PTO/AIA/80 (07-12)
Approved for use through 11/30/2014. OMB 0651-0035
U.S. Patent and Trademark Office: U.S DEPARTMENT OF COMMERCE

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

☒ Practitioners associated with Customer Number: 62574

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignments documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

☒ The address associated with Customer Number: 62574

OR

☐	Firm or Individual Name			
	Address			
	City		State	Zip
	Country			
	Telephone		Email	

Assignee Name and Address: EVOLVED WIRELESS LLC
805 Las Cimas Parkway, Suite 240
Austin, TX 78746

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be Filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of The practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	Abha S Divine	Date	October 22, 2014
Name	Abha Divine	Telephone	
Title	Managing Director		

Electronic Acknowledgement Receipt

EFS ID:	20576882
Application Number:	12538514
International Application Number:	
Confirmation Number:	7519
Title of Invention:	DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME
First Named Inventor/Applicant Name:	Sung Jun PARK
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	7836-5
Receipt Date:	31-OCT-2014
Filing Date:	10-AUG-2009
Time Stamp:	15:13:21
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Statement_Under_373c_w_POA_EWL.pdf	2526218 d57b5fb04b9324714155b15536f657ce194fb50b	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Assignee showing of ownership per 37 CFR 3.73.	1	2
	Power of Attorney	3	3
Warnings:			
Information:			
	Total Files Size (in bytes):	2526218	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: EVOLVED WIRELESS LLC

Application No./Patent No.: 7,881,236 Filed/Issue Date: February 1, 2011

Titled: DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME

EVOLVED WIRELESS LLC, a Corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. [✓] The assignee of the entire right, title, and interest.

2. [ ] An assignee of less than the entire right, title, and interest (check applicable box):

   [ ] The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   [ ] There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. [ ] The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. [ ] The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

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 _____, Frame _____, or for which a copy thereof is attached.

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

1. From: SUNG JUN PARK et al. To: LG ELECTRONICS INC.

   The document was recorded in the United States Patent and Trademark Office at Reel 023095, Frame 0510, or for which a copy thereof is attached.

2. From: LG ELECTRONICS INC. To: TQ LAMBDA LLC

   The document was recorded in the United States Patent and Trademark Office at Reel 032343, Frame 0761, or for which a copy thereof is attached.

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

STATEMENT UNDER 37 CFR 3.73(c)

3. From: TQ LAMBDA LLC To: EVOLVED WIRELESS LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 034039, Frame 0403, or for which a copy thereof is attached.

4. 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.

5. 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.

6. 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(c)(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.

/Jason H. Vick/	October 31, 2014
Signature	Date
Jason H. Vick	45,285
Printed or Typed Name	Title or Registration Number

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
12/538,514	08/10/2009	Sung Jun PARK	

CONFIRMATION NO. 7519

POA ACCEPTANCE LETTER

62574
Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

OC000000067469453

Date Mailed: 04/01/2014

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/11/2014.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/jtfitzhugh sr/

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
12/538,514	08/10/2009	Sung Jun PARK	0465-2287PUS1

CONFIRMATION NO. 7519

POWER OF ATTORNEY NOTICE

2292
BIRCH STEWART KOLASCH & BIRCH, LLP
PO BOX 747
FALLS CHURCH, VA 22040-0747

OC000000067469269

Date Mailed: 04/01/2014

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/11/2014.

- 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).

/jtfitzhugh sr/

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

PTO/AIA/80 (07-12)
Approved for use through 11/30/2014. OMB 0651-0035
U.S. Patent and Trademark Office; U.S DEPARTMENT OF COMMERCE

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

■ Practitioners associated with Customer Number: 62574

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignments documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

■ The address associated with Customer Number: 62574

OR

☐	Firm or Individual Name		
	Address		
	City	State	Zip
	Country		
	Telephone	Email	

Assignee Name and Address: TQ LAMBDA, LLC
805 Las Cimas Parkway, Suite 240
Austin, TX 78746

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be Filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of The practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record
The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	Abha S Divine	Date	2/27/14
Name	Abha S. Divine	Telephone	(512) 609-1820
Title	Managing Director		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

PTO/SB/47 (03-09)
Approved for use through 05/31/2015. OMB 0651-0016
U.S. Patent and Trademark Office; U. S. DEPARTMENT OF COMMERCE

"FEE ADDRESS" INDICATION FORM

Address to:
Mail Stop M Correspondence
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

- OR -

Fax to:
571-273-6500

INSTRUCTIONS: The issue fee must have been paid for application(s) listed on this form. In addition, only an address represented by a Customer Number can be established as the fee address for maintenance fee purposes (hereafter, fee address). A fee address should be established when correspondence related to maintenance fees should be mailed to a different address than the correspondence address for the application. **When to check the first box below**: If you have a Customer Number to represent the fee address. **When to check the second box below**: If you have no Customer Number representing the desired fee address, in which case a completed Request for Customer Number (PTO/SB/125) must be attached to this form. For more information on Customer Numbers, see the Manual of Patent Examining Procedure (MPEP) § 403.

For the following listed application(s), please recognize as the "Fee Address" under the provisions of 37 CFR 1.363 the address associated with:

☑ Customer Number: 62574

OR

☐ The attached Request for Customer Number (PTO/SB/125) form.

PATENT NUMBER (if known)	APPLICATION NUMBER
7,881,236	12/538,514

Completed by (check one):

☐ Applicant/Inventor

Signature

☑ Attorney or Agent of record 45285 (Reg. No.) Jason H. Vick (Typed or printed name)

☐ 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)

303-863-9700
Requester's telephone number

☐ Assignee recorded at Reel _____ Frame_____

March 11, 2014
Date

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 that one signature is required, see below*.

☑ * Total of 1 forms are submitted.

Electronic Acknowledgement Receipt	
EFS ID:	18437962
Application Number:	12538514
International Application Number:	
Confirmation Number:	7519
Title of Invention:	DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME
First Named Inventor/Applicant Name:	Sung Jun PARK
Customer Number:	2292
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	0465-2287PUS1
Receipt Date:	11-MAR-2014
Filing Date:	10-AUG-2009
Time Stamp:	17:52:18
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Statement_Under_373c_w_POA.pdf	521681 aa366adc4901bb55dbcacc26c44b37365c0a7df1	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Assignee showing of ownership per 37 CFR 3.73.	1	2
	Power of Attorney	3	3

Warnings:					
Information:					
2	Change of Address	Fee_Address.pdf	204869 fe3e4ae4dd70f286852233e8e0d6e4a6e38e8f43	no	1
Warnings:					
Information:					
		Total Files Size (in bytes):	726550		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: TQ LAMBDA LLC

Application No./Patent No.: 7,881,236 Filed/Issue Date: February 1, 2011

Titled: DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME

TQ LAMBDA LLC, a Corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

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 _____, Frame _____, or for which a copy thereof is attached.

