

In particular, the claims are directed to completing an enhanced dedicated channel (E-DCH) transmission in a CELL_FACH state. When the WTRU determines that a buffer is empty, the WTRU transmits scheduling information in the E-DCH transmission having a total E-DCH buffer status equal to zero. When the buffer is empty, the WTRU releases an E-DCH resource allocation.

As described in the specification, but not by way of limitation, the release of the E-DCH resource allocation by the WTRU is in contrast to the network ordering the release of such resources (Application, para. 7). Applicants have disclosed a manner for notifying the network of the WTRU-initiated release, while also releasing such resources by the WTRU. In particular, the WTRU, on a condition that the buffer is empty, triggers transmission of scheduling information (SI) in the E-DCH transmission with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero.

In contrast to the claimed embodiments, the Wager provisional merely describes the known manner of releasing of resources by the network (Wager, p. 4, ll. 10-14). Specifically, Wager nowhere teaches or suggests that ***the WTRU*** releases the E-DCH resources or notifies the network in any manner that it is releasing such resources. Rather, Wager maintains that the Node B is responsible for releasing the common E-DCH resource.

Thus, for at least the foregoing reasons, Applicants submit that claims 1, 4, 6, and 32 patentably define over the cited reference(s). Accordingly, Applicants respectfully request withdrawal of the §102(e) rejections of claims 1, 4, 6, and 32.

35 U.S.C. § 103(a) Rejection

Claims 2 and 30 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Wager in view of U.S. pub. no. 2010/0091652 ("Lin"). Claims 3 and 31 stand rejected

under 35 U.S.C. §103(a) as allegedly being unpatentable over Wager in view of Lin and further in view of U.S. pub. no. 2009/0168704 ("Lee"). Claims 5 and 7 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Wager in view of U.S. pub. no. 2005/0026623 ("Fisher").

Claims 2, 3, 5, 7, 30, and 31 depend from at least one of independent claims 1 and 6. Thus, for at least the foregoing reasons for patentability of independent claims 1 and 6, Applicants submit that claims 2, 3, 5, 7, 30, and 31 patentably define over the cited references at least by virtue of their dependency from patentable independent claims 1 and 6. Accordingly, Applicants respectfully request withdrawal of the §103(a) rejections of claims 2, 3, 5, 7, 30, and 31.

Conclusion

In view of the foregoing, applicant respectfully submits that the claims are allowable and that the present application is in condition for allowance. Reconsideration of the application and an early Notice of Allowance are respectfully requested. In the event that the Examiner cannot allow the present application for any reason, the Examiner is encouraged to contact the undersigned attorney, Lori Anne D. Swanson at (215) 558-5716, to discuss resolution of any remaining issues.

Date: April 20, 2012

/Lori Anne D. Swanson/
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DOCKET NO.: IHSP_2-1853.01.US **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Pelletier, Benoit **Confirmation No.: 2438**

Application No.: 12/238,910 **Group Art Unit: 2464**

Filing Date: September 26, 2008 **Examiner: Yuen, Kan**

For: METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL

Filed Via EFS

INFORMATION DISCLOSURE STATEMENT

Pursuant to 37 CFR § 1.56 and in accordance with 37 CFR §§ 1.97-1.98, information relating to the above-identified application is hereby disclosed. Inclusion of information in this statement is not to be construed as an admission that this information is material as that term is defined in 37 CFR § 1.56(b).

☒ **IDS Filed Under 37 CFR 1.97(b)**

In accordance with § 1.97(b), since this Information Disclosure Statement is being filed either within three months of the filing date of the above-identified application, within three months of the date of entry into the national stage of the above identified application as set forth in § 1.491, before the mailing date of a first Office Action on the merits of the above-identified application, or before the mailing date of a first Office Action after the filing of request for continued examination under § 1.114, no additional fee is required.

☐ **IDS filed Under 37 CFR 1.97(c)**

In accordance with § 1.97(c), this Information Disclosure Statement is being filed after the period set forth in § 1.97(b) above but before the mailing date of either a Final Action under § 1.116 or a Notice of Allowance under § 1.311, or before an action that otherwise closes prosecution in the application, therefore:

- ☐ Certification in Accordance with § 1.97(e) is attached; or
- ☐ The fee of **$180.00** as set forth in § 1.17(p) is attached.

☐ **IDS filed Under 37 CFR 1.97(d)**

In accordance with § 1.97(d), this Information Disclosure Statement is being filed after the mailing date of either a Final Action under § 1.113 or a Notice of Allowance under § 1.311 but before, or simultaneously with, the payment of the Issue Fee, therefore included are: Certification in Accordance with § 1.97(e); and the submission fee of **$180.00** as set forth in § 1.17(p).

CONTENT OF IDS PURSUANT TO 37 CFR 1.98

☒ Copies of reference numbers 44-45 listed on the attached Form PTO-1449 are not required to be submitted pursuant to 37 CFR § 1.98(a)(2)(ii).

☒ Copies of reference numbers 46-53 listed on the attached Form PTO-1449 are enclosed herewith.

☐ Copies of reference numbers are not being submitted because they were previously cited by or submitted to the U.S. Patent and Trademark Office in patent application number , filed for which a claim for priority under 35 U.S.C. § 120 has been made in the instant application.

☐ The month of publication for reference numbers is not available. However, the year of publication for these references is sufficiently earlier than the effective US filing date and any foreign priority date so that the particular month of publication is not in issue pursuant to 37 CFR § 1.98(b).

REFERENCES IN A LANGUAGE OTHER THAN ENGLISH

☒ The following documents are not in the English language. Accordingly, a concise explanation of the relevance of the document was incorporated in the specification passages identified below, the document was identified in a foreign communication as identified below or an English language counterpart application has been provided as indicated below.

Foreign Language Document	Cite No.	Pages of Reference in Specification or Relevance of Document
KR 10-2007-0073578 A	46	Cited in an Official Action dated December 9, 2011, issued in related Korean Patent Application No. 10-2010-7009403
RU 2005122724 A	47	Cited in a Decision on Grant dated January 27, 2012, issued in related Russian Patent Application No. 2010116763

Foreign Language Document	Cite No.	English Language Counterpart	Cite No.
KR 10-2007-0073578 A	46	WO 2007/078155 A2	48
RU 2005122724 A	47	US 2006/0023629 A1	45

☐ **CERTIFICATION IN ACCORDANCE WITH § 1.97(e)**

I hereby certify that:

☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement.

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

Please charge any deficiency or credit any overpayment to Deposit Account No. 09-0435.

Date: April 20, 2012

/Lori Anne D. Swanson/
Lori Anne D. Swanson
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Substitute for 1449/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	12/238,910
				Filing Date	September 26, 2008
				First Named Inventor	Pelletier, Benoit
				Art Unit	2464
(use as many sheets as necessary)				**Examiner Name**	Yuen, Kan
Sheet	1	of	1	**Attorney Docket Number**	IHSP_2-1853.01.US

U. S. PUBLICATION AND PATENT DOCUMENTS				
Examiner Initials	Cite No.	Document Number Number – Kind Code (if known)	Publication or Grant Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
	44	2005/0054298 A1	03-10-2005	Chen, Rex Huan-Yueh
	45	2006/0023629 A1	02-02-2006	Kim et al.

FOREIGN PATENT DOCUMENTS					
Examiner Initials	Cite No.	Foreign Patent Document Country Code- Number - Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	T
	46	KR 10-2007-0073578 A	07-10-2007	L.G. Electronics, Inc.	
	47	RU 2005122724 A	01-27-2007	Samsung Electronics Co., Ltd.	
	48	WO 2007/078155 A2	07-12-2007	L.G. Electronics, Inc.	

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), Volume-issue Number(s), publisher, city and/or country where published.	T
	49	3rd Generation Partnership Project (3GPP), R2-071556, “Introduction of Enhanced CELL_FACH state", Change Request 3GPP TS 25.331 Version 7.3.0, 3GPP TSG-2 Meeting #57, St. Julian's Malta, March 26-30, 2007, 76 pages	
	50	3rd Generation Partnership Project (3GPP), R2-080043, "Contention resolution for enhanced uplink in CELL_FACH", Ericsson, 3GPP TSG RAN WG2 #60bis, Seville, Spain, January 14-18, 2008, 4 pages	
	51	3rd Generation Partnership Project (3GPP), R2-080894, "CELL_FACH E-DCH scheduling simplifications", Infineon, 3GPP TSG-RAN WG2 Meeting #61, Sorrento, Italy, February 11-15, 2008, 4 pages	
	52	3rd Generation Partnership Project (3GPP), R2-081581, "Empty Buffer Status reporting and Implicit release for CCCH messages using enhanced uplink in CELL_FACH", Qualcomm Europe, 3GPP TSG-RAN WG2 #61-bis, Shenzhen, China, March 31 - April 4, 2008, 6 pages	
	53	3rd Generation Partnership Project (3GPP), R3-081091, "E-DCH Resource Release in CELL_FACH", Qualcomm Europe, 3GPP TSG-RAN WG3 Meeting#60, Kansas City, USA, May 5-9, 2008, 4 pages	

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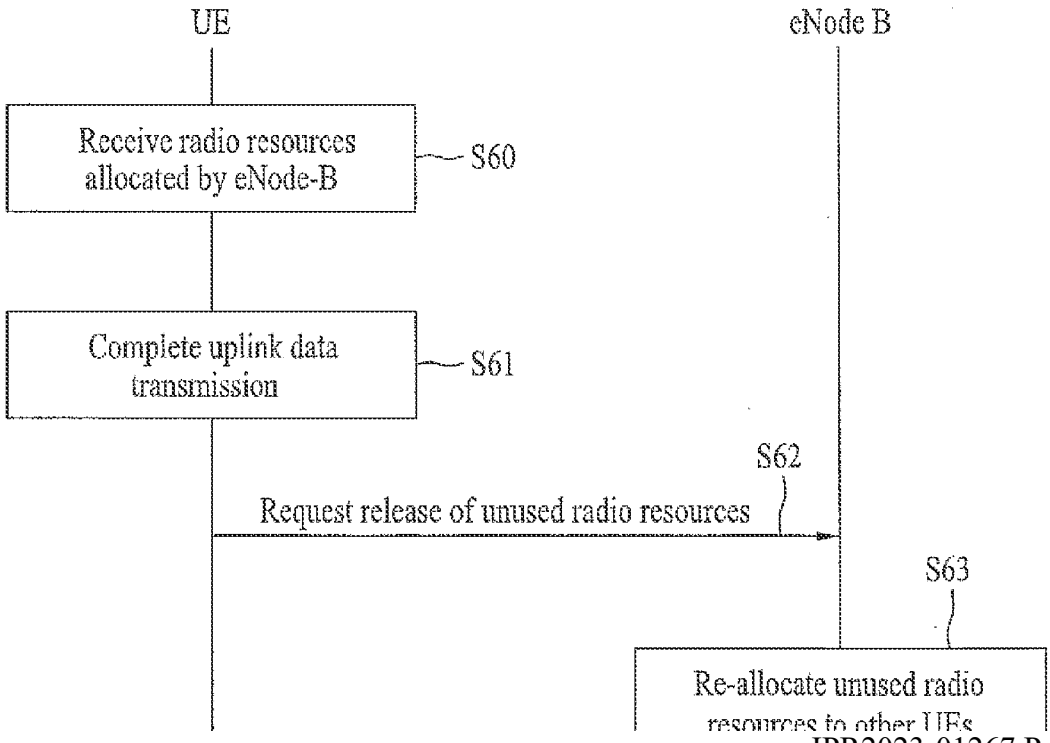
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[Continued o

Title: METHOD FOR SCHEDULING RADIO RESOURCES IN MOBILE COMMUNICATION SYSTEM



TECHNICAL FIELD

The present invention is directed to a mobile communication system, and, specifi method for scheduling radio resources in a mobile communication system.

BACKGROUND ART

FIG. 1 is a structural diagram illustrating a Long Term Evolution (LTE) system v mobile communication system. The LTE system is an evolved version of a convent TS system and has been standardized by the 3GPP (3rd Generation Partnership Proje

The LTE network may be generally classified into an Evolved UMTS Terrestrial R ess Network (E-UTRAN) and a Core Network (CN). The E-UTRAN includes at eNode-B serving as a base station and an Access Gateway (AG) located at the end o ork so that it is connected to an external network.

The AG may be classified into a portion that handles user traffic and a portion les control traffic. A first AG that handles user traffic may communicate with a se that handles control traffic via a new interface. A single eNode-B may include at ell.

A first interface for transmitting user traffic or a second interface for transmi ol traffic may be located between several eNode-Bs. The CN includes the AG a lity of nodes for registering users of User Equipment (UEs). If required, an

cally includes a User Plane for transmitting data and a Control Plane for transmitt
rol signaling.

The protocol layers shown in FIG. 2 may be classified into the first layer (L1)
nd layer (L2), and the third layer (L3) on the basis of three lower layers of an
em Interconnection (OSI) reference model that is well known in the art.

The physical layer which is as the first layer (L1) provides an Information Tra
ice over a physical channel. A radio resource control (RRC) layer located at the
(L3) controls radio resources between the UE and the network.

The RRC layer exchanges RRC messages between the UE and the network for
ose. The RRC layer may be distributed to a plurality of network nodes, such as eNo
AG, and may also be located at the eNode-B or the AG.

A radio protocol control plane will be described with reference to FIG. 2. The
ocol control plane includes a physical layer, a Medium Access Control (MAC) lay
o Link Control (RLC) layer and a Radio Resource Control (RRC) layer.

The physical layer transmits an Information Transfer Service to an upper layer o
ical channel while acting as the first layer (L1). The physical layer is connected
um Access Control (MAC) layer located thereabove via a transport channel.

The MAC layer communicates with the physical layer over the transport channel
data is transferred between the MAC layer and the physical layer. Data is transfe
een respectively different physical layers, such as between a first physical layer

IAC layer, the RLC layer itself may not need to exist.

The RRC (Radio Resource Control) layer located at the lowermost part of the (L3) is only defined in the control plane. The RRC layer handles the control of lo nels, transport channels and physical channels in relation to configura nfiguration and release of Radio Bearers (RBs). An RB refers to a service th ided by the second layer (L2) for data transfer between the UE and the E-UTRAN.

FIG. 3 is a conceptual diagram illustrating a User Plane of a radio interface prot ture between the UE and the UTRAN according to the 3GPP radio access net lard. The radio protocol user plane includes the physical layer, the MAC layer, the and the PDCP layer.

The physical layer of the first layer (L1) and the MAC and RLC layers of the se (L2) are the same as those illustrated in FIG. 2. A PDCP layer of the second layer rms header compression to reduce the size of a relatively-large IP packet he ining unnecessary control information in order to effectively transmit IP packets, v4 or IPv6, within a radio-communication period having a narrow bandwidth.

Uplink and downlink channels for transmitting data between the network and the nereinafter be described in detail. Downlink channels transmit data from the netwo E. Uplink channels transmit data from the UE to the network.

Examples of downlink channels are a Broadcast Channel (BCH) for transmi n information and a downlink Shared Channel (SCH) and a Shared Control Cha

ed channel (SCH) and a shared control channel (SCCH) for transmitting user trai
rol messages.

An orthogonal frequency division multiplexing (OFDM) scheme for use in the phy
r which is the first layer will hereinafter be described in detail. The OFDM sch
les a high-speed data stream into several low-speed data streams and simultaneo
smits the low-speed data streams over a plurality of carriers. Here, each of the plu
arriers is a subcarrier.

The OFDM scheme has orthogonality between several subcarriers. Therefore
uency components of the subcarriers can be detected at the receiving side alth
uency components of the subcarriers overlap each other.

The high-rate data stream is converted into several low-speed data streams b
l/parallel converter, which is also called a "serial to parallel converter." Each o
arriers is multiplied by the parallel data streams generated by the serial/parallel conv
the resultant data streams are summed such that the sum of the data streams is transm
e receiving side.

The parallel data streams generated by the serial/parallel converter may be transm
destination over a plurality of subcarriers according to an Inverse Discrete Fo
sform (IDFT) scheme. The IDFT may be effectively implemented by an Inverse
ier Transform (IFFT) scheme.

Temporal signal dispersion generated by the multi-path delay spreading, suc

A conventional Orthogonal Frequency Division Multiple Access (OFDMA) sch hereinafter be described in detail. The OFDMA scheme transmits some part arriers available for a system based on OFDM modulation to individual users such t iple access function may be implemented for the users.

The OFDMA scheme transmits frequency resources called subcarriers to the u frequency resources are transmitted to the users independent of each other such that ot overlap each other. As a result, the frequency resources are exclusively allocate sers such that there is no overlapping.

FIG. 4 is a block diagram illustrating a transmitter based on a Discrete Fou sform Single-Orthogonal Frequency Division Multiple (DFT-S-OFDM) sche nafter referred to as a "DFT-S-OFDM transmitter." A conventional DFT-S-OF me will be described with reference to FIG. 4.

For the convenience of description, a plurality of variables will be defined. Vari is indicative of the number of subcarriers over which OFDM signals are transmi ble "Nb" is indicative of the number of subcarriers for a specific user. Variable "I ative of a Discrete Fourier Transform (DFT) matrix. Variable "s" is indicative of a ol vector. Variable "x" is indicative of a vector generated by data dispersion with ency domain. Variable "y" is indicative of an OFDM-symbol vector.

A Single Carrie-Frequency Division Multiple Access (SC-FDMA) system converts symbol(s) into a parallel signal using the serial/parallel converter 410 and perfo

ersion of the data symbol(s). The subcarrier mapping unit 430 performs subc
ping of the dispersed vector (x) using a specific subcarrier allocation technique.

The IFDT module 440 receives the mapped signal from the subcarrier mapping
and converts the received signal into a time-domain signal to generate a target signa
eceived at the receiving side via the parallel/serial converter 450. The target s
smitted to the receiving side can be represented by Equation 2:

[Equation 2] $y = F_{N\times N}^{-1} x$

With reference to Equation 2, $F_{N\times N}^{-1}$ indicates an N-sized IDFT matrix require
verting a frequency-domain signal to a time-domain signal. The cyclic prefix inse
460 inserts a cyclic prefix into the OFDM-symbol vector (y) such that the resultan
al including the cyclic prefix is transmitted to a destination.

A method for generating a transmission signal and transmitting the signal tc
iving side according to the above-mentioned scheme is referred to as an SC-FI
iod. The size of the DFT matrix can be controlled in various ways to implem
ific object.