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

   1. From: Sung Jun Park et al. To: LG ELECTRONICS INC.

      The document was recorded in the United States Patent and Trademark Office at

      Reel 023095, Frame 0510, or for which a copy thereof is attached.

   2. From: LG ELECTRONICS INC. To: TQ LAMBDA LLC

      The document was recorded in the United States Patent and Trademark Office at

      Reel 032343, Frame 0761, or for which a copy thereof is attached.

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

STATEMENT UNDER 37 CFR 3.73(c)

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.

4. 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.

5. 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.

6. 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(c)(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.

Signature	March 11, 2014 Date
Jason H. Vick Printed or Typed Name	45,285 Title or Registration Number

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/538,514	02/01/2011	7881236	0465-2287PUS1	7519

2292 7590 01/12/2011

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Sung Jun PARK, Anyang-Si, KOREA, REPUBLIC OF;
Seung June Yi, Anyang-Si, KOREA, REPUBLIC OF;
Young Dae Lee, Anyang-Si, KOREA, REPUBLIC OF;
Sung Duck Chun, Anyang-Si, KOREA, REPUBLIC OF;

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

2292 7590 09/20/2010

BIRCH STEWART KOLASCH & BIRCH, LLP
PO BOX 747
FALLS CHURCH, VA 22040-0747

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/538,514	08/10/2009	Sung Jun PARK	0465-2287PUS1	7519

TITLE OF INVENTION: DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	12/20/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
PEZZLO, JOHN	2465	370-278000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Birch, Stewart,
2 Kolasch & Birch, LLP
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: LG Electronics Inc.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Seoul, Republic of Korea

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 02-2448 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date DEC 17 2010

Typed or printed name Esther H. Chong Registration No. 40,953

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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

Electronic Patent Application Fee Transmittal	
Application Number:	12538514
Filing Date:	10-Aug-2009
Title of Invention:	DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME
First Named Inventor/Applicant Name:	Sung Jun PARK
Filer:	Esther Hyeri Chong/Rolonda Lee
Attorney Docket Number:	0465-2287PUS1
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:				
Utility Appl issue fee	1501	1	1510	1510
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1810**

Electronic Acknowledgement Receipt	
EFS ID:	9068155
Application Number:	12538514
International Application Number:	
Confirmation Number:	7519
Title of Invention:	DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME
First Named Inventor/Applicant Name:	Sung Jun PARK
Customer Number:	02292
Filer:	Esther Hyeri Chong/Rolonda Lee
Filer Authorized By:	Esther Hyeri Chong
Attorney Docket Number:	0465-2287PUS1
Receipt Date:	17-DEC-2010
Filing Date:	10-AUG-2009
Time Stamp:	20:45:33
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1810
RAM confirmation Number	6753
Deposit Account	022448
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)					
File Listing:					
Document Number	**Document Description**	**File Name**	**File Size(Bytes)/ Message Digest**	**Multi Part /.zip**	**Pages (if appl.)**
1	Issue Fee Payment (PTO-85B)	0465-2287PUS1ISSUEFEE.pdf	103135 1c4eddc2d137194b90c926a9b371c4e10722f0ed	no	1
Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	fee-info.pdf	31956 785fcb11f0634385b2e9e43d43290f048da15e50	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	135091		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

2292 7590 09/20/2010

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER	
PEZZLO, JOHN	
ART UNIT	PAPER NUMBER
2465	

DATE MAILED: 09/20/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/538,514	08/10/2009	Sung Jun PARK	0465-2287PUS1	7519

TITLE OF INVENTION: DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	12/20/2010

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

2292 7590 09/20/2010

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)

(Signature)

(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/538,514	08/10/2009	Sung Jun PARK	0465-2287PUS1	7519

TITLE OF INVENTION: DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	12/20/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
PEZZLO, JOHN	2465	370-278000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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

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
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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/538,514	08/10/2009	Sung Jun PARK	0465-2287PUS1	7519

2292 7590 09/20/2010

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER	
PEZZLO, JOHN	
ART UNIT	PAPER NUMBER
2465	

DATE MAILED: 09/20/2010

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

Notice of Allowability	Application No.	Applicant(s)	
	12/538,514	PARK ET AL.	
	Examiner	Art Unit	
	John Pezzlo	2465	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *amendment filed 8/3/10*.

2. ☒ The allowed claim(s) is/are *1, 3-7, 9-15, renumbered 1-5, 7-12, 6, 13*.

3. ☒ 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 the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/John Pezzlo/
Primary Examiner, Art Unit 2465

Notice of References Cited	Application/Control No. 12/538,514	Applicant(s)/Patent Under Reexamination PARK ET AL.	
	Examiner John Pezzlo	Art Unit 2465	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-7,660,279 B2	02-2010	Brueck et al.	370/328
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		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.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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BIB DATA SHEET

CONFIRMATION NO. 7519

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/538,514	08/10/2009 RULE	455	2465	0465-2287PUS1

APPLICANTS

Sung Jun PARK, Anyang-Si, KOREA, REPUBLIC OF;
Seung June Yi, Anyang-Si, KOREA, REPUBLIC OF;
Young Dae Lee, Anyang-Si, KOREA, REPUBLIC OF;
Sung Duck Chun, Anyang-Si, KOREA, REPUBLIC OF;

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

This appln claims benefit of 61/087,988 08/11/2008

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

REPUBLIC OF KOREA 10-2009-0057128 06/25/2009

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

08/19/2009

Foreign Priority claimed	35 USC 119(a-d) conditions met	Verified and Acknowledged	Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
☑ Yes ☐ No	☑ Yes ☐ No	/JOHN PEZZLO/ Examiner's Signature	☐ Initials	KOREA, REPUBLIC OF	10	13	2

ADDRESS

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747
UNITED STATES

TITLE

DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME

FILING FEE RECEIVED		
1090	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

BIB (Rev. 05/07).

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12538514	PARK ET AL.
	Examiner	**Art Unit**
	John Pezzlo	2465

ORIGINAL		INTERNATIONAL CLASSIFICATION									
CLASS	SUBCLASS	CLAIMED					NON-CLAIMED				
370	278	H	0	4	L	12 / 56 (2006.01.01)	H	0	4	J	1 / 16 (2006.01.01)

CROSS REFERENCE(S)					
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
370	329	412			

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1														
	2														
2	3														
3	4														
4	5														
5	6														
7	7														
	8														
8	9														
9	10														
10	11														
11	12														
12	13														
6	14														
13	15														

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	13	
/John Pezzlo/ Primary Examiner.Art Unit 2465	9/14/10	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	8

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12538514	PARK ET AL.
	Examiner	Art Unit
	John Pezzlo	2465

SEARCHED			
Class	Subclass	Date	Examiner
370	329, 412, 278	5/19/10	
370	278, 329, 412	6/4/10	JP
370	278, 329, 412	9/14/10	JP

SEARCH NOTES		
Search Notes	Date	Examiner
Refer to EAST search	5/19/10	JP
Refer to EAST search	6/4/10	JP
Refer to EAST search	9/14/10	JP

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
370	278, 329, 412	5/19/10	JP
370	278, 329, 412	9/14/10	JP

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12538514	PARK ET AL.
	Examiner	Art Unit
	John Pezzlo	2465

✓	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	05/19/2010	06/04/2010	09/14/2010						
1	1	=	✓	=						
	2	=	O	-						
2	3	=	O	=						
3	4	=	O	=						
4	5	=	✓	=						
5	6	=	O	=						
7	7	=	✓	=						
	8	=	O	-						
8	9	=	O	=						
9	10	=	O	=						
10	11	=	O	=						
11	12	=	✓	=						
12	13	=	✓	=						
6	14	=	✓	=						
13	15	=	✓	=						

EAST Search History

EAST Search History (Prior Art)

<This search history is empty>

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	139	370/278,329,412.ccls. and grant and base and (message or packet) and (buffer or memory) and response and data	USPAT; UPAD	OR	OFF	2010/09/14 17:01
L2	6	1 and ((ul or uplink) near grant)	USPAT; UPAD	OR	OFF	2010/09/14 17:02

9/14/10 5:09:04 PM
C:\Program Files\USPTO\EAST\Bin\default.wsp

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application of:	Sung Jun PARK et al.		
Application No.:	12/538,514	Confirmation No.:	7519
Filed:	August 10, 2009	Art Unit:	2465
For:	DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME	Examiner:	J. PEZZLO

AMENDMENT UNDER 37 C.F.R. § 1.111

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

Sir:

In reply to the Office Action dated June 11, 2010, the following amendments and remarks are respectfully submitted in connection with the above-identified application:

Amendments to the Claims begin on page 2.

Remarks begin on page 8.

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method of transmitting data by a user equipment through an uplink, the method comprising:

receiving an uplink grant (UL Grant) signal from a base station on a specific message;

determining whether there is data stored in a message 3 (Msg3) buffer when receiving the UL Grant signal on the specific message;

determining whether the specific message is a random access response message; [[and]]

transmitting the data stored in the Msg3 buffer to the base station using the UL Grant signal received on the specific message, if there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message; and

transmitting new data to the base station in correspondence with the UL Grant signal received on the specific message, if there is no data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message or the specific message is not the random access response message.

2. (Cancelled)

3. (Currently Amended) The method according to ~~claim 2~~claim 1, wherein the transmitting the new data to the base station includes:

acquiring a Medium Access Control Protocol Data Unit (MAC PDU) from a multiplexing and assembly entity; and

transmitting the MAC PDU to the base station.

4. (Currently Amended) The method according to ~~claim 2~~claim 1, wherein the UL Grant signal received on the specific message is a UL Grant signal received on a Physical Downlink Control Channel (PDCCH), and

wherein the user equipment transmits new data in correspondence with the UL Grant signal received on the PDCCH.

5. (Original) The method according to claim 1, wherein the data stored in the Msg3 buffer is a Medium Access Control Protocol Data Unit (MAC PDU) including a user equipment identifier.

6. (Original) The method according to claim 5, wherein the data stored in the Msg3 buffer further includes information about a buffer status report (BSR) if the user equipment starts a random access procedure for the BSR.

7. (Currently Amended) A user equipment, comprising:

a reception module adapted to receive an uplink grant (UL Grant) signal from a base station on a specific message;

a transmission module adapted to transmit data to the base station using the UL Grant signal received on the specific message;

a message 3 (Msg3) buffer adapted to store UL data to be transmitted in a random access procedure; [[and]]

a Hybrid Automatic Repeat Request (HARQ) entity adapted to determine whether there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is a random access response message, acquiring the data stored in the Msg3 buffer if there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is the random access response message, and controlling the transmission module to transmit the data stored in the Msg3 buffer to the base station using the UL Grant signal received by the reception module on the specific message; and

a multiplexing and assembly entity used for transmission of new data,

wherein the HARQ entity acquires the new data to be transmitted from the multiplexing and assembly entity if there is no data stored in the Msg3 buffer when the reception module receives the UL Grant signal on the specific message or the received message is not the random access response message, and controls the transmission module to transmit the new data acquired from the multiplexing and assembly entity using the UL Grant signal received by the reception module on the specific message.

8. (Cancelled)

9. (Currently Amended) The user equipment according to ~~claim 8~~claim 7, further comprising:

one or more HARQ processes; and

HARQ buffers respectively corresponding to the one or more HARQ processes,

wherein the HARQ entity transfers the data acquired from the multiplexing and assembly entity or the Msg3 buffer to a specific HARQ process of the one or more HARQ processes and

controls the specific HARQ process to transmit the data acquired from the multiplexing and assembly entity or the Msg3 buffer through the transmission module.

10. (Original) The user equipment according to claim 9, wherein, when the specific HARQ process transmits the data stored in the Msg3 buffer through the transmission module, the data stored in the Msg3 buffer is controlled to be copied into a specific HARQ buffer corresponding to the specific HARQ process, and the data copied into the specific HARQ buffer is controlled to be transmitted through the transmission module.

11. (Currently Amended) The user equipment according to ~~claim 8~~claim 7, wherein the UL Grant signal received by the reception module on the specific message is a UL Grant signal received on a Physical Downlink Control Channel (PDCCH), and

wherein the HARQ entity controls new data to be transmitted in correspondence with the received UL Grant signal received on the PDCCH.

12. (Original) The user equipment according to claim 7, wherein the UL Grant signal received by the reception module on the specific message is a UL Grant signal received on a random access response message received on Physical Downlink Shared Channel (PDSCH), and

wherein the HARQ entity controls the data stored in the Msg3 buffer to be transmitted using the UL Grant signal received on the random access response message if there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal on the random access response message.

13. (Original) The user equipment according to claim 7, wherein the data stored in the Msg3 buffer is a Medium Access Control Protocol Data Unit (MAC PDU) including a user equipment identifier.

14. (Previously Presented) The method of claim 1, wherein the UL Grant signal received on the specific message is either a UL Grant signal received on a Physical Downlink Control Channel (PDCCH) or a UL Grant signal received on the random access response message.

15. (Previously Presented) The user equipment of claim 7, wherein the UL Grant signal received on the specific message is either a UL Grant signal received on a Physical Downlink Control Channel (PDCCH) or a UL Grant signal received on the random access response message.

REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1, 3-7 and 9-15 are pending, with claims 1, 3-4, 7, 9 and 11 amended, and claims 2 and 8 cancelled without prejudice or disclaimer by the present amendment. Claims 1 and 7 are independent.