FIG. 5 is a conceptual diagram illustrating a hybrid ARQ (HARQ) scheme. A me
mplementing HARQ in the downlink physical layer of a radio packet communic
m will be described with reference to FIG. 5.

Referring to FIG. 5, the eNode-B determines a UE that is to receive packets

gnizes the type and transmission point of the packet and receives the correspor
:et.

The UE transmits a negative acknowledgement (NACK) signal to the eNode-B i
fails to decode a specific packet, such as data1. The eNode-B recognizes that p
;mission has failed and re-transmits the same data, such as data1, using the same p
iat or a new packet format at a suitable time point. The UE combines the re-transm
:et, such as data1, and a previously-received packet for which packet decoding failec
tempts packet decoding.

The UE transmits an acknowledgement (ACK) signal to the eNode-B if the pack
ived and decoded successfully. The eNode-B recognizes successful packet transmis
performs transmission of the next packet, such as data2.

Some parts of the radio resources are allocated according to scheduling of the u
: in order to allow a plurality of eNode-Bs to communicate with a plurality of UEs
ed radio resources using a mobile communication system. The scheduling is gene
uted by the eNode-B(s), which communicate with the UEs using the allocated r
irces.

The eNode-B allocates radio resources to the UE upon receiving a request from th
eNode-B may also allocate the radio resources to the UE if there is a need to allc
resources to the UE in the absence of a request from the UE. The radio resource
allocated to the UE if there is a need to pre-allocate the radio resources to the UE.

resources that were pre-allocated to specific UEs to other UEs, thereby resultin
ective use of radio resources.

Disclosure of invention

Accordingly, the present invention is directed to a method for scheduling r
rces of a mobile communication system that substantially obviates one or r
lems due to limitations and disadvantages of the related art. An object of the pre
ntion is to provide a radio-resource scheduling method for improving efficiency of r
rces available for a mobile communication system, thereby facilitating more effi
munication between the UE and an eNode-B. Another object of the present inventi
rovide a radio-resource scheduling method for reducing an amount of wasted r
rces. Still another object of the present invention is to provide a radio-reso
duling method for effectively allocating radio resources using a message received fr
luring an uplink transmission by the UE.

In one aspect of the present invention, a method for scheduling radio resources
le communication system is provided. The method includes receiving an indicatio
ated radio resources, transmitting information using the allocated radio resources, e
nitting an indication that the radio resources are no longer needed or receivin
ation that the radio resources are no longer allocated and no longer transmi
nation using the radio resources.

ed includes transmitting either an uplink control signal or a preamble over a ran
ss channel (RACH). It is further contemplated that the indication that the radio reso
no longer needed includes an indication that there is no data left for transmission ov
nk path.

In another aspect of the present invention, a method for scheduling radio resources
ile communication system is provided. The method includes allocating radio reso
first mobile communication terminal, determining that the allocated radio resource
onger needed and re-allocating the radio resources to a second mobile communica
inal.

It is contemplated that determining that the allocated radio resources are no lo
led includes receiving an indication that the radio resources are no longer needed.
ner contemplated that receiving the indication that the radio resources are no lo
ed includes receiving either an uplink control signal or a preamble over a random ac
nel (RACH).

It is contemplated that the indication that the radio resources are no longer ne
des an indication that there is no data left for transmission over an uplink path.
er contemplated that determining that the allocated radio resources are no longer ne
des determining that the first mobile communication terminal has no additi
mation to transmit

It is contemplated that the method further includes transmitting an indication to the

ırces to a first mobile communication terminal, the first mobile communication ter
ımitting information using the allocated radio resources, determining that the allo
› resources are no longer needed, the network re-allocating the radio resources
nd mobile communication terminal and the first mobile communication termina
er transmitting information using the radio resources.

It is contemplated that determining that the allocated radio resources are no lc
led includes the first mobile communication terminal transmitting an indication tha
› resources are no longer needed. It is further contemplated that the first m
munication terminal transmits the indication that the radio resources are no longer ne
ther an uplink control signal or a preamble over a random access channel (RACH).

It is contemplated that the method further includes the network transmittin
cation to the first mobile communication terminal that the resources are no lo
cated. It is further contemplated that the indication that the resources are no lo
cated includes a message between a second protocol layer and a first protocol layer.

It is contemplated that determining that the allocated radio resources are no lo
ed includes the network determining that the first mobile communication terminal ha
ional information to transmit. It is further contemplated that the method further incl
ıetwork transmitting an indication to the first mobile communication terminal tha
ırces are no longer allocated. Preferably, the indication that the resources are no lc
ated includes a message between a second protocol layer and a first protocol layer

These and other embodiments will also become readily apparent to those skilled i
from the following detailed description of the embodiments having reference t
hed figures, the invention not being limited to any particular embodiments disclosed

Brief Description of Drawings

The accompanying drawings, which are included to provide a further understandi
invention and are incorporated in and constitute a part of this specification, illus
odiments of the invention and together with the description serve to explain
ciples of the invention. Features, elements, and aspects of the invention that
enced by the same numerals in different figures represent the same, equivalent, or sir
ures, elements, or aspects in accordance with one or more embodiments.

FIG. 1 is a structural diagram illustrating a conventional Long Term Evolution (
em which is a mobile communication system.

FIG. 2 is a conceptual diagram illustrating a Control Plane of a conventional r
face protocol structure between a UE and a UTRAN based on a 3GPP radio ac
ork standard.

FIG. 3 is a conceptual diagram illustrating a User Plane of a conventional r
face protocol structure between a UE and a UTRAN based on a 3GPP radio ac
ork standard.

FIG. 4 is a block diagram illustrating a conventional transmitter based on a DF

nunication system according to another embodiment of the present invention.

best mode for carrying out the inventionReference will now be made in detail t
erred embodiments of the present invention, examples of which are illustrated i
mpanying drawings. Wherever possible, the same reference numbers will be
ughout the drawings to refer to the same or like parts. A method for scheduling r
urces of a mobile communication system according to the present invention
inafter be described with reference to the accompanying drawings.

For the convenience of description and better understanding of the present inven
minal" is used to refer to a transmitter of an uplink signal and "base station" is used
ver of the uplink signal. However, it should be noted that the scope of "terminal"
e station" is not limited to the above-mentioned terms and "terminal" and "base stat
also be used to refer to, respectively, a UE and Node-B or eNode-B.

The following preferred embodiments of the present invention are implemented v
present invention is applied to an OFDM-based LTE system. The OFDM sy
ates a single resource block (RB) composed of both a specific subframe and spe
urrier when the eNode-B performs scheduling of uplink or downlink radio resou
the eNode-B to the UE. This is unlike a Code Division Multiple Access (CDI
m. The UE or the eNode-B can perform transmission/reception of data using
ated RBs.

The eNode-B allocates radio resources for data communication to individual ected to the eNode-B. As previously stated, the radio resources are indicative of RB

The radio resources may be allocated to the UEs upon receiving requests from the eNode-B may also pre-allocate the radio resources to the UEs as necessary ir ıce of requests from the UEs.

The UE radio resource request process is executed according to RACH, (/NACK and data types of a second layer. Each UE receives uplink radio resou ated by the eNode-B (step S60).

Each UE completes uplink data transmission using the allocated radio resources i ık transmission path in which the UE is a transmitter (Step S61). Uplink radio resou be left after the UE completes the data transmission using the radio resources.

For example, it is assumed that the eNode-B allocates 100 RBs as uplink r ırces of a specific UE. If the radio resources used for the uplink data transmission by re only 80 RBs, 20 RBs may be left in the UE.

The specific UE transmits a message including a specific information to the eNoc ler to inform the eNode-B of remaining radio resources (step S62) if there are remai resources after the specific UE completes uplink data transmission. Preferably, fic information is included in a "Request for de-allocation of the allocated uplink r rce" message, hereinafter referred to as a "radio resource allocation release req ıge", for requesting the eNode-B to release the allocated radio resources

For example, the above-mentioned radio resource allocation release request mes be contained in a Protocol Data Unit (PDU) of the MAC layer (hereinafter referred MAC PDU") and transmitted to the eNode-B. The radio resource allocation re est message may employ a 1-bit indicator if the radio resource allocation release re sage is contained in the MAC PDU such that the MAC PDU including the radio resc cation release request message is transmitted to a destination.

The 1-bit indicator is set to "1" to indicate that data for transmission for an up tins in a buffer of the specific UE. The 1-bit indicator is set to "0" to indicate that the nore data for transmission left in the buffer of the specific UE.

The eNode-B recognizes the completion of uplink data transmission of the specific e 1-bit indicator set to "0" is received. Otherwise, the eNode-B recognizes that tins to be transmitted for the uplink in the specific UE if the 1-bit indicator set to " ved.

In another example, the RACH which is a representative transport channel may be ransmitting the radio resource allocation release request message. The RACH repres nnel for transmitting an initial control message from the UE to the network.

Generally, the RACH is adapted to synchronize between the UE and the netw termore, the UE can acquire necessary radio resources using the RACH if there i data left for transmission in a UE that desires to transmit data in an uplink direction.

The specific UE transmits a radio resource allocation release request message to

The information of the release request is contained in the CQI or ACK/NACK s that the UE can inform the eNode-B of the completion of data transmission if th mits the CQI or ACK/NACK signal. The UE may also transmit the information c se request to the eNode-B using the 1-bit indicator.

In another example, a dedicated physical channel may be used for transmittin resource allocation release request message. The eNode-B recognizes the presen ed radio resources when it receives the radio resource allocation release request mes eNode-B then re-allocates the unused radio resources, such as radio resources rele specific UE, to other UEs (step S63).

The eNode-B may re-allocate the unused radio resources to the specific UE. le-B may allocate the released radio resources to the UEs if it receives radio reso est messages from other UEs.

The eNode-B may allocate the released radio resources to the other UEs in the abs request from the other UEs, if required. The radio resource requests of the other be executed according to random access channel (RACH), CQI, ACK/NACK, and of the second layer.

FIG. 7 is a flow chart illustrating a method for scheduling radio resources of a m nunication system according to another embodiment of the present invention. rate in FIG. 7, the process for controlling the eNode-B to allocate some radio resou specific UE and a process for controlling the specific UE to transmit/receive da

types of the second layer, may be transmitted over the RACH, or may be transmitte
mission time of the control signals, such as CQI and ACK/NACK. The 1-bit indica
as the radio resource allocation release request message.

Setting the 1-bit indicator to "1" indicates that the buffer of the UE still has data
mitted. Setting the 1-bit indicator to "0" indicates that there is no more dat
mission left in the buffer of the UE. In this way, the UE can inform the eNode-
mation regarding the state of the buffer.

The eNode-B transmits a radio resource allocation release completion message t
ific UE (step S73) upon receiving the radio resource allocation release request mes
a specific UE. The eNode-B can prevent the specific UE from re-using the
rces if the eNode-B re-allocates the radio resources to other UEs after transmittin
resource allocation release completion message, thereby preventing a collision betv
pecific UE and the other UEs from being generated.

The radio-resource allocation release completion message may be transmitted
ol signal of the first or second layer. The radio-resource allocation release compl
age may also be transmitted over a downlink shared channel (DL-SCH).

The eNode-B re-allocates released radio resources to other UEs when it receive
resource allocation release request message from the specific UE after transmittin
resource allocation release completion message. The radio resource allocation re
ages may be received from other UEs such that the released radio resources ca

:ated radio resources remain in the specific UE after it completes uplink
smission. In this way, efficiency of data communication in a mobile communic
em may be enhanced.

It will be apparent to those skilled in the art that various modifications and varia
be made in the present invention without departing from the spirit or scope o
ntions. Therefore, it is intended that the present invention covers the modification
ations of this invention provided they come within the scope of the appended claim
equivalents.

As the present invention may be embodied in several forms without departing fron
t or essential characteristics thereof, it should also be understood that the ab
ribed embodiments are not limited by any of the details of the foregoing descrip
ss otherwise specified, but rather should be construed broadly within its spirit and s
efined in the appended claims. Therefore, all changes and modifications that fall w
netes and bounds of the claims, or equivalence of such metes and bounds are intend
nbraced by the appended claims.

The foregoing embodiments and advantages are merely exemplary and are not t
trued as limiting the present invention. The present teaching can be readily applie
types of apparatuses.

The description of the present invention is intended to be illustrative, and not to
cope of the claims. Many alternatives, modifications, and variations will be appare

The present invention can be applied to a mobile communication system.

receiving an indication of allocated radio resources;

transmitting information using the allocated radio resources;

one of transmitting an indication that the radio resources are no longer needed

ving an indication that the radio resources are no longer allocated; and

no longer transmitting information using the radio resources.

2. The method according to claim 1, further comprising:

receiving an indication that the resources are no longer allocated after transmittin

ation that radio resources are no longer needed.

3. The method according to claim 1, wherein the indication that the resource

nger allocated comprises a message between a second protocol layer and a first prot

.

4. The method according to claim 1, wherein transmitting the indication tha

resources are no longer needed comprises transmitting one of an uplink control si

preamble over a random access channel (RACH).

5. The method according to claim 1, wherein the indication that the

re-allocating the radio resources to a second mobile communication terminal.

7. The method according to claim 6, wherein determining that the allocated r
ırces are no longer needed comprises receiving an indication that the radio resource
ɔnger needed.

8. The method according to claim 7, wherein receiving the indication tha
ɔ resources are no longer needed comprises receiving one of an uplink control signal
ɛamble over a random access channel (RACH).

9. The method according to claim 7, wherein the indication that the r
ırces are no longer needed comprises an indication that there is no data left
ımission over an uplink path.

10. The method according to claim 6, wherein determining that the allocated r
ırces are no longer needed comprises determining that the first mobile communica
inal has no additional information to transmit.

11. The method according to claim 10, further comprising:

transmitting an indication to the first mobile communication terminal that the reso

13. A method for scheduling radio resources in a mobile communication sy

nethod comprising:

a network allocating radio resources to a first mobile communication terminal;

the first mobile communication terminal transmitting information using the allo

) resources;

determining that the allocated radio resources are no longer needed;

the network re-allocating the radio resources to a second mobile communic

inal; and

the first mobile communication terminal no longer transmitting information usin

) resources.

14. The method according to claim 13, wherein determining that the allo

) resources are no longer needed comprises the first mobile communication ter

mitting an indication that the radio resources are no longer needed.

15. The method according to claim 14, wherein the first mobile communic

inal transmits the indication that the radio resources are no longer needed in one

k control signal and a preamble over a random access channel (RACH).

18. The method according to claim 13, wherein determining that the allo
› resources are no longer needed comprises the network determining that the first m
munication terminal has no additional information to transmit.

19. The method according to claim 18, further comprising:

the network transmitting an indication to the first mobile communication terminal
esources are no longer allocated.

20. The method according to claim 19, wherein the indication that the resou
ıo longer allocated comprises a message between a second protocol layer and a
›col layer.