In the Official Action, claims 1, 5, 7 and 12-15 were rejected under 35 U.S.C. § 102(e) as being anticipated by Ou (U.S. Patent Pub. No. 2010/0034162). Claims 2-4, 6 and 8-11 were indicated as containing allowable subject matter.

Applicant acknowledges with appreciation the indication of allowable subject matter.

Claims 1 and 7 are amended to recite the subject matter of allowable claims 2 and 8. The remaining claims are amended to maintain antecedent support. No new matter is added. Accordingly, the application is in condition for allowance.

Conclusion

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Michael E. Monaco, Reg. No. 52,041, at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§ 1.16 or 1.147; particularly, extension of time fees.

Dated: September 3, 2010

Respectfully submitted,

By 

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703-205-8000

Electronic Acknowledgement Receipt

EFS ID:	8358039
Application Number:	12538514
International Application Number:	
Confirmation Number:	7519
Title of Invention:	DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME
First Named Inventor/Applicant Name:	Sung Jun PARK
Customer Number:	02292
Filer:	Esther Hyeri Chong/Erin Mruk
Filer Authorized By:	Esther Hyeri Chong
Attorney Docket Number:	0465-2287PUS1
Receipt Date:	03-SEP-2010
Filing Date:	10-AUG-2009
Time Stamp:	18:31:42
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		20100903_amend.PDF	336057 4510cfc93224694212323912a1bf98d0650b53be	yes	9

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Miscellaneous Incoming Letter	1	1
	Amendment/Req. Reconsideration-After Non-Final Reject	2	2
	Claims	3	7
	Applicant Arguments/Remarks Made in an Amendment	8	9
Warnings:			
Information:			
	Total Files Size (in bytes):	336057	

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.

AMENDMENT TRANSMITTAL LETTER			Docket No. 0465-2287PUS1
Application No. 12/538,514 - Conf. #7519	Filing Date August 10, 2009	Examiner J. PEZZLO	Art Unit 2465

Applicant(s): Sung Jun PARK et al.

Invention: DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME

MS Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-145

Transmitted herewith is an amendment in the above-identified application.

The fee has been calculated and is transmitted as shown below.

CLAIMS AS AMENDED					
	Claims Remaining After Amendment	Highest Number Previously Paid	Number Extra Claims Present	Rate	
Total Claims	13	- 20 =		x	0.00
Independent Claims	2	- 3 =		x	0.00
Multiple Dependent Claims (check if applicable)	☐				0.00
Other fee (please specify):					0.00
TOTAL ADDITIONAL FEE FOR THIS AMENDMENT:					0.00

☒ Large Entity ☐ Small Entity

☒ No additional fee is required for this amendment.

☐ Please charge Deposit Account No. 02-2448 in the amount of $ _____. A duplicate copy of this sheet is enclosed.

☐ A check in the amount of $ _____ is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☒ The Director is hereby authorized to charge and credit Deposit Account No. 02-2448 as described below.

☒ Credit any overpayment.

☒ Charge any additional filing or application processing fees required under 37 CFR 1.16 and 1.17.

Dated: September 3, 2010

Esther H. Chong
Attorney Reg. No.: 40953

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PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/538,514	Filing Date 08/10/2009	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
	09/03/2010	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	Total (37 CFR 1.16(i))	* 13	Minus	** 20	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)					
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	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:
/TONI HAKIM/

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/538,514	08/10/2009	Sung Jun PARK	0465-2287PUS1	7519

2292 7590 06/11/2010

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER	
PEZZLO, JOHN	
ART UNIT	PAPER NUMBER
2465	

NOTIFICATION DATE	DELIVERY MODE
06/11/2010	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):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	12/538,514	PARK ET AL.	
	Examiner	Art Unit	
	John Pezzlo	2465	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ 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) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5,7 and 12-15* is/are rejected.

7)☒ Claim(s) *2-4,6 and 8-11* 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 *10 August 2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

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 *3/31/10, 11/27/09, 10/02/09*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

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

> A person shall be entitled to a patent unless –
>
> (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.

I. Claims 1, 5, 7, and 12-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Ou et al. (US 2010/0034162 A1) hereinafter Ou.

1. Regarding claim 1 – Ou discloses receiving an uplink grant (UL Grant) signal from a base station on a specific message, determining whether there is data stored in a message 3 (Msg3) buffer when receiving the UL Grant signal on the specific message, determining whether the specific message is a random access response message, and transmitting the data stored in the Msg3 buffer to the base station using the UL Grant signal received on the specific message, if there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message, refer to paragraphs [0007], [0008], [0015, [0016], [0038], [0039]. Ou discloses receiving an uplink grant on a

specific message and transmitting a message 3 stored in a buffer in response to a random access response message.

2. Regarding claims 5 and 13 – Ou discloses the data stored in the Msg3 buffer is a Medium Access Control Protocol Data Unit (MAC PDU) including a user equipment identifier, refer to paragraph [0008].

3. Regarding claims 14 and 15 – Ou discloses the UL Grant signal received on the specific message is either a UL Grant signal received on a Physical Downlink Control Channel (PDCCH) or a UL Grant signal received on the random access response message, refer to [0007], [0008], [0015, [0016], [0038], [0039].

4. Regarding claim 7 – Ou discloses a reception module adapted to receive an uplink grant (UL Grant) signal from a base station on a specific message, a transmission module adapted to transmit data to the base station using the UL Grant signal received on the specific message, a message 3 (Msg3) buffer adapted to store UL data to be transmitted in a random access procedure, and a Hybrid Automatic Repeat Request (HARQ) entity adapted to determine whether there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is a random access response message, acquiring the data stored in the Msg3 buffer if there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is the random access response message, and controlling the transmission module to transmit the data stored in the Msg3 buffer to the base

station using the UL Grant signal received by the reception module on the specific message, refer to [0007], [0008], [0015, [0016], [0038], [0039].

5. Regarding claim 12 – Ou discloses the UL Grant signal received by the reception module on the specific message is a UL Grant signal received on a random access response message received on Physical Downlink Shared Channel (PDSCH), and wherein the HARQ entity controls the data stored in the Msg3 buffer to be transmitted using the UL Grant signal received on the random access response message if there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal on the random access response message, refer to [0007], [0008], [0015, [0016], [0038], [0039].

Allowable Subject Matter

Claims 2-4, 6, and 8-11 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

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1. Maheshwari et al. (US 2010/0037113 A1) discloses utilizing HARQ for uplink grants received in wireless communications.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Pezzlo whose telephone number is (571) 272-3090. The examiner can normally be reached on Monday to Friday from 8:30 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel, can be reached on (571) 272-2988. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2600.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C.

or faxed to:

(571) 273-8300

For informal or draft communications, please label "PROPOSED" or "DRAFT"

Hand delivered responses should be brought to:

Jefferson Building

2A15

500 Dulany Street

Alexandria, VA, 22313.

John Pezzlo

4 June 2010

/John Pezzlo/

Primary Examiner, Art Unit 2465

Notice of References Cited	Application/Control No. 12/538,514	Applicant(s)/Patent Under Reexamination PARK ET AL.	
	Examiner John Pezzlo	Art Unit 2465	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2010/0037113 !	02-2010	Maheshwari et al.	714/748
*	B	US-2010/0034162 A1	02-2010	Ou 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.

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BIB DATA SHEET

CONFIRMATION NO. 7519

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/538,514	08/10/2009	455	2465	0465-2287PUS1

APPLICANTS

Sung Jun PARK, Anyang-Si, KOREA, REPUBLIC OF;
Seung June Yi, Anyang-Si, KOREA, REPUBLIC OF;
Young Dae Lee, Anyang-Si, KOREA, REPUBLIC OF;
Sung Duck Chun, Anyang-Si, KOREA, REPUBLIC OF;

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

This appln claims benefit of 61/087,988 08/11/2008

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

REPUBLIC OF KOREA 10-2009-0057128 06/25/2009

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

08/19/2009

Foreign Priority claimed ☑ Yes ☐ No 35 USC 119(a-d) conditions met ☑ Yes ☐ No Verified and Acknowledged /JOHN PEZZLO/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		KOREA, REPUBLIC OF	10	13	2

ADDRESS

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747
UNITED STATES

TITLE

DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME

FILING FEE RECEIVED		
1090	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

BIB (Rev. 05/07).

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2	(("20070042784") or ("20070115871")).PN.	US-PGPUB; USPAT	OR	OFF	2010/05/06 07:30

EAST Search History (Interference)

< This search history is empty>

5/6/10 7:33:08 AM
C:\Program Files\USPTO\EAST\Bin\default.wsp

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	29	((ul or uplink) near grant) and base and (message or packet) and ((data or packet or message) near (buffer or memory or storage or fifo)) and (random near access near response)	US-PGPUB; USPAT	OR	OFF	2010/05/19 12:09

EAST Search History (Interference)

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5/19/10 3:54:52 PM
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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12538514	PARK ET AL.
	Examiner	Art Unit
	John Pezzlo	2465

✓	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	05/19/2010	06/04/2010							
	1	=	✓							
	2	=	O							
	3	=	O							
	4	=	O							
	5	=	✓							
	6	=	O							
	7	=	✓							
	8	=	O							
	9	=	O							
	10	=	O							
	11	=	O							
	12	=	✓							
	13	=	✓							
	14	=	✓							
	15	=	✓							

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12538514	PARK ET AL.
	Examiner	Art Unit
	John Pezzlo	2465

SEARCHED			
Class	Subclass	Date	Examiner
370	329, 412, 278	5/19/10	
370	278, 329, 412	6/4/10	JP

SEARCH NOTES		
Search Notes	Date	Examiner
Refer to EAST search	5/19/10	JP
Refer to EAST search	6/4/10	JP

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
370	278, 329, 412	5/19/10	JP

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	base and ((ul or uplink) near grant) and (specific near (message or packet or data)) and (random near access near procedure) and harq and ((specific near message) near (random near access response near message))	US-PGPUB; USPAT	OR	OFF	2010/05/19 16:36

EAST Search History (Interference)

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	base and ((ul or uplink) near grant) and (specific near (message or packet or data)) and (random near access near procedure) and harq and ((specific near message) near (random near access response near message))	US-PGPUB; USPAT	OR	OFF	2010/05/19 16:36
L2	35	base and ((ul or uplink) near grant) and (random near access near procedure) and harq and ((message) near (random near access response near message))	US-PGPUB; USPAT	OR	OFF	2010/05/19 16:38
L3	3	2 and (message near "3" near buffer)	US-PGPUB; USPAT	OR	OFF	2010/05/19 16:39

EAST Search History (Interference)

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PTO/SB/08a (07-09)
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U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 2

Complete if Known	
Application Number	12/538,514
Filing Date	08-10-09
First Named Inventor	Sung Jun Park
Art Unit	2400 2465
Examiner Name	L. D. Feild
Attorney Docket Number	0465-2287PUS1

U.S. PATENT DOCUMENTS

Examiner initial *	Cite No. 1	Document Number Number - Kind Code [2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, columns, Lines, Where Relevant Passages or Relevant Figures Appear
/JP/	1	US-2007/0042784-A1	02-22-2007	Anderson	

FOREIGN PATENT DOCUMENTS

Examiner Initial *	Cite No. 1	Foreign Patent Document Country[3] Code	Number[4] Kind Code (if known)[5]	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
/JP/	2	WO	2008/023932-A1	02-28-2008			☐

Examiner Signature	/John Pezzlo/	Date Considered	05/06/2010

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

1. Applicant's unique citation designation number (optional) 2. See Kinds codes of USPTO patent Documents. at www.uspto.gov or MPEP 901.04,

3. Enter Office that isssued the document, by the two-letter code (WIPO Standard ST.3.) 4. For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5. Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.f 16 if possible. 6. Applicant is to place a check mark here if English language Translation is attached.

PTO/SB/08b (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449B/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 2 of 2

Complete if Known	
Application Number	12/538,514
Filing Date	08-10-09
First Named Inventor	Sung Jun Park
Group Art Unit	2400 2465
Examiner Name	L. D. Feild
Attorney Docket Number	0465-2287PUS1

NON PATENT LITERATURE DOCUMENTS

Examiner initial *	Cite No. 1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 2
/JP/	3	LG Electronics, "Corrections to the random access response reception," 3GPP TSG-RAN WG2 #62, May 5-9, 2008, p. 3, paragraph 5.1.4.	☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐
			☐

Examiner Signature	/John Pezzlo/	Date Considered	05/06/2010

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1. Applicants unique citation designation number. (optional) 2. Applicant is to place a check mark here if English language Translation is attached.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	12/538,514-Conf. #7519
Filing Date	August 10, 2009
First Named Inventor	Sung Jun PARK
Art Unit	2617 2465
Examiner Name	Not Yet Assigned
Attorney Docket Number	0465-2287PUS1

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
/JP/	CA	3GPP TS 36.321 V8.2.0., "3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA) Medium Access Control (MAC) protocol specification (Release 8), pgs. 1-33, May 2008	
/JP/	CB	3rd Generation Partnership Project (3GPP), "Enforcing New Transmission After Flushing HARQ Process", pgs. 1-6, February 9-13, 2009, Athens, Greece, XP050323002	

Examiner Signature	/John Pezzlo/	Date Considered	05/06/2010

*EXAMINER: Initial if reference 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. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