FIG. 1

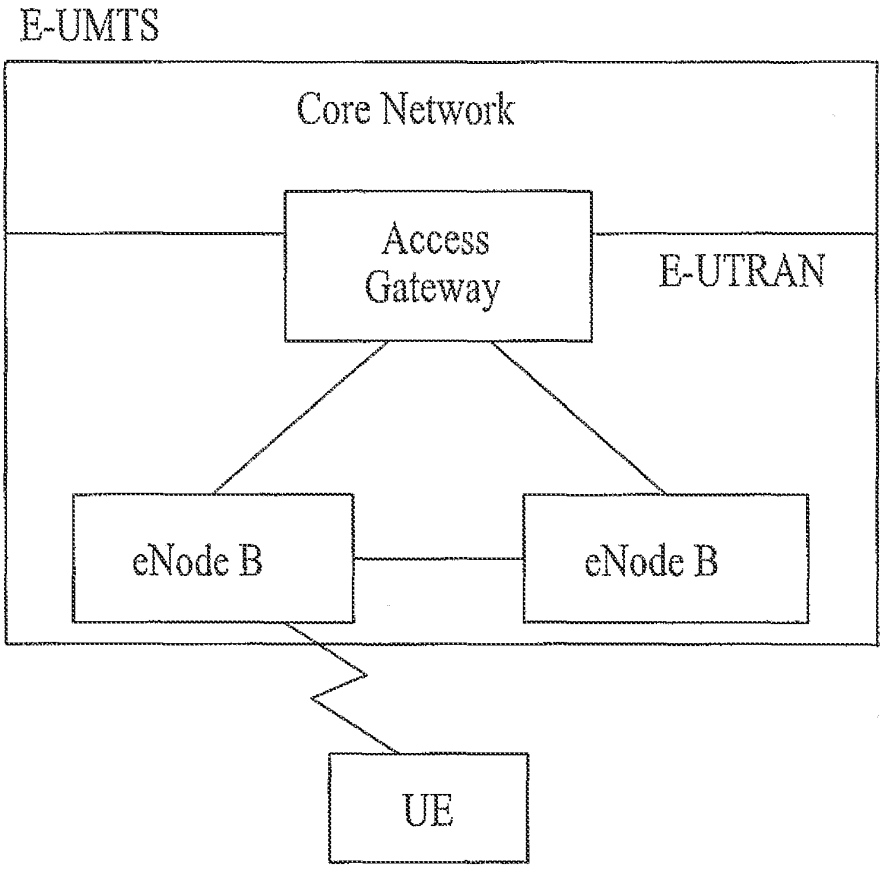


FIG. 2

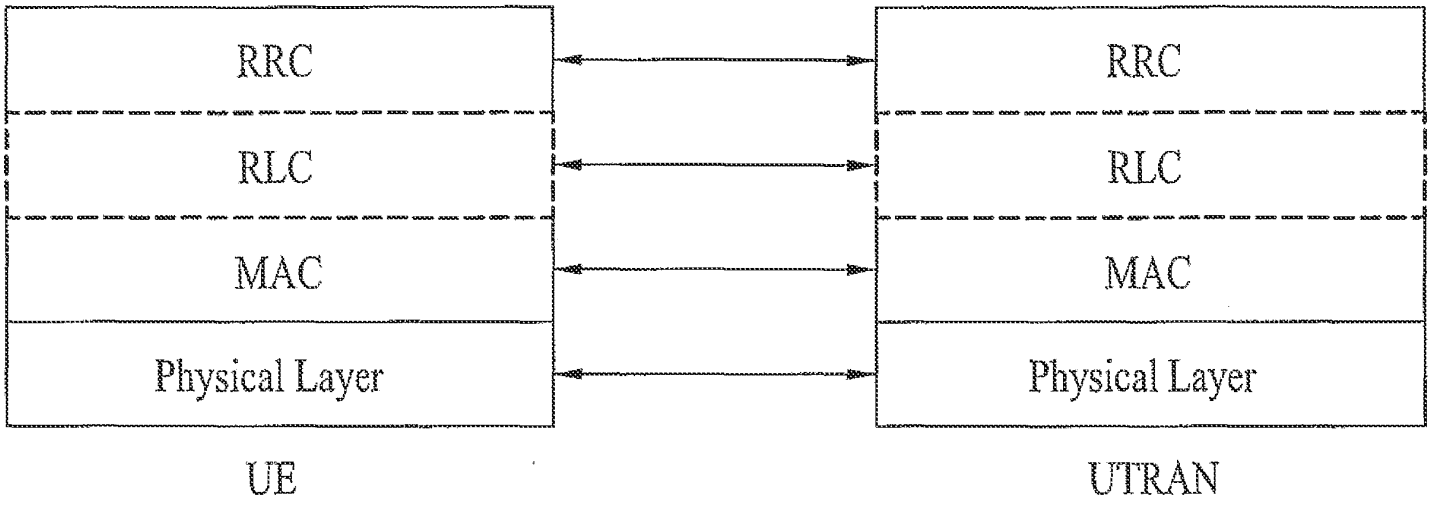

RRC
RLC
MAC
Physical Layer
RRC
RLC
MAC
Physical Layer
UE
UTRAN

FIG. 3

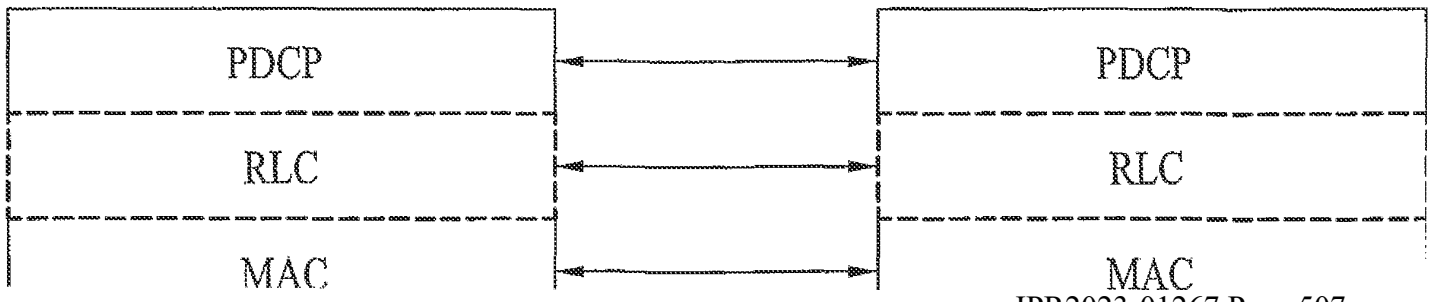

PDCP
RLC
MAC
PDCP
RLC
MAC

FIG. 4

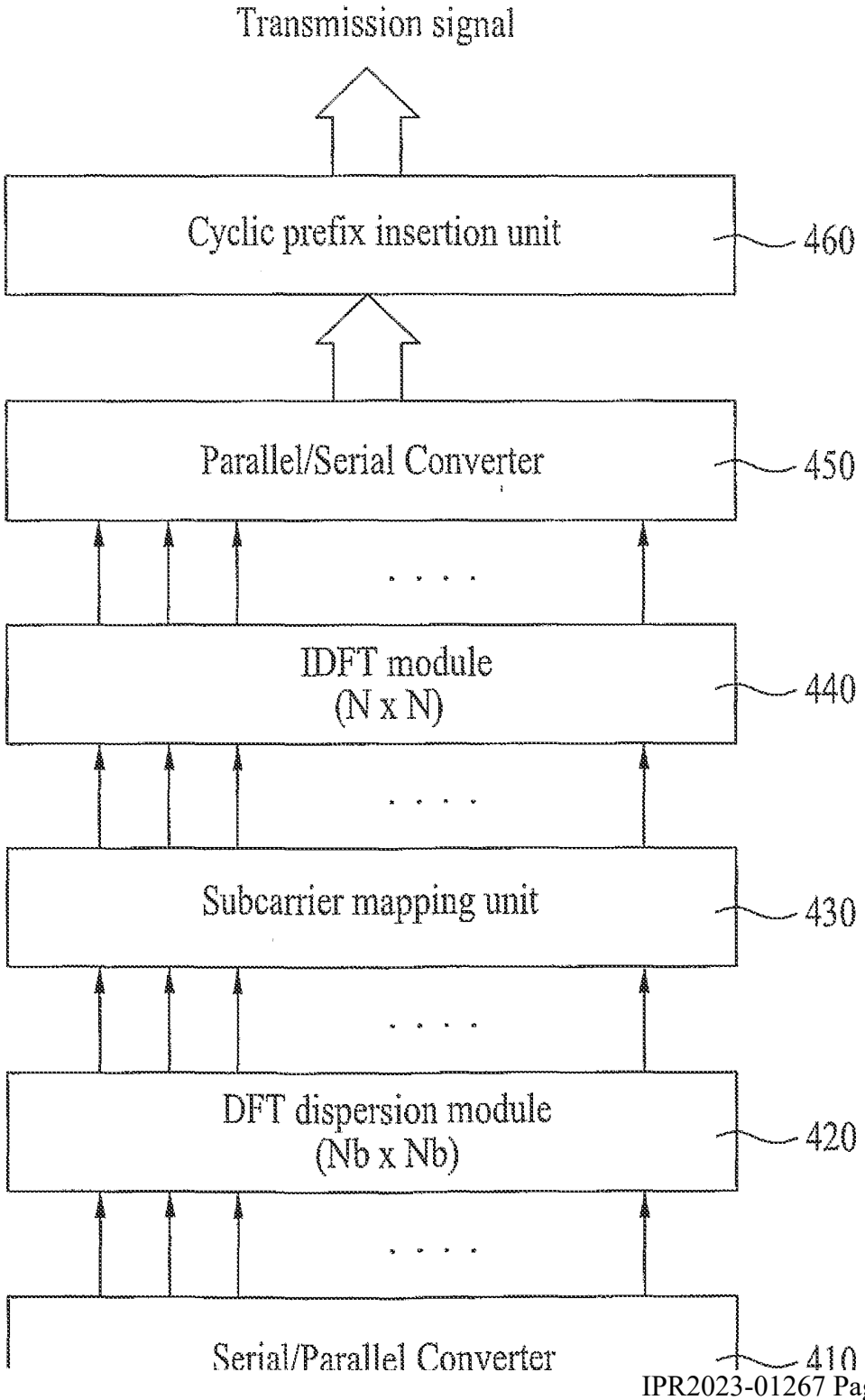
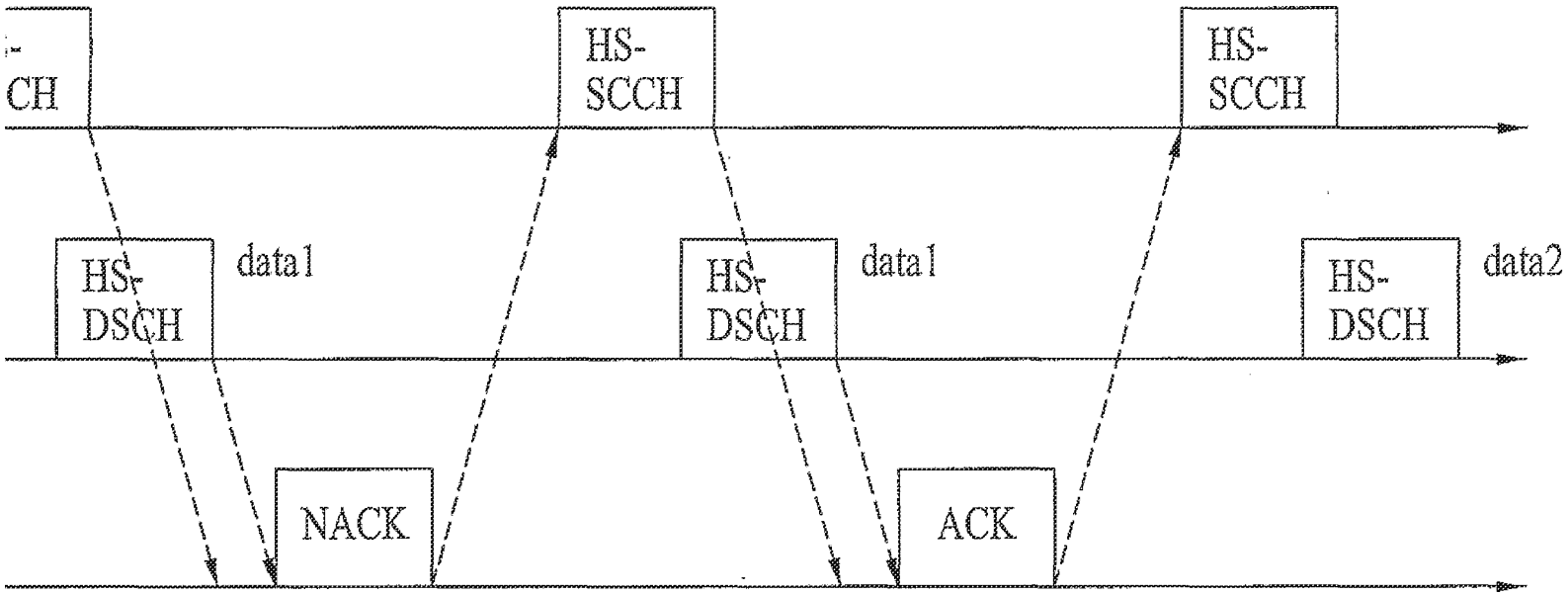

Transmission signal
Cyclic prefix insertion unit
460
Parallel/Serial Converter
450
IDFT module
(N x N)
440
Subcarrier mapping unit
430
DFT dispersion module
(Nb x Nb)
420
Serial/Parallel Converter
410

FIG. 5



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FIG. 6

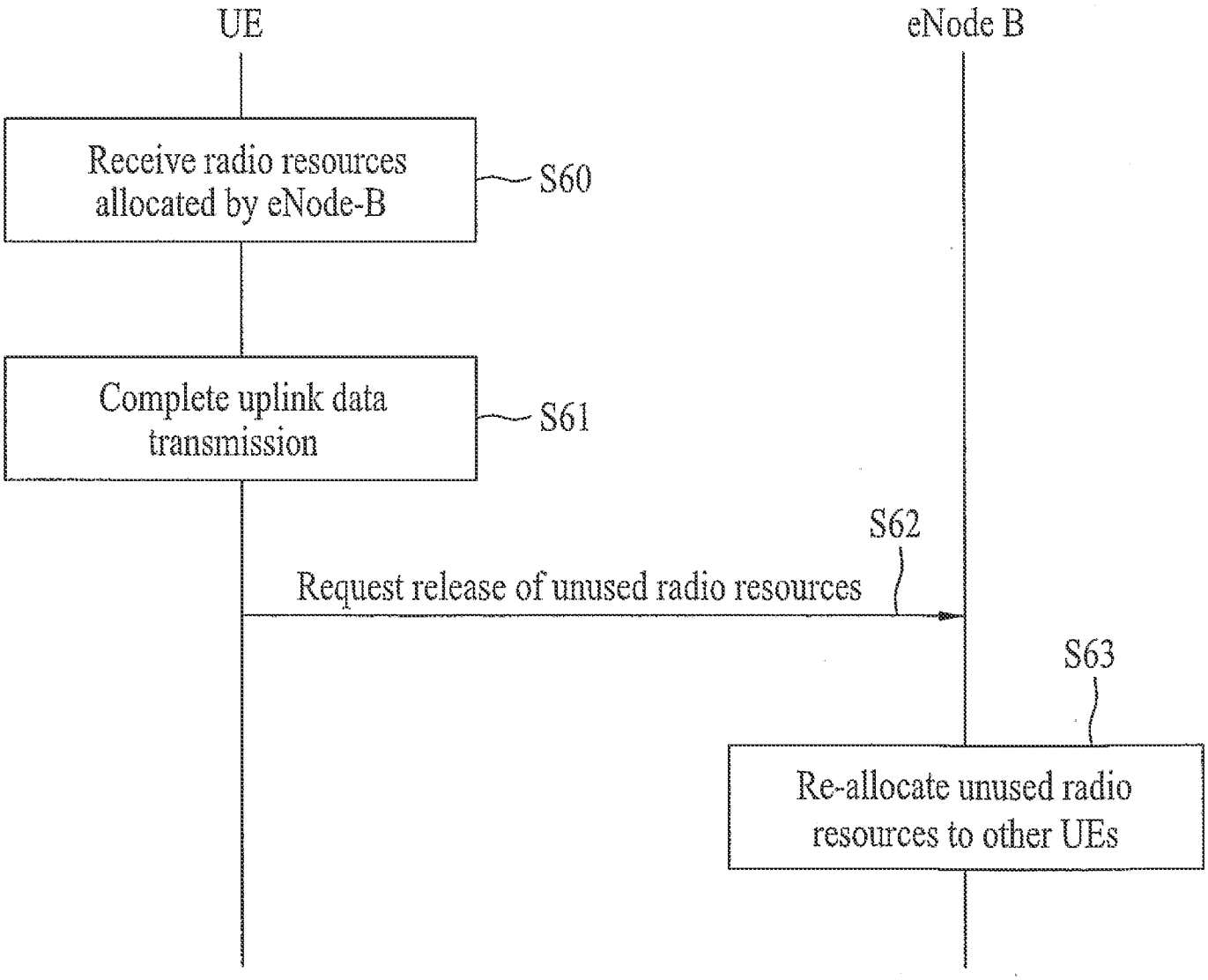
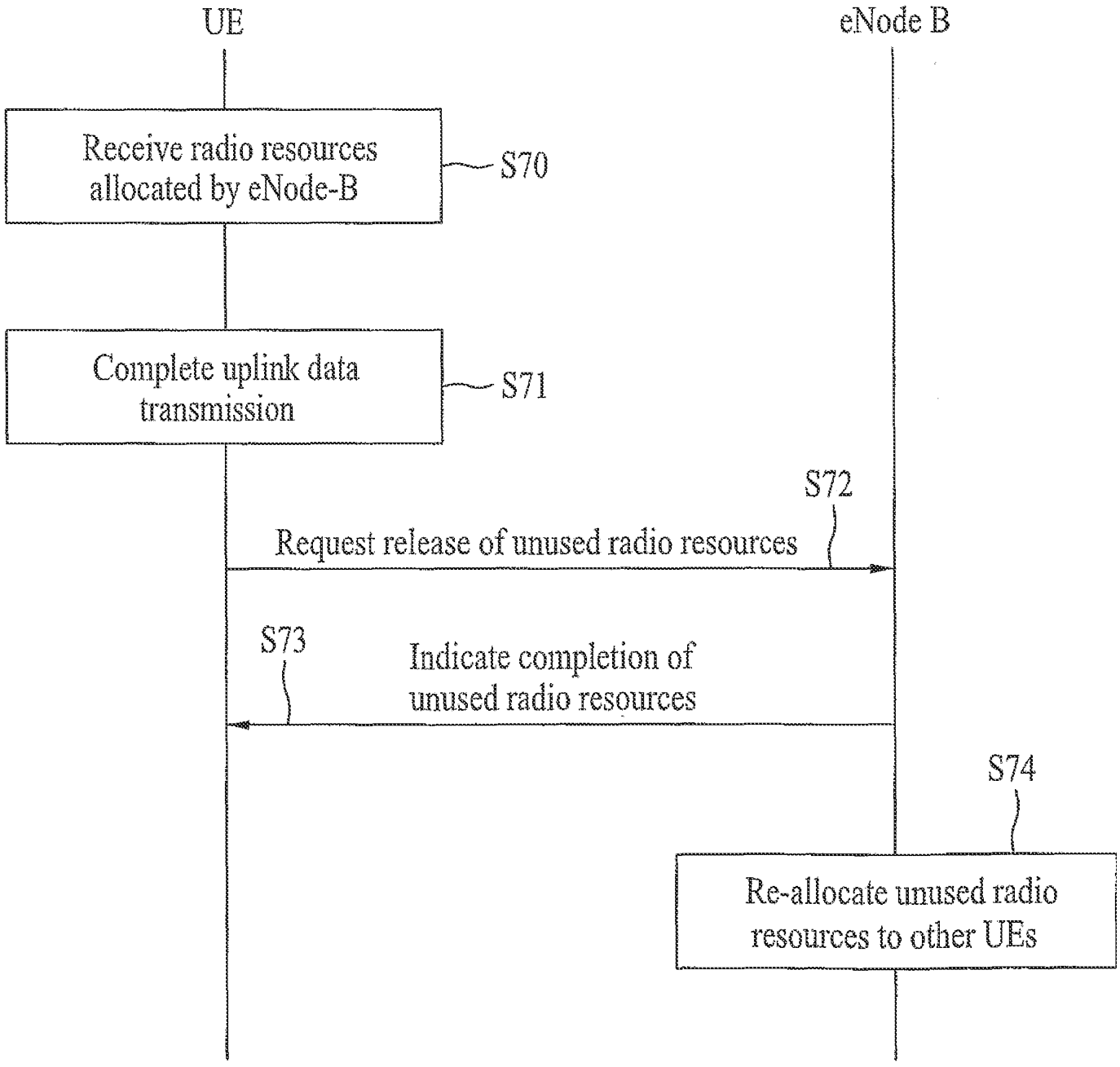

UE
eNode B
Receive radio resources allocated by eNode-B
S60
Complete uplink data transmission
S61
S62
Request release of unused radio resources
S63
Re-allocate unused radio resources to other UEs

FIG. 7


UE
eNode B
Receive radio resources allocated by eNode-B
S70
Complete uplink data transmission
S71
S72
Request release of unused radio resources
S73
Indicate completion of unused radio resources
S74
Re-allocate unused radio resources to other UEs

Espacenet

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METHOD AND DEVICE FOR EXECUTING UNPLANNED TRANSFER IN MOBILE COMMUNICATION SYSTEM FOR SUPPORTING IMPROVED DEDICATED UPLINK CHANNEL

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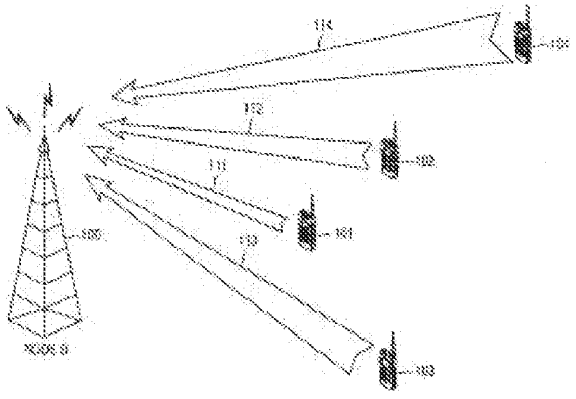


FIG.1

FIELD: mobile communications, code division multi-access systems. ^ SUBSTANCE: mobile communication system, using improved dedicated transport channel uplink, transfers data at relatively low efficient data transmission speed by means of an unplanned transmission. Time intervals of data transmission for user equipment units have various values in unplanned transmission and therefore interference in uplink is decreased. Period N of unplanned transmission and number of unplanned transmissions k are determined in such a way, that each user equipment unit realizes an unplanned transmission. Unit B and each user equipment unit are notified about possible time intervals of unplanned transmission, on basis of certain period n of unplanned transmission and certain number of unplanned transmissions k, by means of signal transfer.; User equipment unit transmits data through an uplink without planning by unit B in possible time intervals of unplanned transmission. ^ EFFECT: increased

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efficiency of autonomous transfer and decreased interference in the uplink. ^ 6 cl, 9 dwg

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(54) **METHOD FOR SCHEDULING RADIO RESOURCES IN A MOBILE COMMUNICATION SYSTEM, ESPECIALLY CONCERNED WITH INCREASING THE EFFICIENCY OF AVAILABLE RADIO RESOURCES FOR MORE SMOOTH COMMUNICATION**

(57) Abstract:

PURPOSE: A method for scheduling radio resources in a mobile communication system is provided to minimize a waste of radio resources by reallocating radio resources, which have been allocated to UE, but still remain after uplink data transmission of the UE, to other UEs(User Equipments) by using a control signal transmitted from the UE.