Birch, Stewart, Kolasch & Birch, LLP

EHC/cml

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	12/538,514-Conf. #7519
Filing Date	August 10, 2009
First Named Inventor	Sung Jun PARK
Art Unit	2617 2465
Examiner Name	D. D. Bost
Attorney Docket Number	0465-2287PUS1

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/JP/	AA*	US-2007/0115871-A1	05-24-2007	Zhang et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
/JP/	BA	KR-10-2007-0055004-A	05-30-2007			ABS
/JP/	BB	KR-10-2007-0107619-A	11-07-2007			ABS
/JP/	BC	KR-10-2008-0030941-A	04-07-2008			ABS
/JP/	BD	JP-2008-103862-A	05-01-2008			ABS

*EXAMINER: Initial if reference 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. * CITE NO.: Those application(s) which are marked with an single asterisk (*) next to the Cite No. are not supplied (under 37 CFR 1.98(a)(2)(iii)) because that application was filed after June 30, 2003 or is available in the IFW. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

NON PATENT LITERATURE DOCUMENTS

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Examiner Signature	/John Pezzlo/	Date Considered	05/06/2010

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[1]Applicant's unique citation designation number (optional). [2]Applicant is to place a check mark here if English language Translation is attached.

Birch, Stewart, Kolasch & Birch, LLP

EHC/klg

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/538,514	08/10/2009	Sung Jun PARK	0465-2287PUS1	7519

2292 7590 04/28/2010
BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER	
FEILD, LYNN DIANA	
ART UNIT	**PAPER NUMBER**
2400	

NOTIFICATION DATE	DELIVERY MODE
04/28/2010	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):

mailroom@bskb.com

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
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BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH VA 22040-0747

In re Application of: PARK, SUNG JUN et al.
Application No. 12538514
Filed: August 10, 2009
For: DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME

DECISION ON REQUEST TO PARTICIPATE IN PATENT PROSECUTION HIGHWAY PROGRAM AND PETITION TO MAKE SPECIAL UNDER 37 CFR 1.102(d)

MAILED

APR 27 2010

DIRECTOR OFFICE
TECHNOLOGY CENTER 2400

This is a decision on the request to participate in the Patent Prosecution Highway (PPH) program and the petition under 37 CFR 1.102(d), filed March 5, 2010, to make the above-identified application special.

The petition is **GRANTED.**

A grantable request to participate in the PPH program and petition to make special require:

(1) The U.S. application is
(a) a Paris Convention application which either
(i) validly claims priority under 35 U.S.C. 119(a) and 37 CFR 1.55 to one or more applications filed in the KIPO, or
(ii) validly claims priority to a PCT application that contains no priority claims,

Or

(b) a national stage application under the PCT (an application which entered the national stage in the U.S. from a PCT international application after compliance with 35 U.S.C. 371), which PCT application
(i) validly claims priority to an application filed in the KIPO, or
(ii) validly claims priority to a PCT application that contains no priority claims, or
(iii) contains no priority claim,

Or

(c) a so-called bypass application filed under 35 U.S.C. 111 (a) which validly claims benefit under 35 U.S.C. 120 to a PCT application, which PCT application
(i) validly claims priority to an application filed in the KIPO, or
(ii) validly claims priority to a PCT application that contains no priority claims, or
(iii) contains no priority claim.

Where the KIPO application that contains the allowable/patentable claims is not the same application for which priority is claimed in the U.S. application, applicant must identify the relationship between the KIPO application that contains the allowable/patentable claims and the KIPO priority application claimed in the U.S. application;

(2) Applicant must submit a copy of:
a. The allowable/patentable claim(s) from the KR application(s);
b. An English translation of the allowable/patentable claim(s), if the claims were published in a language other than English); and
c. A statement that the English translation is accurate;

(3) Applicant must:
a. Ensure all the claims in the U.S. application must sufficiently correspond or be amended to sufficiently correspond to the allowable/patentable claim(s) in the KIPO application(s) and
b. Submit a claim correspondence table in English;

(4) Examination of the U.S. application has not begun;

(5) Applicant must submit:
a. A copy of all the office action(s) (which are relevant to patentability), excluding "Decision to Grant a Patent" from each of the KR application(s) containing the allowable/patentable claim(s);
b. An English language translation of the KIPO office action(s) (if the office action(s) are not in the English language); and
c. A statement that the English translation is accurate;

(6) Applicant must submit:
a. An IDS listing the documents cited by the KIPO examiner in the KIPO office action (unless already filed in this application); and
b. Copies of all the documents cited in the KIPO office action, except U.S. patents or U.S. patent application publications (unless already filed in this application); and

(7) The required petition fee under 37 CFR 1.17(h).

The request to participate in the PPH program and petition are found to comply with all the above requirements. Accordingly, the above-identified application has been accorded "special" status.

Telephone inquiries concerning this decision should be directed to Hassan Kizou at 571-272-3088

All other inquiries concerning the examination or status of the application is accessible in the PAIR system at http://www.uspto.gov/ebc/index.html.

The application is being forwarded to the examiner for action on the merits commensurate with this decision.

Hassan Kizou
Quality Assurance Specialist
Technology Center 2400

PTO/SB/08a (07-09)
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U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet	1	of	2

Complete if Known	
Application Number	12/538,514
Filing Date	08-10-09
First Named Inventor	Sung Jun Park
Art Unit	2400
Examiner Name	L. D. Feild
Attorney Docket Number	0465-2287PUS1

U.S. PATENT DOCUMENTS

Examiner initial *	Cite No. 1	Document Number Number - Kind Code 2 (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	US-2007/0042784-A1	02-22-2007	Anderson	

FOREIGN PATENT DOCUMENTS

Examiner Initial *	Cite No. 1	Foreign Patent Document Country 3 Code	Number 4 Kind Code (if known) 5	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, columns, Lines, Where Relevant Passages or Relevant Figures Appear	T 6
	2	WO	2008/023932-A1	02-28-2008			☐

Examiner Signature		Date Considered	

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

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3. Enter Office that isssued the document, by the two-letter code (WIPO Standard ST.3.) 4. For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. 5. Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.f 16 if possible. 6. Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form 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, 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 assisstance in completing the form, call 1-800-PTO-9199 (1-800-786.9199) and select option 2.

PTO/SB/08b (07-09)
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U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449B/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 2 of 2

Complete if Known	
Application Number	12/538,514
Filing Date	08-10-09
First Named Inventor	Sung Jun Park
Group Art Unit	2400
Examiner Name	L. D. Feild
Attorney Docket Number	0465-2287PUS1

NON PATENT LITERATURE DOCUMENTS

Examiner initial *	Cite No. 1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T 2
	3	LG Electronics, "Corrections to the random access response reception," 3GPP TSG-RAN WG2 #62, May 5-9, 2008, p. 3, paragraph 5.1.4.	☐
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			☐
			☐

Examiner Signature		Date Considered	

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1. Applicants unique citation designation number. (optional) 2. Applicant is to place a check mark here if English language Translation is attached.