CONSTITUTION: UE executes uplink data transmission by using the radio resources allocated from a node B(S60,S61). In case some of the allocated radio resources remain even though the UE has completed uplink data transmission, the UE transmits a message containing a specific control signal, or a request for de-allocation of the allocated uplink radio resources, to the node B(S62). Receiving the specific control signal, the node B reallocates the remaining de-allocated radio resources to other UEs(S63).



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심사청구 : 없음

(54) 이동 통신 시스템에서의 무선 자원 스케줄링 방법

요약

본 발명에 따르면 단말이 상향링크로 데이터 전송이 완료된 후에도 여전히 할당된 무선 자원이 남아 있는 경우에, 기지국이 단말로부터 무선 자원 할당해제 요청메시지를 수신하여, 다른 단말들에게 상기 무선 자원을 재할당하는 스케줄링 방법을 제공함으로써, 낭비되는 무선 자원을 최소화하여, 효율성을 높이는 효과가 있다.

대표도

도6

색인어

스케줄링, OFDM, 재할당, 무선 자원 할당

명세서

도면의 간단한 설명

도 1은 종래 및 본 발명에 적용되는 이동통신 시스템인 LTE(Long Term Evolution) 시스템의 망구조를 설명하기 위한 도면이다.

도 2는 3GPP 무선접속망 규격을 기반으로 한 단말과 UTRAN (UMTS Terrestrial Radio Access Network) 사이의 무선 인터페이스 프로토콜 (Radio Interface Protocol) 제어 평면의 구조를 설명하기 위한 도면이다.

도 3은 3GPP 무선접속망 규격을 기반으로 한 단말과 UTRAN (UMTS Terrestrial Radio Access Network) 사이의 무선 인터페이스 프로토콜 (Radio Interface Protocol) 사용자 평면의 구조를 설명하기 위한 도면이다.

도 4는 DFT-S-OFDM 방식의 송신기의 구조에 대한 블록 구성도이다.

도 5는 HARQ (hybrid ARQ) 방식에 대해 설명하기 위한 도면이다.

도 6은 본 발명의 일 실시 형태에 따른 절차 흐름도이다.

도 7은 본 발명의 다른 실시 형태에 따른 절차 흐름도이다.

발명의 상세한 설명

발명의 목적

발명이 속하는 기술분야 및 그 분야의 종래기술

본 발명은 이동 통신 시스템에 관한 것으로 보다 구체적으로는 이동 통신 시스템에서 무선 자원을 스케줄링하는 방법에 관한 것이다.

도 1은 이동 통신 시스템인 LTE(Long Term Evolution) 시스템의 망 구조를 설명하기 위한 도면이다. LTE시스템은 기존 UMTS시스템에서 진화한 시스템으로 현재 3GPP에서 기초적인 표준화 작업을 진행하고 있다.

LTE망은 크게 E-UTRAN과 CN(Core Network)으로 구분할 수 있다. E-UTRAN은 적어도 하나의 기지국(eNode B)을 포함하며 구성된다. 그리고, 망의 종단에 위치하며 외부망과 연결되는 접속 게이트웨이(Access Gateway: 이하 AG로 약칭)를 포함한다. AG는 사용자 트래픽을 처리하는 부분과 제어용 트래픽을 처리하는 부분을 포함하여 이루어진다. 이때는 새로운 사용자 트래픽을 처리하는 AG 부분과 제어용 트래픽을 처리하는 AG 부분 사이에 새로운 인터페이스를 사용하여 서로 통신을 할 수 있다. 하나의 기지국에는 하나 이상의 셀(Cell)을 포함하여 이루어질 수 있다. 기지국 간에는 사용자 트래픽 혹은 제어 트래픽 전송을 위한 인터페이스가 사용된다. CN은 AG와 기타 UE의 사용자 등록 등을 위한 노드 등을 포함한다. 또한, E-UTRAN과 CN을 구분하기 위해 인터페이스가 사용될 수 있다.

도 2 및 도 3은 3GPP 무선접속망 규격을 기반으로 한 단말과 UTRAN (UMTS Terrestrial Radio Access Network) 사이의 무선 인터페이스 프로토콜 (Radio Interface Protocol)의 구조를 나타낸다.

무선 인터페이스 프로토콜은 수평적으로 물리 계층(Physical Layer), 데이터링크 계층(Data Link Layer) 및 네트워크 계층(Network Layer)으로 이루어지며, 수직적으로는 데이터정보 전송을 위한 사용자 평면(User Plane)과 제어신호(Signaling) 전송을 위한 제어 평면(Control Plane)으로 구분된다. 프로토콜 계층들은 통신시스템에서 널리 알려진 개방형 시스템 간 상호접속 (Open System Interconnection: OSI)기준 모델의 하위 3개 계층을 바탕으로 L1 (제1계층), L2 (제2계층), L3(제3계층)로 구분될 수 있다. 이 중에서 제1계층에 속하는 물리계층은 물리채널(Physical Channel)을 이용한 정보 전송 서비스(Information Transfer Service)를 제공하며, 제3계층에 위치하는 무선 자원 제어(Radio Resource Control: 이하 RRC라 약칭함)계층은 단말과 망간에 무선 자원을 제어하는 역할을 수행한다. 이를 위해 RRC계층은 단말과 망간에 RRC메시지를 서로 교환한다. RRC계층은 기지국과 AG 등 망 노드들에 분산되어 위치할 수 있고, 기지국 또는 AG에만 위치할 수도 있다.

이하 도 2를 참조하여 무선 프로토콜 제어 평면을 설명한다. 무선 프로토콜 제어 평면은 물리계층, 매체접속제어(Medium Access Control: 이하 MAC로 약칭)계층, 무선링크제어(Radio Link Control: 이하 RLC로 약칭)계층 및 무선 자원제어(Radio Resource Control: 이하 RRC라 약칭함)계층을 포함하여 이루어진다.

제1계층인 물리계층은 물리 채널(Physical Channel)을 이용하여 상위 계층에게 정보 전송 서비스(Information Transfer Service)를 제공한다. 물리 계층은 상위에 있는 매체접속제어(Medium Access Control)계층과는 전송 채널(Transport Channel)을 통해 연결되어 있으며, 이 전송채널을 통해 매체접속제어계층과 물리계층 사이의 데이터가 이동한다. 그리고, 서로 다른 물리계층 사이, 즉 송신측과 수신측의 물리계층 사이는 물리채널을 통해 데이터가 이동한다.

제2계층의 MAC 계층은 논리 채널(Logical Channel)을 통해 상위계층인 무선링크제어(Radio Link Control)계층에게 서비스를 제공한다. 제2계층의 RLC 계층은 신뢰성 있는 데이터의 전송을 지원한다. RLC 계층의 기능이 MAC내부의 기능 블록으로 구현될 수도 있다. 이러한 경우에는 RLC계층은 존재하지 않을 수도 있다.

제3계층의 가장 상부에 위치한 RRC 계층은 제어 평면에서만 정의되며, 무선베어러 (Radio Bearer: RB라 약칭함)들의 설정(Configuration), 재설정(Re-configuration) 및 해제(Release)와 관련되어 논리 채널, 전송 채널 및 물리 채널들의 제어를 담당한다. 이때, RB는 단말과 UTRAN간의 데이터 전달을 위해 제2계층에 의해 제공되는 서비스를 의미한다.

이하 도 3을 참조하여 무선 프로토콜 사용자 평면의 각 계층을 설명한다. 무선 프로토콜 사용자 평면은 물리계층, MAC 계층, RLC 계층 및 PDCP 계층을 포함하여 이루어진다.

제1계층의 물리계층과 제2계층의 MAC 계층, RLC 계층에 대한 설명은 도 2에서의 설명과 동일하므로 생략한다. 제2계층의 PDCP 계층은 IPv4나 IPv6와 같은 IP 패킷 전송시에 대역폭이 작은 무선 구간에서 효율적으로 전송하기 위하여 상대적으로 크기가 크고 불필요한 제어정보를 담고 있는 IP 패킷 헤더 사이즈를 줄여주는 헤더압축 (Header Compression) 기능을 수행한다.

이하 망과 단말 사이의 데이터 전송하기 위한 상향 및 하향 전송 채널에 대해 설명한다. 망에서 단말로 데이터를 전송하는 하향 전송 채널로는 시스템 정보를 전송하는 BCH(Broadcast Channel)과 그 이외에 사용자 트래픽이나 제어 메시지를 전송하는 하향 SCH(Shared Channel)와 SCCH(Shared Control Channel)이 있다.

하향 멀티캐스트 또는 방송 서비스의 트래픽 또는 제어메시지의 경우 하향 SCH를 통해 전송될 수도 있고, 또는 별도의 하향 MCH(Multicast Channel)을 통해 전송될 수도 있다. 한편, 단말에서 망으로 데이터를 전송하는 상향 전송 채널로는 초기 제어메시지를 전송하는 RACH(Random Access Channel)와 그 이외에 사용자 트래픽이나 제어 메시지를 전송하는 상향 SCH(Shared Control Channel)가 있다.

이하 제1계층인 물리계층에서 사용하는 OFDM(orthogonal frequency division multiplexing) 방식을 설명한다. OFDM의 기본원리는 고속 전송률(high-rate)을 갖는 데이터 열(data stream)을 낮은 전송률(slow-rate)을 갖는 많은 수의 데이터 열로 나누고, 이들을 다수의 반송파를 사용하여 동시에 전송하는 것이다. 상기 다수의 반송파 각각을 부 반송파(subcarrier)라 한다. 상기 OFDM의 다수의 반송파 사이에 직교성(orthogonality)이 존재하기 때문에, 반송파의 주파수 성분은 상호 중첩되어도 수신 단에서의 검출이 가능하다. 상기 고속 전송률을 갖는 데이터 열은, 직/병렬 변환부(Serial to Parallel converter)를 통해 다수의 낮은 전송률의 데이터 열(data stream)로 변환되고, 상기 병렬로 변환된 다수의 데이터 열에 각각의 부 반송파가 곱해진 후 각각의 데이터 열이 합해져서 수신 단으로 전송된다.

직/병렬 변환부에 의해 생성된 다수의 병렬 데이터 스트림은, IDFT(Inverse Discrete Fourier Transform)에 의하여 다수의 부 반송파로 전송될 수 있으며, 상기 IDFT는 역 고속 푸리에 변환(IFFT: Inverse Fast Fourier Transform)을 사용하여 효율적으로 구현될 수 있다.

낮은 전송률을 갖는 부 반송파의 심볼 구간(symbol duration)은 증가하게 되므로 다중경로 지연확산에 의해 발생하는 시간상에서의 상대적인 신호 분산(dispersion)이 감소한다. OFDM 심볼 사이에 채널의 지연 확산보다 긴 보호구간(guard interval)을 삽입하여 심볼간 간섭(Inter-Symbol Interference)을 줄일 수 있다. 이러한 보호구간에 OFDM 신호의 일부를 복사하여 삽입하면 OFDM 심볼은 순환적으로 확장(cyclically extended)되어 심볼을 보호할 수 있다.

이하 종래 기술에 따른 OFDMA(orthogonal frequency division multiple access)를 설명한다. OFDMA는, OFDM을 변조 방식으로 사용하는 시스템에 있어 이용 가능한 부 반송파(subcarrier)의 일부를 각 사용자에게 제공하여 다중 접속을 실현하는 다중 접속 방법을 말한다. OFDMA는 부 반송파라는 주파수 자원을 각 사용자에게 제공하며, 각각의 주파수 자원은 다수의 사용자에게 서로 독립적으로 제공되며 서로 중첩되지 않는 것이 일반적이다. 결국 주파수 자원은 상호 배타적으로 할당된다.

도 4는 DFT-S-OFDM 방식의 송신기의 구조를 나타내는 도면이다. 이하, 도 4를 참조하여 종래 DFT-S-OFDM 방식을 설명한다. 종래 장치의 동작을 설명하기 위하여 몇 가지 변수를 정의한다. N은 OFDM 신호를 전송하는 부 반송파의 개수를 나타내고, Nb는 임의의 사용자를 위한 부 반송파의 개수를 나타내고, F는 이산 푸리에 변환 행렬, 즉 DFT 행렬을 나타내고, s는 데이터 심볼 벡터를 나타내고, x는 주파수 영역에서 데이터가 분산된 벡터를 나타내고, y는 시간영역에서 전송되는 OFDM 심볼 벡터를 나타낸다.

SC-FDMA에서는 데이터 심볼(s)을 직/병렬 변환부(410)에 의해 병렬 신호로 변환하고, DFT 확산 모듈(420)에 의해 데이터 심볼(s)을 전송하기 전에 DFT 행렬을 이용해서 분산시킨다. 이는 다음 수식으로 표현된다.

$$x = F_{N_b \times N_b} s$$

상기 수학식 1에서 $F_{N_b \times N_b}$는, 데이터 심볼(s)을 분산시키기 위해서 사용된 Nb 크기의 DFT 행렬이다. 이렇게 분산된 벡터(x)에 대하여 부반송파 매핑부(430)에서 일정한 부 반송파 할당 개법에 의해 부 반송파 매핑(subcarrier mapping)이 수행되고, IDFT 모듈(440)에 의해 시간영역으로 변환되어 병/직렬 변환부(450)을 거쳐 수신 측으로 전송하고자 하는 신호가 얻어진다. 상기 수신 측으로 전송되는 전송신호는 아래 식과 같다.

$$y = F_{N \times N}^{-1} x$$

상기 수학식 2에서 $F_{N \times N}^{-1}$는 주파수 영역의 신호를 시간 영역의 신호로 변환하기 위해 사용되는 크기 N의 IDFT 행렬이다. 상술한 방법에 의해 생성된 신호 y는, 순환 전치 삽입부(460)에 의해 순환 전치(cyclic prefix)가 삽입되어 전송된다. 상술한 방법에 의해 전송 신호를 생성하여 수신 측으로 전송하는 방법을 SC-FDMA 방법이라 한다. DFT 행렬의 크기는 특정한 목적을 위해 다양하게 제어될 수 있다.

도 5는 HARQ (hybrid ARQ) 방식에 대해 설명하기 위한 도면이다. 이하 무선 패킷 통신 시스템의 하향 링크 물리 계층에 적용되는 HARQ(hybrid ARQ)의 구체적인 구현 방식에 대해 설명한다.

도 5를 참조하면, 기지국은 패킷을 수신할 단말과 그 단말에 전송할 패킷의 형식(복호화율, 변조방식, 데이터량 등)을 결정하여 이 정보를 먼저 하향 링크 제어 채널(HS-SCCH) 전송을 통하여 그 단말에 알려주고, 이와 연관된 시점에서 해당 데이터 패킷(HS-DSCH)을 전송한다. 해당 단말은 하향 링크 제어 채널을 수신하여 자신에게 전송될 패킷의 형식과 전송 시점을 알게 되고, 해당 패킷을 수신할 수 있다. 만일, 단말이 패킷(data1) 복호화에 실패했을 경우 단말은 NACK 신호를 기지국으로 전송하고, NACK 신호를 수신한 기지국은 해당 단말로의 패킷 전송이 실패했음을 감지하고 적절한 시점에서 동일 데이터를 동일한 패킷 형식, 또는 새로운 패킷 형식으로 재전송할 수 있다. 이때에 단말은 재전송된 패킷(data1)과 이전에 수신했지만 복호화에 실패한 패킷을 다양한 방식으로 결합하여 다시 복호화를 시도하게 된다.

패킷 수신 후에 그 패킷 데이터의 복호화를 거쳐서 만일 복호화에 성공했을 경우 단말은 ACK 신호를 기지

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국으로 전송하고, ACK 신호를 수신한 기지국은 해당 단말로의 패킷 전송이 성공했음을 감지하고 다음 패킷(data2) 전송 작업을 수행할 수 있다.

무선 이동 통신 시스템에서 한정된 무선 통신 자원을 통해 다수의 기지국, 단말들 사이의 통신을 위해서는 상기 무선 통신 자원을 상위 계층에 의한 스케줄링에 의해서 일부를 할당하고, 할당받은 자원을 통해서 통신을 수행하게 된다. 상기 스케줄링은 기지국에 의해서 수행되는 것이 일반적이다.

기지국에서는 단말의 요청이 있거나, 단말의 요청이 없는 경우에도 필요하다고 판단되거나, 미리 할당하고자 하는 경우에는 상기 무선 자원을 단말에 할당한다. 단말들은 기지국으로부터 할당된 지정된 무선 자원을 이용하여 데이터 또는 제어 신호를 전송한다. 상향링크의 전송에서 기지국으로부터 할당된 무선 자원들은 특정 단말들에게 지정된 무선 자원이다. 이렇기 때문에 만약 상기 특정 단말들이 기지국으로부터 할당받은 무선 자원들을 사용하지 않는다면, 상기 무선 자원은 낭비되는 것이다. 즉, 특정 단말로 이미 할당된 무선 자원들은 다른 단말들이 다시 재사용하기 어렵기 때문에, 무선 자원을 비효율적으로 이용하게 되는 문제점이 있다.

발명이 이루고자 하는 기술적 과제

본 발명은 상술한 바와 같은 종래 기술의 문제점을 해결하기 위해서 안출된 것으로서, 본 발명의 목적은, 이동 통신 시스템에서 사용가능한 무선 자원의 효율을 높여서 보다 원활한 통신을 가능하게 하는 것이다. 또한, 간단한 방법으로 무선 자원의 낭비를 줄일 수 있는 스케줄링 방법을 제공하기 위한 것이다.

발명의 구성 및 작용

본 발명에서는 기지국이 무선 자원을 스케줄링할 때, 단말이 전송의 주체가 되는 상향링크의 경우 상기 단말에서 전송하는 특정 제어 신호를 통하여, 효율적으로 무선 자원을 할당하는 방법을 제안한다.

상기 기지국에 의해서 기 할당된 무선 자원에 대해서 특정 단말이 자신에게 할당된 무선 자원을 통해서 데이터 송수신을 한다. 상기 특정 단말이 데이터 송수신을 완료한 후에도 할당받은 무선 자원을 모두 사용한 것이 아니라 남은 무선 자원이 있는 경우에는 상기 스케줄링을 수행하는 기지국으로 데이터 송수신이 완료되었음을 알리는 정보 또는 전송 완료 후에 남은 무선 자원이 있음을 알리는 정보 등을 전송한다. 상기 정보를 통해 사용되지 않는 무선 자원이 있음을 알게 된 기지국은 적어도 하나 이상의 다른 단말들이 데이터 송수신에 이용할 수 있도록 상기 특정 단말에 의해서 사용되지 않은 무선 자원을 재할당한다.

본 발명의 일 양상으로서, 이동 통신 시스템에서의 무선 자원 스케줄링 방법은, 단말에 대해 무선 자원을 할당하는 단계와, 상기 단말로부터 상기 할당된 무선 자원의 해제 요청을 수신하는 단계 및 상기 해제 요청된 무선 자원을 다른 단말로 재할당하는 단계를 포함하여 이루어진다.

본 발명의 다른 양상으로서, 이동 통신 시스템의 단말에서의 무선 자원 스케줄링 방법은,

네트워크로부터 할당받은 무선 자원을 통해 데이터를 전송하는 단계와, 데이터 전송을 완료한 후 상기 할당받은 무선 자원의 해제 요청을 상기 네트워크로 전송하는 단계 및 상기 해제 요청된 무선 자원에 대한 할당이 해제되었음을 나타내는 정보를 상기 네트워크로부터 수신하는 단계를 포함하여 이루어진다.

상술한 본 발명의 목적, 구성 및 다른 특징들과 관련한 바람직한 실시 형태의 예들을 첨부된 도면을 참조하여 다음의 상세한 설명을 통해서 상세히 설명한다. 첨부된 도면과 함께 이하에 게시될 상세한 설명은 본 발명의 예시적인 실시 형태를 설명하고자 하는 것이며, 본 발명이 실시될 수 있는 유일한 실시 형태를 나타내고자 하는 것이 아니다. 또한, 이하의 설명에서 상향링크 신호를 송신하는 주체로서 "단말"을, 수신 주체로서 "기지국"을 중심으로 설명하나, 이들 용어에 한정될 필요는 없으며 상향링크 송신 주체로서 "사용자 기기(UE)", 수신 주체로서 "노드 B(eNode B)" 등 임의의 용어로서 지칭되는 경우 역시 동일한 의미를 나타낸다. 또한, 본 명세서 전체에서 동일한 구성요소에 대해서는 동일한 도면 부호를 사용하여 설명한다.

이하에서 설명되는 실시 형태들은 본 발명의 기술적 특징이 OFDM을 기반으로 한 LTE 시스템에서의 적용된 경우에 대한 것들이다. OFDM 시스템에서는 CDMA 시스템과는 달리 기지국에서 단말로 상향링크 또는 하향링크의 무선 자원을 스케줄링 하는 경우에, 특정 부 반송파(subcarrier)들과 특정 시간(subframe)으로 구성된 하나의 자원 블록(Resource Block; 이하 "RB")을 할당한다. 즉, 이렇게 할당된 RB들을 통해서 기지국 또는 단말은 데이터를 송수신하게 된다.

도 6은 본 발명의 바람직한 일 실시 형태에 따른 절차 흐름도이다. 데이터 전송 등에 대한 스케줄링은 기지국이 아닌 다른 주체를 통해서도 수행될 수 있지만, 이하 설명되는 본 발명의 일 실시 형태의 경우 기지국에서 수행하는 것으로 가정하여 설명한다.

기지국은 데이터 송수신을 위한 무선 자원들을 연결이 수립된 각 단말에 대해 할당한다. 앞서 언급한 바와 같이 상기 무선 자원은 RB들을 의미한다. 상기 무선 자원은 단말의 요청에 따라 할당될 수 있고, 단말의 요청이 없는 경우라도, 기지국에서 단말에 미리 할당해 줄 수 있다. 상기 단말의 무선 자원 요청은 RACH, CQI, ACK/NACK 그리고 제2계층의 데이터 형식을 통하여 수행된다. 각 단말은 기지국으로부터 할당받은 상향링크의 무선 자원을 가지고 있다(S60).

단말의 전송의 주체가 되는 상향링크 전송에서 각 단말은 상기 할당받은 무선 자원을 이용하여 상향링크의 데이터 전송을 완료한다. 상기 무선 자원을 사용하여 데이터 전송을 완료한 후에도 상기 단말에 할당받은 상향링크의 무선 자원이 남아있을 수 있다(S61). 예를 들면, 기지국이 특정 단말의 상향링크의 무선 자원으로 100 RB들을 할당했다고 가정한다. 실제로 상기 단말이 상향링크의 데이터 전송에 사용한 무선 자원은 80 RB들인 경우에는, 상기 단말에 20 RB만큼의 무선 자원이 남아 있게 된다.

위와 같이 특정 단말이 상향링크 데이터 전송을 완료한 후에 남아 있는 무선 자원이 있는 경우에는 이와 같은 사실을 알리기 위해서 상기 기지국으로 특정 제어 신호를 포함한 메시지를 전송한다. 바람직하게, 상기 특정 제어 신호는 단말에 할당된 무선 자원에 대해 해제하라는 무선 자원 할당 해제 요청(Request for

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de-allocation of the allocated uplink radio resource) 신호이다.

상기 무선 자원 할당 해제 요청 신호는, 도 3을 통해 설명한 제2계층의 데이터 형식으로 전송되거나, 특정 물리채널을 통하여 전송될 수 있다.

먼저 상기의 무선 자원 할당 해제 요청 신호를 포함하는 메시지를 제2계층의 데이터 형식으로 전송하는 방법의 일례에 대해서 설명한다. 상기 무선 자원 할당 해제 요청 신호를 예를 들어, MAC 계층의 PDU(Protocol Data Unit)에 포함하여 상기 기지국으로 전송한다. MAC 계층의 PDU에 상기 무선 자원 할당 해제 요청 신호를 포함하여 전송하는 경우, 상기 무선 자원 할당 해제를 요청하기 위한 메시지는 1 비트의 지시자(Indicator)를 이용할 수 있다. 즉, 상기 1 비트의 지시자가 "1"인 경우에는 상기 특정 단말의 버퍼에 상향링크로 전송할 데이터가 아직 있는 것을 의미한다. 반면에 "0"인 경우에는 상기 특정 단말의 버퍼에 더 이상 전송할 데이터가 없으며 데이터 전송이 완료되었음을 의미한다. 즉 "0"의 지시자를 수신한 경우 기지국에서는 상기 특정 단말의 상향링크 데이터 전송이 완료되었음을 알 수 있다. 반대로, 지시자가 "1"인 경우가 데이터 전송이 완료되었음을 의미하고 "0"인 경우가 상향링크로 전송할 데이터가 아직 있는 것으로 정의할 수도 있음은 자명하다.

다른 발명으로는 전송 채널의 일종인 RACH를 이용할 수도 있다. 상기 RACH은 단말이 망으로 초기 제어메시지를 전송하기 위한 채널이다. 일반적으로 RACH를 이용하는 목적은 단말이 망과 시간 동기를 맞추기 위한 것과 단말이 상향링크로 데이터 전송이 필요한데 상기 데이터를 전송할 상향링크의 무선자원이 없는 경우에 무선자원을 획득하는 것이다. 상기 특정 단말은 무선 자원 할당 해제 요청 신호를 RACH를 통하여 기지국에 전송한다. 이 경우에는 프리앰블(preamble)에 상기 사항을 알리는 지시자가 포함될 수 있다.

또 다른 방법은 상향링크의 제어신호를 이용하는 것이다. 다른 상향링크의 제어신호와 함께 전송될 수도 있다. 상기의 상향링크의 제어신호는 CQI, ACK/NACK등이 있다. 즉, 상기 단말이 CQI, ACK/NACK을 전송할 때, 상기 단말의 데이터 전송이 완료됨을 알리기 위해 상기 제어신호에 상기 무선 자원 할당 해제 요청 신호를 함께 전송한다. 이 경우에도 1 비트의 지시자(Indicator)를 사용하여 상기 무선 자원 할당 해제 요청 신호를 전송할 수 있다.

또 다른 방법으로는 상기 무선 자원 할당 해제 요청 신호의 전송을 위한 전용 물리채널을 이용하여 전송할 수도 있다.

상기 무선 자원 할당 해제 요청 신호를 수신한 기지국은 사용되지 않는 무선 자원이 있음을 알게 된다. 따라서, 상기 남는 무선 자원 즉, 상기 특정 단말에 의해서 할당이 해제된 무선 자원에 대해서 다른 단말에 대해 재할당한다(S63). 상기 기지국은 다른 단말들의 무선 자원 요청이 있는 경우에, 상기의 할당 해제된 무선 자원을 상기 다른 단말의 요청에 따라 할당할 수 있고, 다른 단말의 요청이 없는 경우라도, 기지국에서 단말에 할당할 수 있다. 이 경우에도 상기 다른 단말의 무선 자원 요청은 RACH, CQI, ACK/NACK 그리고 제2계층의 데이터 형식을 통하여 수행된다.

또 7은 본 발명의 다른 실시 형태에 따른 절차 흐름도이다. 도 7을 참조하면, 특정 단말이 기지국으로부터 일부 무선 자원을 할당받아 할당받은 무선 자원을 통해서 데이터를 송수신하는 과정은 동일하게 수행된다(S71, S72). 또한, 상기 데이터 송수신 완료된 후에도 남아 있는 무선 자원이 있는 경우에 상기 기지국으로부터 무선 자원 할당 해제 요청 신호를 전송하는 과정도 동일하게 수행된다(S72). 이 경우에도 상기 무선 자원 할당 해제 요청 신호는 제2계층의 데이터 형식으로 전송될 수 있고, 전송 채널의 일종인 RACH를 통해서 전송될 수 있고, CQI, ACK/NACK 등의 제어 신호를 전송할 때 함께 전송할 수도 있다. 상기 무선 자원 할당 해제 요청 신호에 대해 1 비트의 지시자(Indicator)를 사용하여, 상기 지시자가 "1"인 경우와 "0"인 경우를 각각 단말의 버퍼에 전송할 데이터가 남아있는 경우와 모두 전송한 경우 등의 해나로 설정하여 상기 기지국에 단말의 버퍼에 대한 정보를 알릴 수 있다.

기지국은 단말로부터 전송받은 무선 자원 할당 해제 요청 신호에 따라, 상기 특정 단말로 상기 할당된 무선 자원이 해제되었음을 알리기 위한 무선 자원 할당 해제 완료 메시지를 전송한다(S73). 상기 무선 자원 할당 해제 완료 메시지를 전송하여, 상기 기지국이 상기의 무선 자원을 다른 단말로 재할당하는 경우 상기 특정 단말이 다시 상기 무선 자원을 사용하여 충돌이 발생하는 것을 막을 수 있다. 상기의 무선 자원 할당 해제 완료 메시지는 제1계층 또는 제2계층의 제어 신호를 통하여 전송할 수 있다. 또는, 하향 링크 SCH(DL-SCH)를 통해서 전송될 수도 있다.

상기 기지국은 무선 자원 할당 해제 완료 메시지를 전송한 후, 상기 특정 단말이 전송한 무선 자원 할당 해제 요청 신호에 따라, 할당이 해제된 무선 자원을 다른 단말들에 재할당한다. 상기 다른 단말들에 대해 재할당할 때는 상기 다른 단말들로부터 무선 자원 할당 요청을 수신하여 할당할 수도 있고, 상기 요청이 없는 경우라도 상기 기지국이 할당할 수도 있다.

이상에서 설명한 본 발명이 속하는 기술분야의 당업자는 본 발명이 그 기술적 사상이나 필수적 특징을 변경하지 않고서 다른 구체적인 형태로 실시될 수 있다는 것을 이해할 수 있을 것이다. 그러므로 이상에서 기술한 실시 형태는 모든 면에서 예시적인 것이며 한정적인 것이 아닌 것으로서 이해할 것이다. 본 발명의 범위는 상기 상세한 설명보다는 후술하는 특허청구범위에 의하여 나타내어지며, 특허청구범위의 의미 및 범위 그리고 그 등가한 개념으로부터 도출되는 모든 변경 또는 변형된 형태가 본 발명의 범위에 포함되는 것으로 해석될 것이다.

발명의 효과

본 발명에 따르면 단말이 상향링크로 데이터 전송이 완료된 후에도 여전히 할당된 무선 자원이 남아 있는 경우에, 단말에서 전송되는 제어 신호를 이용하여, 다른 단말들에게 상기 무선 자원을 재할당해 줄 수 있는 방법을 통해, 낭비되는 무선 자원을 최소화할 수 있는 효과가 있고, 또한, 이동 통신 시스템에서의 데이터 송수신의 효율성을 높이는 효과가 있다.

청구의 범위

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청구항 1

이동 통신 시스템에서의 무선 자원 스케줄링 방법에 있어서,

단말에 대해 무선 자원을 할당하는 단계;

상기 단말로부터 상기 할당된 무선 자원의 해제 요청을 수신하는 단계; 및

상기 해제 요청된 무선 자원을 다른 단말로 재할당하는 단계

를 포함하는 것을 특징으로 하는 무선 자원 스케줄링 방법.

청구항 2

제 1 항에 있어서,

상기 단말로 상기 단말에 할당되었던 무선 자원이 해제되었음을 나타내는 정보를 전송하는 단계를 더 포함하는 것을 특징으로 하는 무선 자원 스케줄링 방법.

청구항 3

제 1 항에 있어서,

상기 할당된 무선 자원의 해제 요청에는, 상기 할당받은 무선 자원을 통해 데이터를 전송하고 남아 있는 무선 자원에 대한 정보 및 상기 단말의 버퍼에 더 이상 전송할 데이터가 없음을 알리기 위한 정보 중에서 적어도 하나를 포함하는 것을 특징으로 하는 무선 자원 스케줄링 방법.

청구항 4

제 1 항에 있어서,

상기 무선 자원의 할당을 위해서 상기 단말로부터 무선 자원 할당 요청을 수신하는 단계를 더 포함하는 것을 특징으로 하는 무선 자원 스케줄링 방법.

청구항 5

이동 통신 시스템의 단말에서의 무선 자원 스케줄링 방법에 있어서,

네트워크로부터 할당받은 무선 자원을 통해 데이터를 전송하는 단계;

데이터 전송을 완료한 후 상기 할당받은 무선 자원의 해제 요청을 상기 네트워크로 전송하는 단계; 및

상기 해제 요청된 무선 자원에 대한 할당이 해제되었음을 나타내는 정보를 상기 네트워크로부터 수신하는 단계

를 포함하는 것을 특징으로 하는 무선 자원 스케줄링 방법.

청구항 6

제 5 항에 있어서,

상기 무선 자원 할당 해제 요청은, 제2계층의 데이터 형식으로 전송되는 것을 특징으로 하는 무선 자원 스케줄링 방법.

청구항 7

제 5 항에 있어서,

상기 무선 자원 할당 해제 요청은, 상향 링크 제어 신호와 함께 전송되는 것을 특징으로 하는 무선 자원 스케줄링 방법.

청구항 8

제 5 항에 있어서,

상기 무선 자원 할당 해제 요청은, 전용 물리 채널(Dedicated Physical Channel) 및 RACH(Random Access Channel) 중에서 적어도 하나를 통해 전송되는 것을 특징으로 하는 무선 자원 스케줄링 방법.

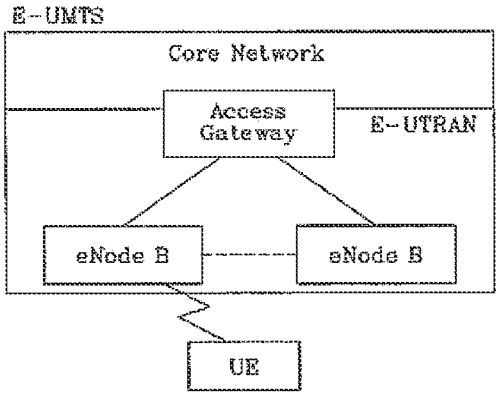
청구항 9

제 5 항에 있어서,

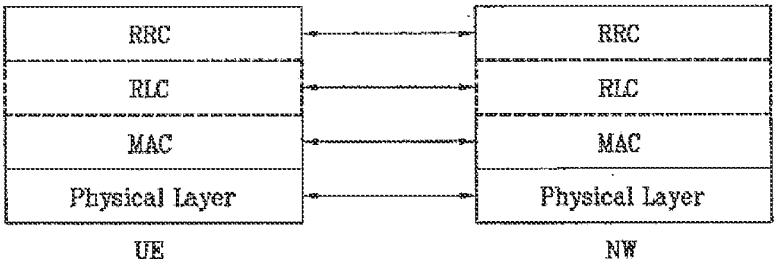
상기 무선 자원 할당 해제 요청은, 일정 비트 수로 구성된 지시자(Indicator)를 이용하는 것을 특징으로 하는 무선 자원 스케줄링 방법.