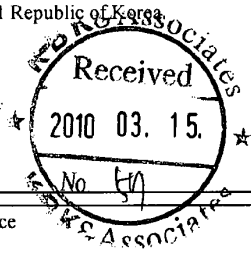
PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:

KIM Yong In

KBK & Associates,7th Floor, Hyundae Building, 175-9, Jamsil-dong, Songpa-ku Seoul, 138-861 Republic of Korea



PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference TZ09-151WO	Date of mailing *(day/month/year)* 09 MARCH 2010 (09.03.2010)
International application No. **PCT/KR2009/004002**	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
Applicant **LG ELECTRONICS INC. et al**	International filing date *(day/month/year)* 20 JULY 2009 (20.07.2009)

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, National Chapters.

Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea	Authorized officer COMMISSIONER
Facsimile No. 82-42-472-7140	Telephone No. 82-42-481-5281

Form PCT/ISA/220 (July 2009) *(See notes on accompanying sheet)*

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under Article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the *PCT Applicant's Guide*.

In these Notes, "Article", "Rule" and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions, respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report and the written opinion of the International Searching Authority, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only (see *PCT Applicant's Guide*, Annex B).

The attention of the applicant is drawn to the fact that ammendments to the claims under Article 19 are not allowed where the International Searching Authority has declared, under Article 17(2), that no international search report would be established (see *PCT Applicant's Guide*, paragraph 296).

What parts of the international application may be amended ?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Preliminary Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When ? Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments ?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How ? Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet or sheets containing a complete set of claims in replacement of all the claims previously filed must be submitted.
Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively .in Arabic numerals (Section 205(a)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments ?

Letter (Section 205(b)):

The amendments must be submitted with a letter.
The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below,under "Statement under Article 19(1)").
The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

(i) the claim is unchanged;
(ii) the claim is cancelled;
(iii) the claim is new;
(iv) the claim replaces one or more claims as filed;
(v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
   "Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
   "Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
   "Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
   "Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:
   "Claims 1 - 10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under Article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be indentified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments and any accompanying statement, under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the time of filing the amendments (and any statement) with the International Bureau, also file with the International Preliminary Examining Authority a copy of such amendments (and of any statement) and, where required, a translation of such amendments for the proceduer before that Authority (see Rules 55.3(a) and 62.2, first sentence). For further information, see the Notes to the demand form (PCT/IPEA/401).

If a demand for international preliminary examination is made, the written opinion of the International Searching Authority will, except in certain cases where the International Preliminary Examining Authority did not act as International Searching Authority and where it has notified the International Bureau under Rule 66.1*bis*(b), be considered to be a written opinion of the International Preliminary Examining Authority. If a demand is made, the applicant may submit to the International Preliminary Examining Authority a reply to the written opinion 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 (Rule 43*bis*.1(c)).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see the *PCT Applicant's Guide*, National Chapters.

* Attention

Copies of the documents cited in the international search report can be searched in the following Korean Intellectual Property Office English website for three months from the date of mailing of the international search report.

http://www.kipo.go.kr/en/ => Patent Search => PCT-Service

ID : PCT international application number
PW : **P3CLCH3E**

Notes to Form PCT/ISA/220 (third sheet) (July 2009)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
KIM Yong In

KBK & Associates,7th Floor, Hyundae Building, 175-9, Jamsil-dong, Songpa-ku Seoul, 138-861 Republic of Korea

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)*	**09 MARCH 2010 (09.03.2010)**
Applicant's or agent's file reference TZ09-151WO	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/KR2009/004002	**20 JULY 2009 (20.07.2009)**	11 AUGUST 2008 (11.08.2008)

International Patent Classification (IPC) or both national classification and IPC

H04B 7/26(2006.01)i

Applicant

LG ELECTRONICS INC. et al

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 43bis.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 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 notified the International Bureau under Rule 66.1bis(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/KR	Date of completion of this opinion	Authorized officer
Korean Intellectual Property Office Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	08 MARCH 2010 (08.03.2010)	Jung, Gu Ung Telephone No.82-42-481-8598

Form PCT/ISA/237 (cover sheet) (July 2009)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/KR2009/004002

Box No. I Basis of this 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 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:

   a. a sequence listing filed or furnished
      ☐ on paper
      ☐ in electronic form

   b. time of filing or 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 has been filed or furnished, the required statements that the information in the subsequent or additioanl 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:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/KR2009/004002

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-13	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	1-13	YES
	Claims	NONE	NO
Industrial applicability (IA)	Claims	1-13	YES
	Claims	NONE	NO

2. Citations and explanations :

Reference is made to the following documents:

D1: KR 10-2007-0055004 A (SAMSUNG ELECTRONICS CO., LTD.) 30 May 2007
D2: US 2007-0042784 A1 (NICHOLAS WILLIAM ANDERSON) 22 February 2007
D3: US 2007-0115871 A1 (GUODONG ZHANG et al.) 24 May 2007

1. Novelty and Inventive Step

1.1 Claims 1-6

1.1.1 Independent Claim 1

The subject matter of claim 1 differs from these prior art documents in that a method of transmitting data by a user equipment through an uplink comprises the step of transmitting the data stored in the Msg3 buffer to the base station using the UL Grant signal received on the specific message, if there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message. And it is not obvious to a person skilled in the art by the documents, taken alone or in combination. Therefore, claim 1 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

1.1.2 Dependent Claims 2-6

Claims 2-6 are dependent on claim 1 and therefore meet the requirements of PCT Article 33(2) and (3).

1.2 Claims 7-13

1.2.1 Independent Claim 7

The subject matter of claim 7 differs from these prior art documents in that a user equipment comprises a Hybrid Automatic Repeat Request (HARQ) entity determining whether there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is a random access response message, acquiring the data stored in the Msg3 buffer if there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is the random access response message, and controlling the transmission module to transmit the data stored in the Msg3 buffer to the base station using the UL Grant signal received by the reception module on the specific message. And it is not obvious to a person skilled in the art by the documents, taken alone or in combination. Therefore, claim 7 meets the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

1.2.2 Dependent Claims 8-13

Claims 8-13 are dependent on claim 7 and therefore meet the requirements of PCT Article 33(2) and (3).

(Continued on Supplemental Box)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/KR2009/004002

Supplemental Box

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

Box No. V

2. Industrial Applicability

Claims 1-13 are industrially applicable under PCT Article 33(4).