도면

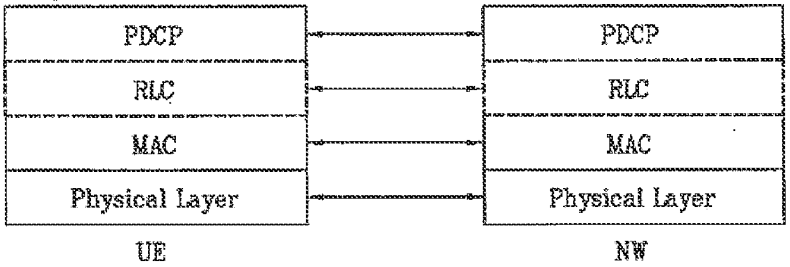
도면1



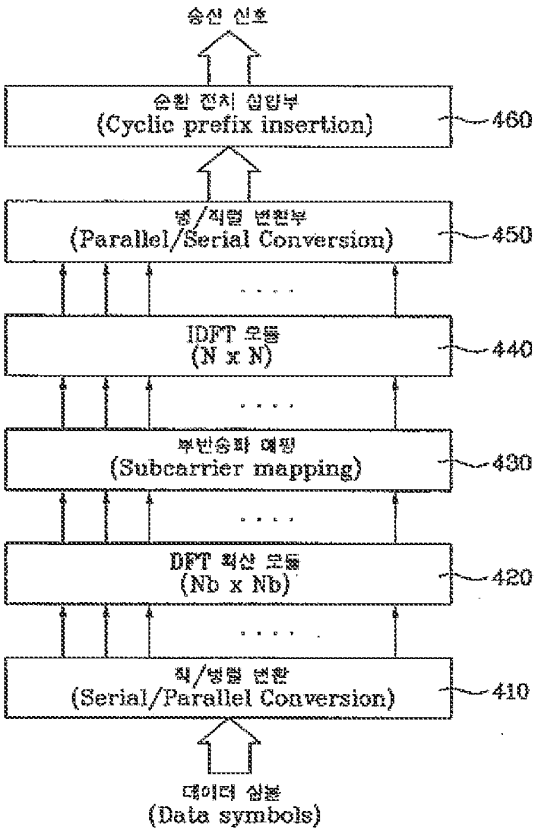
도면2



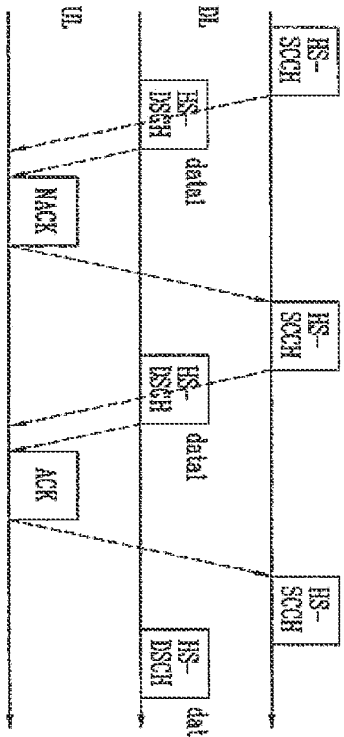
도면3



도면4

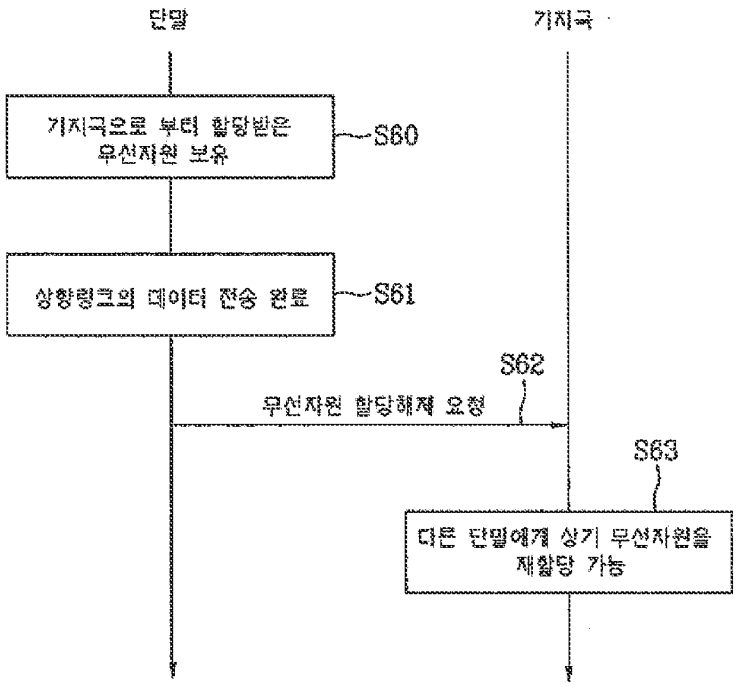

송신 신호
순환 전치 삽입부
(Cyclic prefix insertion)
460
병/직렬 변환부
(Parallel/Serial Conversion)
450
IDFT 모듈
(N x N)
440
부반송파 매핑
(Subcarrier mapping)
430
DFT 확산 모듈
(Nb x Nb)
420
직/병렬 변환
(Serial/Parallel Conversion)
410
데이터 심볼
(Data symbols)

도면5

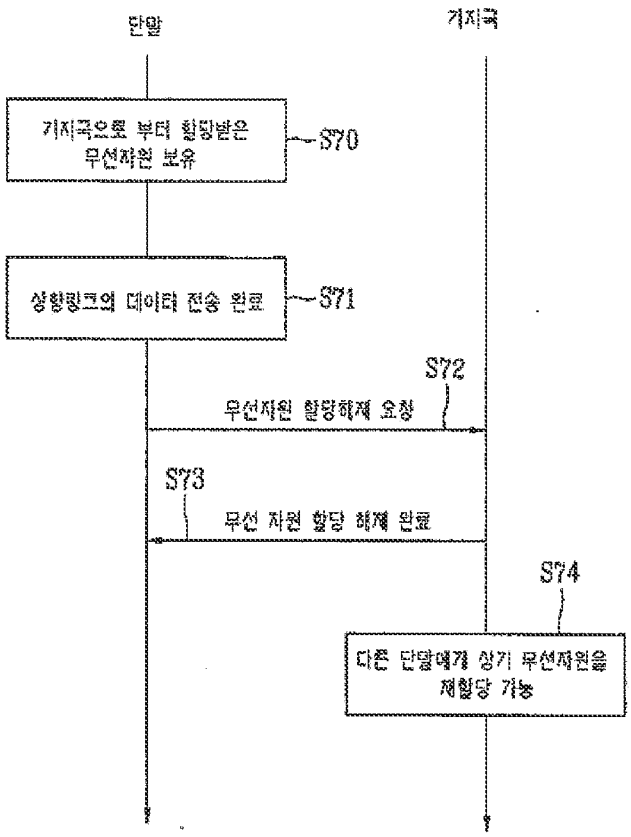


IPR2023-01267 Page 524

도면6


단말
기지국
기지국으로 부터 할당받은 무선자원 보유
S60
상향링크의 데이터 전송 완료
S61
S62
무선자원 할당해제 요청
S63
다른 단말에게 상기 무선자원을 재할당 가능

도면7


단말
기지국
기지국으로 부터 할당받은 무선자원 보유
S70
상향링크의 데이터 전송 완료
S71
S72
무선자원 할당해제 요청
S73
무선 자원 할당 해제 완료
S74
다른 단말에게 상기 무선자원을 재할당 가능

Electronic Patent Application Fee Transmittal

Application Number:	12238910
Filing Date:	26-Sep-2008
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Filer:	LoriAnne D. Swanson/Juli Lawrence
Attorney Docket Number:	IHSP_2-1853.01.US

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

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

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	1801	1	930	930
		Total in USD ($)		**930**

Electronic Acknowledgement Receipt	
EFS ID:	12592528
Application Number:	12238910
International Application Number:	
Confirmation Number:	2438
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Customer Number:	15800
Filer:	LoriAnne D. Swanson/Juli Lawrence
Filer Authorized By:	LoriAnne D. Swanson
Attorney Docket Number:	IHSP_2-1853.01.US
Receipt Date:	20-APR-2012
Filing Date:	26-SEP-2008
Time Stamp:	14:51:41
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	IHSP_2_1853_01_US_RCE.pdf	697881 e1f07cee4aacd0fa98f7018f71a2469dc944c751	no	3
Warnings:					
Information:					

2		IHSP_2_1853_01_US_Supplemental_Reply_to_Final_OA_Dated_12_6_11.pdf	127390 e9537af942919448dee96df57beef5f7870e9c63	yes	9

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment Submitted/Entered with Filing of CPA/RCE	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	9

Warnings:

Information:

3	Transmittal Letter	IHSP_2_1853_01_US_SIDS_Trans_IDCC.pdf	104368 73c18cd04d3d4c1658291ac8cc19f032c88feddc	no	4

Warnings:

Information:

4	Information Disclosure Statement (IDS) Form (SB08)	IHSP_2_1853_01_US_SIDS_1449.pdf	126728 49f7351161a74b79306cebb10c475de0f0e4ad31	no	1

Warnings:

Information:

This is not an USPTO supplied IDS fillable form

5	Non Patent Literature	3GPP_R2_080043_RANWG2_January2008_4pp.pdf	207985 e1719345d1e362f972328022257dfb6354ab1e8b5	no	4

Warnings:

Information:

6	Non Patent Literature	3GPP_R2_080894_RANWG2_Febrauary2008_4pp.pdf	145228 7abba271d429fd97426cb6ca7e6175b4f7a3c50d	no	4

Warnings:

Information:

7	Non Patent Literature	3GPP_R2_081581_RANWG2_MarchApril2008_6pp.pdf	315450 789b29ef2c609589b64b96b20288440e75b95201	no	6

Warnings:

Information:

8	Non Patent Literature	3GPP_R3_081091_RANWG3_May2008_4pp.pdf	186519 48116b31f6ce61f261ca7e8dd3617f230bfeceee	no	4

Warnings:

Information:

9	Non Patent Literature	3GPP_R2_071556_TSG_2_March2007_76pp1.pdf	554432 de569bea42d6724c7cd30f509baf6d8fbb09c04c	no	76
Warnings:					
Information:					
10	Foreign Reference	WO_2007078155_1.pdf	4549109 493a202179130b2d83518c6826177974389551bd	no	30
Warnings:					
Information:					
11	Foreign Reference	RU_2005122724_1.pdf	140476 c7b2802388aa34e0198ba6001b74274bb5e9f98d	no	2
Warnings:					
Information:					
12	Foreign Reference	KR_10_2007_0073578_1.pdf	4029793 7150d4c8b19d15493bee70c88af325a1a038333e	no	13
Warnings:					
Information:					
13	Fee Worksheet (SB06)	fee-info.pdf	30614 5ca3e90b6c8b4f722977b6bc32e35559bad1b8b3	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	11215973	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
12/238,910	09/26/2008	

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 04/20/2012	(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))	* 32	Minus	** 32	= 0	X $ =		OR	X $60=	0
Independent (37 CFR 1.16(h))	* 8	Minus	***8	= 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:
/STEFANIE BRYCE/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/238,910	09/26/2008	Benoit Pelletier	IHSP_2-1853.01.US	2438

15800 7590 04/23/2012

Condo Roccia LLP
One Liberty Place
Suite 2200
Philadelphia, PA 19103

EXAMINER	
YUEN, KAN	
ART UNIT	**PAPER NUMBER**
2464	

MAIL DATE	DELIVERY MODE
04/23/2012	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.

Advisory Action **Before the Filing of an Appeal Brief**	**Application No.** *12/238,910*	**Applicant(s)** PELLETIER ET AL.
	Examiner KAN YUEN	**Art Unit** 2464

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 06 April 2012 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 *4* 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 Continuation Sheet*. (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: _____.

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: 1-7 and 30-32.

Claim(s) withdrawn from consideration: .

/Ricky Ngo/ Supervisory Patent Examiner, Art Unit 2464	/Kan Yuen/ Examiner, Art Unit 2464

Continuation of 3. NOTE: According to the claim amendment filed on 04/06/2012, the applicant broadens the independent claims 1 and 6, by deleting at least the feature: "determining a condition of a last HARQ data transmission". Thus, the applicant changes the scope of the claim invention by broadening the claim subject matters, and therefore a new search and/or reconsideration is required .

DOCKET NO.: IHSP_2-1853.01.US
Application No.: 12/238,910
Final Action Dated: December 6, 2011

DO NOT ENTER: /K.Y./
/Kan Yuen/ 04/11/2012

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **Benoit Pelletier, et al.**	**Confirmation No.: 2438**
Application No.: 12/238,910	**Group Art Unit: 2464**
Filing Date: September 26, 2008	**Examiner: Kan Yuen**

For: Method And Apparatus For Terminating Transmission Of A Message In An Enhanced Random Access Channel

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

Sir:

REPLY PURSUANT TO 37 CFR § 1.116

In response to the Final Action dated **December 6, 2011**, reconsideration is respectfully requested in view of the amendments and/or remarks as indicated below:

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

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

☐ **Amendments to the Drawings** begin on page of this paper and include an attached replacement sheet.

☒ **Remarks** begin on page 8 of this paper.

☒ The Commissioner is hereby authorized to charge any fee deficiency, charge any additional fees, or credit any overpayment of fees, associated with this application in connection with this filing, or any future filing, submitted to the U.S. Patent and Trademark Office during the pendency of this application, to Deposit Account No. 09-0435.

IPR2023-01267 Page 536

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/238,910	09/26/2008	Benoit Pelletier	IHSP_2-1853.01.US	2438

15800 7590 06/06/2012

Condo Roccia LLP
One Liberty Place
Suite 2200
Philadelphia, PA 19103

EXAMINER	
YUEN, KAN	
ART UNIT	**PAPER NUMBER**
2464	
MAIL DATE	**DELIVERY MODE**
06/06/2012	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	12/238,910	PELLETIER ET AL.	
	Examiner	Art Unit	
	KAN YUEN	2464	

-- 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 *20 April 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) *1-7 and 30-32* 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) *1-3, 5-7 and 30-31* is/are rejected.

8)☐ Claim(s) *4 and 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: _____.

Detailed Action

1. 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 the Advisory Action. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 04/20/2012 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 1-7 and 30-32 have been considered but are moot because the arguments do not apply to any of the references being used in the current rejection.

Priority

3. Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. *119(e) and/or 120* as follows:

The later-filed application must be an application for a patent for an invention which is also disclosed in the prior application (the parent or original non-provisional application or provisional application). The disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the

requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994).

4. The disclosure of the prior-filed application, Provisional Application No. ***60/975,985***, fails to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this application.

At least one feature in claims 1 and 6 is not described in the provisional application. In particular, the provisional application does not describe the feature "on a condition that the buffer is empty, the WTRU releasing a E-DCH resource allocation".

According to paragraph 0027 of the provisional application **60/975,985**, the application discloses the feature for allowing the WTRU to detect a collision and to release the E-PRACH resources based on the detection. According to paragraph 0028 of the provisional application **60/975,985**, the application discloses the feature wherein once the WTRU has triggered an E-RACH message part termination, the WTRU preferably transmits a signal to the network to inform it to release the radio resources. This signal may preferably take one of the following forms such as special or reserved value of the scheduling information (SI) with a total TEBS equals zero.

According to the paragraphs 0027 and 0028, the provisional application seems to disclose the features for releasing E-PRACH and E-RACH, however, the provisional application fails to disclose the feature "on a condition that the buffer is empty, the WTRU releasing a E-DCH resource allocation".

Thus, the current application is not entitled to the benefit of the filing date (09/28/2007) of the prior-filed provisional application 60/975,985.

5. The disclosure of the prior-filed application, Provisional Application No. ***60/982,528***, fails to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this application.

At least one feature in claims 1 and 6 is not described in the provisional application. In particular, the application does not describe the feature “on a condition that the buffer is empty, triggering a transmission by the WTRU of scheduling information (SI) in the E-DCH transmission with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero".

Thus, the current application is not entitled to the benefit of the filing date (10/25/2007) of the prior-filed provisional application 60/982528.

Claim Rejections - 35 USC § 102

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

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

7. Claims 1 and 6 are rejected under 35 U.S.C. 102(e) as being anticipated by Wager et al. (Provisional Application No.: 61015316).

Regarding claim 6, Wager et al. disclosed a wireless transmit/receive unit (WTRU) (read as the UE) for terminating an enhanced dedicated channel (E-DCH) in a cell forward access channel (CELL FACH) state, the WTRU comprising:

a receiver; a transmitter; and a processor in communication with the receiver and the transmitter, the processor configured to:

the WTRU determining that a buffer is empty; on a condition that the buffer is empty, triggering a transmission by the WTRU of scheduling information (SI) in the E-DCH transmission with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero; and on a condition that the buffer is empty, the WTRU releasing a E-DCH resource allocation (see pages 3 and 4; it is an object of the present invention to achieve a method and arrangement that allows a UE and/or nodeB to release common E-DCH resources. The release of the common E-DCH resources is signaled between UE and NodeB using existing signaling fields on L2 or L1. During scenarios when UE triggers resource release: Once a UE in CELL_FACH transmitting on a common E-DCH resource has emptied its RLC transmit buffer, it should include the scheduling information (SI) field in the last MAC PDU, indicating the TEBS is equal to zero. This indication can be interpreted as the end of the communication transmission, and the E-DCH resources will be released thereafter).

Claim 1 is rejected similar to claim 6.

Claim Rejections - 35 USC § 103

8. 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.

9. 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.

10. Claims 2 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wager et al. (Provisional Application No.: 61015316) in view of Lin (Pub No.: 2010/0091652).

Regarding claims 2 and 30, Wager et al. failed to disclose the feature wherein an inactivity timer is started when the buffer is empty.

Lin from the same or similar fields of endeavor disclosed the feature wherein an inactivity timer is started when the buffer is empty (Lin see paragraph 0038; when a queue becomes empty, the timer corresponding to the queue starts counting).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the disclosure of Wager et al. and to implement the

feature as disclosed by Lin to provide the feature wherein an inactivity timer is started when the buffer is empty.

The motivation would be to increase the transmission efficiency by providing indication on how long the queue is empty.

11. Claims 3 and 31 rejected under 35 U.S.C. 103(a) as being unpatentable over Wager et al. (Provisional Application No.: 61015316) in view of Lin (Pub No.: 2010/0091652) as applied to claim 2 above, and further in view of Lee et al. (Pub No.: 2009/0168704).

Regarding claims 3 and 31, Wager et al. in view of Lin failed to disclose the feature wherein the transmission of the SI is triggered when the inactivity timer expires.

Lee et al. from the same or similar fields of endeavor disclosed the feature wherein the transmission of the SI is triggered when the inactivity timer expires (Lee et al. see paragraphs 0077 and 0078; the SI is sent each time the timer expires).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the disclosure of Wager et al. in view of Lin and to implement the feature as disclosed by Lee et al. to provide the feature wherein the transmission of the SI is triggered when the inactivity timer expires.

The motivation would be to improve transmission reliability by sending scheduling information from a UE to control an uplink radio resource.

12. Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wager et al. (Provisional Application No.: 61015316) in view of Fisher (Pub No.: 2005/0026623).

Regarding claims 5 and 7, Wager et al. failed to disclose the feature for terminating the E-DCH transmission in case of cell reselection or radio link failure.

Fisher from the same or similar fields of endeavor disclosed the feature for terminating the E-DCH transmission in case of cell reselection or radio link failure (Fisher see paragraph 0027; a determination is whether all of the dedicated channels are NRT. If all the DCHs are not NRT, then this indicates a failure, and the procedure is terminated).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the disclosure of Wager et al. and to implement the feature as disclosed by Fisher et al. to provide the feature for terminating E-DCH when failure is detected.

The motivation would be to reduce transmission error.

Examiner's Note:

13. Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the

references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

In the case of amending the claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on for proper interpretation and also to verify and ascertain the metes and bounds of the claimed invention.

The Applicant is welcome to request a telephonic interview if the Applicant has any questions or requires any additional information that would further or expedite the prosecution of the application.

Allowable Subject Matter

14. Claims 4 and 32 are 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 any intervening claims.

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAN YUEN whose telephone number is (571)270-1413. The examiner can normally be reached on Monday-Friday 11:00a.m-6:00p.m EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky O. Ngo can be reached on 571-272-3139. 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.

/Kan Yuen/
Examiner, Art Unit 2464

KY

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12238910	PELLETIER ET AL.
	Examiner	**Art Unit**
	KAN YUEN	2464

✓	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	05/01/2012								
	1	✓								
	2	✓								
	3	✓								
	4	O								
	5	✓								
	6	✓								
	7	✓								
	8	N								
	9	N								
	10	N								
	11	N								
	12	N								
	13	N								
	14	N								
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	22	N								
	23	N								
	24	N								
	25	N								
	26	N								
	27	N								
	28	N								
	29	N								
	30	✓								
	31	✓								
	32	O								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12238910	PELLETIER ET AL.
	Examiner	Art Unit
	KAN YUEN	2464

SEARCHED			
Class	Subclass	Date	Examiner
370	328,329,338,341,348	5/1/2012	KY
455	450,464	5/1/2012	KY
709	226,229	5/1/2012	KY

SEARCH NOTES		
Search Notes	Date	Examiner
EAST SEARCH CONSULTED WITH SPE	5/1/2012	KY
MANUAL SEARCH CLASS 370 SUBCLASS 329	5/1/2012	KY
INVENTORSHIP SEARCH	5/1/2012	KY

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

Substitute for 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*				***Complete if Known***	
				Application Number	12/238,910
				Filing Date	September 26, 2008
				First Named Inventor	Pelletier, Benoit
				Art Unit	2464
				Examiner Name	Yuen, Kan
Sheet	1	of	1	**Attorney Docket Number**	IHSP_2-1853.01.US

U. S. PUBLICATION AND PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number Number – Kind Code (if known)	Publication or Grant Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
	44	2005/0054298 A1	03-10-2005	Chen, Rex Huan-Yueh
	45	2006/0023629 A1	02-02-2006	Kim et al.

FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Foreign Patent Document Country Code- Number - Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	T
	46	KR 10-2007-0073578 A	07-10-2007	L.G. Electronics, Inc.	
	47	RU 2005122724 A	01-27-2007	Samsung Electronics Co., Ltd.	
	48	WO 2007/078155 A2	07-12-2007	L.G. Electronics, Inc.	

NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.	Include name of the author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), Volume-issue Number(s), publisher, city and/or country where published.	T
	49	3rd Generation Partnership Project (3GPP), R2-071556, “Introduction of Enhanced CELL_FACH state", Change Request 3GPP TS 25.331 Version 7.3.0, 3GPP TSG-2 Meeting #57, St. Julian's Malta, March 26-30, 2007, 76 pages	
	50	3rd Generation Partnership Project (3GPP), R2-080043, "Contention resolution for enhanced uplink in CELL_FACH", Ericsson, 3GPP TSG RAN WG2 #60bis, Seville, Spain, January 14-18, 2008, 4 pages	
	51	3rd Generation Partnership Project (3GPP), R2-080894, "CELL_FACH E-DCH scheduling simplifications", Infineon, 3GPP TSG-RAN WG2 Meeting #61, Sorrento, Italy, February 11-15, 2008, 4 pages	
	52	3rd Generation Partnership Project (3GPP), R2-081581, "Empty Buffer Status reporting and Implicit release for CCCH messages using enhanced uplink in CELL_FACH", Qualcomm Europe, 3GPP TSG-RAN WG2 #61-bis, Shenzhen, China, March 31 - April 4, 2008, 6 pages	
	53	3rd Generation Partnership Project (3GPP), R3-081091, "E-DCH Resource Release in CELL_FACH", Qualcomm Europe, 3GPP TSG-RAN WG3 Meeting#60, Kansas City, USA, May 5-9, 2008, 4 pages	

Examiner Signature	/Kan Yuen/	**Date Considered**	05/01/2012

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K.Y./

Substitute for 1449/PTO **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** *(use as many sheets as necessary)*				***Complete if Known***	
				Application Number	12/238,910
				Filing Date	September 26, 2008
				First Named Inventor	Pelletier, Benoit
				Art Unit	2464
				Examiner Name	Yuen, Kan
Sheet	1	of	1	**Attorney Docket Number**	IHSP_2-1853.01.US

U. S. PUBLICATION AND PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number Number – Kind Code (if known)	Publication or Grant Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
	44	2005/0054298 A1	03-10-2005	Chen, Rex Huan-Yueh
	45	2006/0023629 A1	02-02-2006	Kim et al.

FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Foreign Patent Document Country Code- Number - Kind Code (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	T
	46	KR 10-2007-0073578 A	07-10-2007	L.G. Electronics, Inc.	
	47	RU 2005122724 A	01-27-2007	Samsung Electronics Co., Ltd.	
	48	WO 2007/078155 A2	07-12-2007	L.G. Electronics, Inc.	

NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.	Include name of the author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), Volume-issue Number(s), publisher, city and/or country where published.	T
	49	3rd Generation Partnership Project (3GPP), R2-071556, “Introduction of Enhanced CELL_FACH state", Change Request 3GPP TS 25.331 Version 7.3.0, 3GPP TSG-2 Meeting #57, St. Julian's Malta, March 26-30, 2007, 76 pages	
	50	3rd Generation Partnership Project (3GPP), R2-080043, "Contention resolution for enhanced uplink in CELL_FACH", Ericsson, 3GPP TSG RAN WG2 #60bis, Seville, Spain, January 14-18, 2008, 4 pages	
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Examiner Signature	/Kan Yuen/	**Date Considered**	05/01/2012

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K.Y./

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	22	(e-dch or edch or (enhanced adj2 dedicat$4 adj2 channel)) with (e-aich or (acquisition near2 indication near2 channel))	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	AND	ON	2012/05/02 13:18
L2	12	(e-dch or edch or (enhanced adj2 dedicat$4 adj2 channel)) with (e-aich or (acquisition near2 indication near2 channel)) with (respon$6 or feedback or ack or acknowled$8)	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	AND	ON	2012/05/02 13:28
S1	391	(releas$6 with (e-dch or edch or (enhanced adj2 dedicat$4 adj2 channel)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	AND	ON	2012/05/01 15:03
S2	90001	(buffer or tebs) with (zero or "0")	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	AND	ON	2012/05/01 15:04
S3	28	S1 S2	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	AND	ON	2012/05/01 15:04
S4	1	12/238910	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	AND	ON	2012/05/01 15:07
S5	1	12/314247	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	AND	ON	2012/05/01 15:28
S6	108130	(buffer or tebs) with (empt$4 or zero or "0")	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	AND	ON	2012/05/01 15:44
S7	410	((releas$4 or disconnec$6) with (e-dch or edch or (enhanced adj2	US-PGPUB; USPAT;	AND	ON	2012/05/01 15:46

		dedicat$4 adj2 channel)))	USOCR; FPRS; EPO; DERWENT; IBM_TDB			
S8	33	S6 S7	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	AND	ON	2012/05/01 15:46
S9	425	((clos$4) with (e-dch or edch or (enhanced adj2 dedicat$4 adj2 channel)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	AND	ON	2012/05/01 16:00
S10	458356	(buffer or tebs or memory or stor$3 or database) with (empt$4 or zero or "0")	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	AND	ON	2012/05/01 16:00
S11	847	((clos$4 or releas$4 or disconnect$6 or discontinu$4) with (e-dch or edch or (enhanced adj2 dedicat$4 adj2 channel)))	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	AND	ON	2012/05/01 16:03
S12	71	S10 S11	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	AND	ON	2012/05/01 16:03
S13	4	("20050054298" | "20060023629").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	AND	ON	2012/05/01 17:25
S14	0	S11 S13	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	AND	ON	2012/05/01 17:25
S15	1	61/015316	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	AND	ON	2012/05/01 19:22

EAST Search History (Interference)

<This search history is empty>

5/2/2012 1:57:54 PM

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **Benoit Pelletier, et al.**	**Confirmation No.: 2438**
Application No.: 12/238,910	**Group Art Unit: 2464**
Filing Date: September 26, 2008	**Examiner: Kan Yuen**

For: Method And Apparatus For Terminating Transmission Of A Message In An Enhanced Random Access Channel

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

Sir:

REPLY PURSUANT TO 37 CFR § 1.111

In response to the Official Action dated June 6, 2012, reconsideration is respectfully requested in view of the amendments and/or remarks as indicated below:

☐ **Amendments to the Specification** begin on page of this paper.

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

☐ **Amendments to the Drawings** begin on page of this paper and include an attached replacement sheet.

☒ **Remarks** begin on page 7 of this paper.

☒ The Commissioner is hereby authorized to charge any fee deficiency, charge any additional fees, or credit any overpayment of fees, associated with this application in connection with this filing, or any future filing, submitted to the U.S. Patent and Trademark Office during the pendency of this application, to Deposit Account No. 09-0435.

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

Listing of Claims:

1. (Currently Amended) A method for completing an enhanced dedicated channel (E-DCH) transmission in a cell forward access channel (CELL_FACH) state by a wireless transmit/receive unit (WTRU), the method comprising:

~~the WTRU~~ determining that a buffer is empty;

on a condition that the buffer is empty, triggering a transmission by the WTRU of scheduling information (SI) ~~in the E-DCH transmission~~ with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero; and

on a condition that the buffer is empty, ~~the WTRU~~ releasing a E-DCH resource ~~allocation~~.

2. (Original) The method as in claim 1, wherein an inactivity timer is started when the buffer is empty.

3. (Original) The method as in claim 2, wherein the transmission of the SI is triggered when the inactivity timer expires.

4. (Previously Presented) The method as in claim 1, wherein an E-DCH transmission occurs on a condition that a response is received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU.

5. (Previously Presented) The method as in claim 1, further comprising completeing the E-DCH transmission in case of cell reselection or radio link failure.

6. (Currently Amended) A wireless transmit/receive unit (WTRU) ~~for completing an enhanced dedicated channel (E-DCH) in a cell forward access channel (CELL_FACH) state, the WTRU~~ comprising:

~~a receiver;~~

~~a transmitter; and~~

~~a processor in communication with the receiver and the transmitter, the~~ a processor configured to:

determine that a buffer is empty;

on a condition that the buffer is empty, trigger a transmission of scheduling information (SI) ~~in a E-DCH transmission~~ with a total E-DCH buffer status (TEBS) equal to zero;

determine a condition of a last hybrid automatic repeat request (HARQ) data transmission being finished; and

on a condition that the buffer is empty, release a E-DCH resource ~~allocation~~.

7. (Previously Presented) The WTRU as in claim 6, the processor further configured to complete the E-DCH transmission on a condition cell reselection or radio link failure.

8. (Withdrawn) A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

releasing the E-RACH message during transition from cell forward access channel (CELL_FACH) state to cell dedicated channel (CELL_DCH) state.

9. (Withdrawn) The method as in claim 8, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

10. (Withdrawn) A wireless transmit receive unit (WTRU), comprising:

a receiver configured to receive enhanced dedicated channel (E-DCH) resources on an acquisition indication channel (AICH) and an E-DCH AICH (E-AICH); and

a processor configured to access the E-DCH resources in cell forward access channel (CELL_FACH) state, to receive a reconfiguration message indicating to switch to a cell dedicated channel (CELL_DCH) state, and to release the E-DCH resources based on switching to CELL_DCH state.

11. (Withdrawn) A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

receiving an explicit E-DCH termination signal; and

releasing a E-DCH resource.

12. (Withdrawn) The method as in claim 11, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

13. (Withdrawn) The method as in claim 11, wherein the explicit E-DCH termination signal comprises a special value signaled on an E-DCH absolute grant channel (E-AGCH).

14. (Withdrawn) A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

initiating a timer in response to a trigger; and

releasing resource allocation for common control channel (CCCH) when a maximum allowable transmission time for the CCCH has been reached.

15. (Withdrawn) The method as in claim 14, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

16. (Withdrawn) The method as in claim 14, wherein a maximum enhanced dedicated channel (E-DCH) allocation time is allocated to the CCCH transmission when an E-DCH radio network temporary identifier (E-RNTI) is not present.

17. (Withdrawn) The method as in claim 14, wherein the timer starts when a positive acknowledgement (ACK) associated with a transmitted preamble signature is received on an acquisition indication channel (AICH) or an enhanced dedicated channel (E-DCH) AICH (E-AICH).

18. (Withdrawn) The method as in claim 14, wherein the timer starts when radio resource control (RRC) provides timer values to medium access control (MAC), and after receiving resource index of an enhanced dedicated channel (E-DCH).

19. (Withdrawn) The method as in claim 14, wherein the timer starts when a wireless transmit receive unit (WTRU) starts first dedicated physical control channel (DPCCH) preamble transmission.

20. (Withdrawn) The method as in claim 19, wherein the timer starts when the first DPCCH transmission is completed after an enhanced dedicated channel (E-DCH) transmission backoff transmission time intervals (TTIs) or a first medium access control (MAC) protocol data unit (PDU) is passed to a physical layer.

21. (Withdrawn) The method as in claim 14, wherein the timer starts when a wireless transmit receive unit (WTRU) starts an enhanced dedicated channel (E-DCH) transmission.

22. (Withdrawn) The method as in claim 14, wherein a wireless transmit receive unit (WTRU) may initiate the timer when a collision resolution an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH) carrying the WTRU E-DCH radio network temporary identifier (E-RNTI) is received.

23. (Withdrawn) A Node-B comprising:

a processor configured to determine an end of enhanced random access channel (E-RACH) message transmission; and

a transmitter connected to the processor, the transmitter configured to transmit a special value over an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH) indicating the end of transmission.

24. (Withdrawn) A method for releasing enhanced dedicated channel (E-DCH) resources while in cell forward access channel (CELL_FACH) state, the method comprising:

terminating reception procedures for an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH), an E-DCH relative grant channel (E-RGCH), and an E-DCH hybrid automatic repeat request (HARQ) indicator channel (E-HICH); and

terminating transmission procedures for an E-DCH dedicated physical control channel (E-DPCCH) and an enhanced dedicated physical data channel (E-DPDCH); and

resetting the medium access control (MAC) entity.

25. (Withdrawn) The method as in claim 24, wherein the channels are terminated when an enhanced random access channel (E-RACH) transmission signal has been received.

26. (Withdrawn) The method as in claim 24, wherein the channels are terminated when a common control channel (CCCH) timer has expired.

27. (Withdrawn) The method as in claim 24, wherein the channels are terminated when the scheduling information (SI) is equal to zero.

28. (Withdrawn) The method as in claim 24, wherein the MAC reset procedures include flushing the hybrid automatic repeat request (HARQ) processes, discarding remaining segments in segmentation entity of the MAC entity, and resetting a transmission sequence number (TSN) value to zero.

29. (Withdrawn) The method as in claim 24, wherein the resources are released when an inactivity timer expires.

30. (Currently Amended) The WTRU as in claim 6, wherein the processor is further configured to start ~~starts~~ an inactivity timer when the buffer is empty.

31. (Previously Presented) The WTRU as in claim 30, wherein the transmission of the SI is triggered when the inactivity timer expires.

32. (Currently Amended) The WTRU as in claim 6, wherein ~~the~~ an E-DCH transmission occurs on a condition that a response is received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU.

REMARKS

Claims 1-7 and 30-32 are pending in the present application. Claims 1, 6, 30, and 32 have been amended. Claims 8-29 were previously withdrawn. No claims have been cancelled. No new matter has been added. Support for the claims can be found throughout the application, including paragraphs 0023, 0029, and 0037-0050 as found in the as-filed application and paragraphs 0016-0018, 0024-0028, and 0034-0039 as found in related provisional application U.S. Provisional Pat. App. No. 60/975,985. Applicants request reconsideration and withdrawal of the rejections in view of the foregoing amendments and following remarks.

Summary of Telephonic Interview

Applicants thank Examiner Yuen for taking the time to conduct a telephonic interview on October 9, 2012. During the interview, the undersigned discussed sections of U.S. Provisional Pat. App. No. 60/975,985 that support the current claims. Specifically, the undersigned and Examiner Yuen agreed that U.S. Provisional Pat. App. No. 60/975,985 supports claim features relating to determining that a buffer is empty, and, on a condition that the buffer is empty, triggering a transmission by the WTRU of scheduling information (SI) with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero. No agreement was reached on other claim features.

Rejections under 35 U.S.C. §102

Independent claims 1 and 6 stand rejected under Section 102(e) as allegedly being anticipated by U.S. Provisional Pat. App. No. 61/015,316 ("Wager") of U.S. Patent App. Pub. No. 2009/025709. However, Wager does not qualify as prior art against the present claims.

The present application claims priority to U.S. Provisional Pat. App. No. 60/975,985, filed September 28, 2007. The Wager provisional application was filed on December 20, 2007. As described in detail below, the present claims are supported by U.S. Provisional Pat. App. No. 60/975,985. Thus, Wager does not qualify as prior art against the present claims.

The office action asserts that the present claims are not entitled to the filing date of U.S. Provisional Pat. App. No. 60/975,985, alleging that the present claims are not supported in that application (office action at pp. 2-4). Applicants respectfully disagree.

Independent claim 1, as amended, recites "determining that a buffer is empty," "on a condition that the buffer is empty, triggering a transmission by the WTRU of scheduling information (SI) with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero," and "on a condition that the buffer is empty, releasing a E-DCH resource." Independent claim 6 recites similar features.

U.S. Provisional Pat. App. No. 60/975,985 provides support for features of the independent claims as illustrated, without limitation, by the following examples. Paragraphs 0024 and 0025 recite "WTRU initiated triggers," which may include "the status of [the WTRU's] queue or buffer," and, the WTRU having "emptied its buffer." These paragraphs, as well as others in U.S. Provisional Pat. App. No. 60/975,985, provide support for "determining that a buffer is empty" and "on a condition that the buffer is empty," as recited in independent claim 1 and similarly in independent claim 6.

Paragraph 0028 recites that based on a trigger, a WTRU "transmits a signal to the network," which may comprise a "value of the scheduling information, (e.g., a scheduling information (SI) with a total E-DCH buffer status (TEBS) of 0)." This paragraph, as well as others in U.S. Provisional Pat. App. No. 60/975,985, provide support for the claim language, "on a condition that the buffer is empty, triggering a transmission by the WTRU of scheduling information (SI) with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero," as recited in independent claim 1 and similarly in independent claim 6.

Paragraph 0016 recites that an E-DCH "may be used as a shared resource…i.e., an enhanced RACH (E-RACH)," and further, that "access with E-DCH can comprise…E-RACH message part." In addition, paragraphs 0034-0039 recite that a WTRU action relating to a trigger may be to "clear all resources," for example where "the WTRU releases the resources associated with the E-RACH (resetting the Mac es/e, flushing the soft buffer, stop listening to the downlink E-RACH messages, etc.)." These paragraphs, as well as others in U.S. Provisional Pat. App. No. 60/975,985, provide support for "on a condition that the buffer is empty, releasing a E-DCH resource," as recited in independent claim 1 and similarly in independent claim 6.

Because features of independent claims 1 and 6 are supported in U.S. Provisional Pat. App. No. 60/975,985, and thus pre-date Wager, Wager does not qualify as prior art against the present claims. Accordingly, Applicants submit that claims 1 and 6 are patentable. Inasmuch as

claims 2-5, 7, and 30-32 all depend directly or indirectly on claim 1 or 6, Applicants submit that that these claims are likewise patentable. Therefore, Applicants request withdrawal of the rejection of claims 1-7 and 30-32.

CONCLUSION

In view of the foregoing, Applicants submit that the claims are allowable and that the present application is in condition for allowance. Reconsideration of the application and an early Notice of Allowance are requested. In the event that the Examiner cannot allow the present application for any reason, the Examiner is encouraged to contact the undersigned attorney to discuss resolution of any remaining issues.

Date: October 11, 2012

/Stuart A. Schanbacher/
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PTO/SB/22 (09-11)
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)	Docket Number (Optional) IHSP_2-1853.01.US
Application Number 12/238,910	Filed September 26, 2008
For Method And Apparatus For Terminating Transmission Of A Message In An Enhanced Random Access Cl	
Art Unit 2464	Examiner Kan Yuen

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))	$560	$280	$ 560.00
☐ Three months (37 CFR 1.17(a)(3))	$1270	$635	$
☐ Four months (37 CFR 1.17(a)(4))	$1980	$990	$
☐ Five months (37 CFR 1.17(a)(5))	$2690	$1345	$

☐ 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 09-0435.

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.
Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☑ attorney or agent of record. Registration Number 61,895

☐ attorney or agent under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34 _____

/Stuart A. Schanbacher/	October 11, 2012
Signature	Date
Stuart A. Schanbacher	215-558-5740
Typed or printed name	Telephone Number

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☑ Total of 1 (one) forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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:	12238910
Filing Date:	26-Sep-2008
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Filer:	Stuart A. Schanbacher/Marissa Antonelli
Attorney Docket Number:	IHSP_2-1853.01.US

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
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:	13958071
Application Number:	12238910
International Application Number:	
Confirmation Number:	2438
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Customer Number:	15800
Filer:	Stuart A. Schanbacher/Marissa Antonelli
Filer Authorized By:	Stuart A. Schanbacher
Attorney Docket Number:	IHSP_2-1853.01.US
Receipt Date:	11-OCT-2012
Filing Date:	26-SEP-2008
Time Stamp:	10:01:03
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$570
RAM confirmation Number	8097
Deposit Account	090435
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)	
Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)	
Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		IHSP_2_185301US_response_to_non_final_rejection_dated_6_6_12.pdf	126435 67d2fc8782c475ee171bf1b6617aa2e08c471728	yes	10
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
	Claims		2	6	
	Applicant Arguments/Remarks Made in an Amendment		7	10	
Warnings:					
Information:					
2	Extension of Time	IHSP_2_1853_01_US_EOT_for_Response_to_OA_Dated_6_6_12.pdf	286845 760647f9ea3382fd4a1676f31509c5b38e173170	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30638 01112a300c196eb008cee4fe390f1a27d050ae13	no	2
Warnings:					
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		Total Files Size (in bytes):	443918		

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **Benoit Pelletier, et al.**	**Confirmation No.: 2438**
Application No.: 12/238,910	**Group Art Unit: 2464**
Filing Date: September 26, 2008	**Examiner: Kan Yuen**

For: Method And Apparatus For Terminating Transmission Of A Message In An Enhanced Random Access Channel

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

Sir:

SUPPLEMENTAL REPLY

Supplemental to the Reply filed on **October 11, 2012**, reconsideration is respectfully requested in view of the amendments and/or remarks as indicated below:

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

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

☐ **Amendments to the Drawings** begin on page of this paper and include an attached replacement sheet.

☒ **Remarks** begin on page 7 of this paper.

☒ The Commissioner is hereby authorized to charge any fee deficiency, charge any additional fees, or credit any overpayment of fees, associated with this application in connection with this filing, or any future filing, submitted to the U.S. Patent and Trademark Office during the pendency of this application, to Deposit Account No. 09-0435.

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

Listing of Claims:

1. (Currently Amended) A method for completing an enhanced dedicated channel (E-DCH) transmission in a cell forward access channel (CELL_FACH) state by a wireless transmit/receive unit (WTRU), the method comprising:

~~the WTRU~~ determining that a buffer is empty;

on a condition that the buffer is empty, triggering a transmission by the WTRU of scheduling information (SI) ~~in the E-DCH transmission~~ with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero; and

on a condition that the buffer is empty, ~~the WTRU~~ releasing a E-DCH resource ~~allocation~~.

2. (Original) The method as in claim 1, wherein an inactivity timer is started when the buffer is empty.

3. (Original) The method as in claim 2, wherein the transmission of the SI is triggered when the inactivity timer expires.

4. (Previously Presented) The method as in claim 1, wherein an E-DCH transmission occurs on a condition that a response is received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU.

5. (Previously Presented) The method as in claim 1, further comprising completing the E-DCH transmission in case of cell reselection or radio link failure.

6. (Currently Amended) A wireless transmit/receive unit (WTRU) ~~for completing an enhanced dedicated channel (E-DCH) in a cell forward access channel (CELL_FACH) state, the WTRU~~ comprising:

~~a receiver;~~

~~a transmitter; and~~

~~a processor in communication with the receiver and the transmitter, the~~ a processor configured to:

determine that a buffer is empty;

on a condition that the buffer is empty, trigger a transmission of scheduling information (SI) ~~in a E-DCH transmission~~ with a total E-DCH buffer status (TEBS) equal to zero;

~~determine a condition of a last hybrid automatic repeat request (HARQ) data transmission being finished;~~ and

on a condition that the buffer is empty, release a E-DCH resource ~~allocation~~.

7. (Previously Presented) The WTRU as in claim 6, the processor further configured to complete the E-DCH transmission on a condition cell reselection or radio link failure.

8. (Withdrawn) A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

releasing the E-RACH message during transition from cell forward access channel (CELL_FACH) state to cell dedicated channel (CELL_DCH) state.

9. (Withdrawn) The method as in claim 8, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

10. (Withdrawn) A wireless transmit receive unit (WTRU), comprising:

a receiver configured to receive enhanced dedicated channel (E-DCH) resources on an acquisition indication channel (AICH) and an E-DCH AICH (E-AICH); and

a processor configured to access the E-DCH resources in cell forward access channel (CELL_FACH) state, to receive a reconfiguration message indicating to switch to a cell dedicated channel (CELL_DCH) state, and to release the E-DCH resources based on switching to CELL_DCH state.

11. (Withdrawn) A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

receiving an explicit E-DCH termination signal; and

releasing a E-DCH resource.

12. (Withdrawn) The method as in claim 11, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

13. (Withdrawn) The method as in claim 11, wherein the explicit E-DCH termination signal comprises a special value signaled on an E-DCH absolute grant channel (E-AGCH).

14. (Withdrawn) A method for terminating an enhanced random access channel (E-RACH) message in an E-RACH transmission, the method comprising:

initiating a timer in response to a trigger; and

releasing resource allocation for common control channel (CCCH) when a maximum allowable transmission time for the CCCH has been reached.

15. (Withdrawn) The method as in claim 14, further comprising terminating the E-RACH message in case of cell reselection or radio link failure.

16. (Withdrawn) The method as in claim 14, wherein a maximum enhanced dedicated channel (E-DCH) allocation time is allocated to the CCCH transmission when an E-DCH radio network temporary identifier (E-RNTI) is not present.

17. (Withdrawn) The method as in claim 14, wherein the timer starts when a positive acknowledgement (ACK) associated with a transmitted preamble signature is received on an acquisition indication channel (AICH) or an enhanced dedicated channel (E-DCH) AICH (E-AICH).

18. (Withdrawn) The method as in claim 14, wherein the timer starts when radio resource control (RRC) provides timer values to medium access control (MAC), and after receiving resource index of an enhanced dedicated channel (E-DCH).

19. (Withdrawn) The method as in claim 14, wherein the timer starts when a wireless transmit receive unit (WTRU) starts first dedicated physical control channel (DPCCH) preamble transmission.

20. (Withdrawn) The method as in claim 19, wherein the timer starts when the first DPCCH transmission is completed after an enhanced dedicated channel (E-DCH) transmission backoff transmission time intervals (TTIs) or a first medium access control (MAC) protocol data unit (PDU) is passed to a physical layer.

21. (Withdrawn) The method as in claim 14, wherein the timer starts when a wireless transmit receive unit (WTRU) starts an enhanced dedicated channel (E-DCH) transmission.

22. (Withdrawn) The method as in claim 14, wherein a wireless transmit receive unit (WTRU) may initiate the timer when a collision resolution an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH) carrying the WTRU E-DCH radio network temporary identifier (E-RNTI) is received.

23. (Withdrawn) A Node-B comprising:

a processor configured to determine an end of enhanced random access channel (E-RACH) message transmission; and

a transmitter connected to the processor, the transmitter configured to transmit a special value over an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH) indicating the end of transmission.

24. (Withdrawn) A method for releasing enhanced dedicated channel (E-DCH) resources while in cell forward access channel (CELL_FACH) state, the method comprising:

terminating reception procedures for an enhanced dedicated channel (E-DCH) absolute grant channel (E-AGCH), an E-DCH relative grant channel (E-RGCH), and an E-DCH hybrid automatic repeat request (HARQ) indicator channel (E-HICH); and

terminating transmission procedures for an E-DCH dedicated physical control channel (E-DPCCH) and an enhanced dedicated physical data channel (E-DPDCH); and

resetting the medium access control (MAC) entity.

25. (Withdrawn) The method as in claim 24, wherein the channels are terminated when an enhanced random access channel (E-RACH) transmission signal has been received.

26. (Withdrawn) The method as in claim 24, wherein the channels are terminated when a common control channel (CCCH) timer has expired.

27. (Withdrawn) The method as in claim 24, wherein the channels are terminated when the scheduling information (SI) is equal to zero.

28. (Withdrawn) The method as in claim 24, wherein the MAC reset procedures include flushing the hybrid automatic repeat request (HARQ) processes, discarding remaining segments in segmentation entity of the MAC entity, and resetting a transmission sequence number (TSN) value to zero.

29. (Withdrawn) The method as in claim 24, wherein the resources are released when an inactivity timer expires.

30. (Currently Amended) The WTRU as in claim 6, wherein the processor is further configured to start ~~starts~~ an inactivity timer when the buffer is empty.

31. (Previously Presented) The WTRU as in claim 30, wherein the transmission of the SI is triggered when the inactivity timer expires.

32. (Currently Amended) The WTRU as in claim 6, wherein ~~the~~ an E-DCH transmission occurs on a condition that a response is received on an E-DCH acquisition indication channel (E-AICH) to a preamble transmitted by the WTRU.

33. (New) The WTRU as in claim 6, wherein the processor is further configured to determine a condition of a last hybrid automatic repeat request (HARQ) data transmission.

34. (New) The method as in claim 1, further comprising determining a condition of a last hybrid automatic repeat request (HARQ) data transmission.

REMARKS

This response is a supplemental reply, to replace in entirety the reply filed on October 11, 2012.

Claims 1-7 and 30-32 are pending in the present application. Claims 1, 6, 30, and 32 have been amended. Claims 33 and 34 have been added. Claims 8-29 were previously withdrawn. No claims have been cancelled. No new matter has been added. Support for the claims can be found throughout the application, including paragraphs 0023, 0029, and 0037-0050 as found in the as-filed application and paragraphs 0016-0018, 0024-0028, and 0034-0039 as found in related provisional application U.S. Provisional Pat. App. No. 60/975,985. Support for the claims can also be found in originally filed claims 1 and 6. Applicants request reconsideration and withdrawal of the rejections in view of the foregoing amendments and following remarks.

Summary of Telephonic Interview

Applicants thank Examiner Yuen for taking the time to conduct a telephonic interview on October 9, 2012. During the interview, the undersigned discussed sections of U.S. Provisional Pat. App. No. 60/975,985 that support the current claims. Specifically, the undersigned and Examiner Yuen agreed that U.S. Provisional Pat. App. No. 60/975,985 supports claim features relating to determining that a buffer is empty, and, on a condition that the buffer is empty, triggering a transmission by the WTRU of scheduling information (SI) with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero. No agreement was reached on other claim features.

Rejections under 35 U.S.C. §102

Independent claims 1 and 6 stand rejected under Section 102(e) as allegedly being anticipated by U.S. Provisional Pat. App. No. 61/015,316 ("Wager") of U.S. Patent App. Pub. No. 2009/025709. However, Wager does not qualify as prior art against the present claims.

The present application claims priority to U.S. Provisional Pat. App. No. 60/975,985, filed September 28, 2007. The Wager provisional application was filed on December 20, 2007.

As described in detail below, the present claims are supported by U.S. Provisional Pat. App. No. 60/975,985. Thus, Wager does not qualify as prior art against the present claims.

The office action asserts that the present claims are not entitled to the filing date of U.S. Provisional Pat. App. No. 60/975,985, alleging that the present claims are not supported in that application (office action at pp. 2-4). Applicants respectfully disagree.

Independent claim 1, as amended, recites "determining that a buffer is empty," "on a condition that the buffer is empty, triggering a transmission by the WTRU of scheduling information (SI) with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero," and "on a condition that the buffer is empty, releasing a E-DCH resource." Independent claim 6 recites similar features.

U.S. Provisional Pat. App. No. 60/975,985 provides support for features of the independent claims as illustrated, without limitation, by the following examples. Paragraphs 0024 and 0025 recite "WTRU initiated triggers," which may include "the status of [the WTRU's] queue or buffer," and, the WTRU having "emptied its buffer." These paragraphs, as well as others in U.S. Provisional Pat. App. No. 60/975,985, provide support for "determining that a buffer is empty" and "on a condition that the buffer is empty," as recited in independent claim 1 and similarly in independent claim 6.

Paragraph 0028 recites that based on a trigger, a WTRU "transmits a signal to the network," which may comprise a "value of the scheduling information, (e.g., a scheduling information (SI) with a total E-DCH buffer status (TEBS) of 0)." This paragraph, as well as others in U.S. Provisional Pat. App. No. 60/975,985, provide support for the claim language, "on a condition that the buffer is empty, triggering a transmission by the WTRU of scheduling information (SI) with a total enhanced dedicated channel (E-DCH) buffer status (TEBS) equal to zero," as recited in independent claim 1 and similarly in independent claim 6.

Paragraph 0016 recites that an E-DCH "may be used as a shared resource…i.e., an enhanced RACH (E-RACH)," and further, that "access with E-DCH can comprise…E-RACH message part." In addition, paragraphs 0034-0039 recite that a WTRU action relating to a trigger may be to "clear all resources," for example where "the WTRU releases the resources associated with the E-RACH (resetting the Mac es/e, flushing the soft buffer, stop listening to the downlink E-RACH messages, etc.)." These paragraphs, as well as others in U.S. Provisional Pat. App. No.

60/975,985, provide support for "on a condition that the buffer is empty, releasing a E-DCH resource," as recited in independent claim 1 and similarly in independent claim 6.

Because features of independent claims 1 and 6 are supported in U.S. Provisional Pat. App. No. 60/975,985, and thus pre-date Wager, Wager does not qualify as prior art against the present claims. Accordingly, Applicants submit that claims 1 and 6 are patentable. Inasmuch as claims 2-5, 7, and 30-32 all depend directly or indirectly on claim 1 or 6, Applicants submit that that these claims are likewise patentable. Therefore, Applicants request withdrawal of the rejection of claims 1-7 and 30-32.

CONCLUSION

In view of the foregoing, Applicants submit that the claims are allowable and that the present application is in condition for allowance. Reconsideration of the application and an early Notice of Allowance are requested. In the event that the Examiner cannot allow the present application for any reason, the Examiner is encouraged to contact the undersigned attorney to discuss resolution of any remaining issues.

Date: October 12, 2012

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Electronic Patent Application Fee Transmittal

Application Number:	12238910
Filing Date:	26-Sep-2008
Title of Invention:	METHOD AND APPARATUS FOR TERMINATING TRANSMISSION OF A MESSAGE IN AN ENHANCED RANDOM ACCESS CHANNEL
First Named Inventor/Applicant Name:	Benoit Pelletier
Filer:	Stuart A. Schanbacher/Marissa Antonelli
Attorney Docket Number:	IHSP_2-1853.01.US

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Claims in excess of 20	1202	2	62	124
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
		Total in USD ($)		**124**