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.
TZ09-151WO		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/KR2009/004002	**20 JULY 2009 (20.07.2009)**	11 AUGUST 2008 (11.08.2008)
Applicant		
LG ELECTRONICS INC. et al		

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

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

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

1. **Basis of the report**
   a. With regard to the **language**, the international search was carried out on the basis of :
      ☒ the international application in the language in which it was filed
      ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
   b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).
   c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.
2. ☐ **Certain claims were found unsearchable** (See Box No. II)
3. ☐ **Unity of invention is lacking** (See Box No. III)
4. With regard to the **title**,
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established by this Authority to read as follows:
5. With regard to the **abstract**,
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established, according to Rule 38.2, 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. 9
      ☒ 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 figure is to be published with the abstract.

Form PCT/ISA/210 (first sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2009/004002

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)

H04B 7/26; H04B 7/00; H04Q 7/20; H04W 72/12

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models
Japanese utility models and applications for utility models
(Chinese Patents and application for patent)

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

eKOMPASS(KIPO internal) & Keywords: uplink, grant, data, transmission

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 10-2007-0055004 A (SAMSUNG ELECTRONICS CO., LTD.) 30 May 2007 See abstract; page 11, line 4 - page 12, line 4; claims 1-2 and figures 8-11.	1-13
A	US 2007-0042784 A1 (NICHOLAS WILLIAM ANDERSON) 22 February 2007 See abstract; paragraphs [0057]-[0073]; claims 10-18 and figures 6-8.	1-13
A	US 2007-0115871 A1 (GUODONG ZHANG et al.) 24 May 2007 See abstract; paragraphs [0018]-[0027]; claims 1-13 and figures 2-3.	1-13

☐ 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
08 MARCH 2010 (08.03.2010)	**09 MARCH 2010 (09.03.2010)**

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

Jung, Gu Ung

Telephone No. 82-42-481-8598

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/KR2009/004002

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 10-2007-0055004 A	30.05.2007	None	
US 2007-0042784 A1	22.02.2007	CN 101243619 A	13.08.2008
		EP 1917727 A1	07.05.2008
		JP 2009-505595 A	05.02.2009
		KR 10-2008-0041237 A	09.05.2008
		WO 2007-023043 A1	01.03.2007
US 2007-0115871 A1	24.05.2007	CA 2605471 A1	26.10.2006
		CA 2605498 A1	26.10.2006
		CN 101164262 A0	16.04.2008
		CN 101189809 A0	28.05.2008
		EP 1875626 A2	09.01.2008
		EP 1875639 A1	09.01.2008
		JP 2008-537448 A	11.09.2008
		JP 2008-538683 A	30.10.2008
		KR 10-2007-0122540 A	31.12.2007
		KR 10-2008-0010424 A	30.01.2008
		MX 2007012870 A	13.12.2007
		NO 20075957 A	18.01.2008
		US 2006-0268884 A1	30.11.2006
		US 2008-273483 A1	06.11.2008
		US 7408895 B2	05.08.2008
		WO 2006-113712 A1	26.10.2006
		WO 2006-113829 A2	26.10.2006

Form PCT/ISA/210 (patent family annex) (July 2009)

Electronic Acknowledgement Receipt

EFS ID:	7330065
Application Number:	12538514
International Application Number:	
Confirmation Number:	7519
Title of Invention:	DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME
First Named Inventor/Applicant Name:	Sung Jun PARK
Customer Number:	02292
Filer:	Esther Hyeri Chong/DEBBIE LABRINY
Filer Authorized By:	Esther Hyeri Chong
Attorney Docket Number:	0465-2287PUS1
Receipt Date:	31-MAR-2010
Filing Date:	10-AUG-2009
Time Stamp:	19:03:50
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		04652287PUS120100331IDStransb08.pdf	358119 2414fe3680948570a8b34faab2e12878b7d6f77d	yes	7

	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	5	
	Information Disclosure Statement (IDS) Filed (SB/08)		6	7	
Warnings:					
Information:					
2	NPL Documents	04652287PUS1npl220210237.pdf	501791 ebaf87c91a3286e4399deb9df5870dd0d5b2c344	no	11
Warnings:					
Information:					
3	NPL Documents	04652287PUS1nplepSR.pdf	59832 c1664a334c762f2ab0df02669378e7d4791cb510	no	3
Warnings:					
Information:					
4	Foreign Reference	WO2008023932.pdf	1125137 55e4ad82d9819938182ae71ffc7724caffda3d4e	no	20
Warnings:					
Information:					
5	NPL Documents	3GPPnpl.pdf	178291 3c43ff17d799d61bd9d21b40dd885c4988f973d5	no	6
Warnings:					
Information:					
Total Files Size (in bytes):			2223170		

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.

Docket No.: 0465-2287PUS1
(Patent)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application of:
Sung Jun PARK et al.

Application No.:	12/538,514	Confirmation No.:	7519
Filed:	August 10, 2009	Art Unit:	2400
For:	DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME	Examiner:	L. D. FEILD

INFORMATION DISCLOSURE STATEMENT

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

Sir:

Applicants hereby submit an Information Disclosure Statement for consideration by the Examiner.

I. LIST OF PATENTS, PUBLICATIONS OR OTHER INFORMATION

The patents, publications, or other information submitted for consideration by the Office are listed on the attached PTO/SB/08.

II. COPIES

☑ a. Copies of foreign patent documents, non-patent literature and other information.

☐ b. REFERENCES PREVIOUSLY CITED OR SUBMITTED: Copies of any information not provided can be found in one or more of the following applications which has been relied upon for an earlier filing date under 35 U.S.C. § 120:

U.S. Application No. and U.S. Filing Date

III. CONCISE EXPLANATION OF THE RELEVANCE/OTHER INFORMATION

☐ a. NON-ENGLISH LANGUAGE DOCUMENTS: A concise explanation of the relevance of all non-English language patents, publications, or other information listed is as follows:

☑ b. ENGLISH LANGUAGE SEARCH REPORT OR FOREIGN PATENT OFFICE COMMUNICATION: An English language version of the search report or Foreign Patent Office communication that indicates the degree of relevance is attached.

☑ c. OTHER: The following additional information is provided.

The non-patent literature reference entitled, "3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access Medium Access Control protocol specification (release 8)," cited in the attached European Search Report mailed November 27, 2009, was previously cited in an Information Disclosure Statement filed on October 2, 2009.

Also attached hereto are Forms PCT/ISA/220, PCT/ISA/237 and PCT/ISA/210 issued in the International Application No. PCT/KR2009/004002 on March 9, 2010. KR-10-2007-0055004-A and US-2007/0115871-A1, cited in the attached PCT/ISA/210, were previously cited in an Information Disclosure Statement filed on November 27, 2009.

IV. STATEMENT UNDER 37 C.F.R. § 1.97(e)

The undersigned hereby states that:

☐ a. Each item of information contained in the IDS was first cited in any communication from a foreign patent office in a counterpart foreign application not more than **30 days** prior to the filing of this IDS. This statement does not relate to English language counterparts not listed in a communication from the foreign patent office. Such English language counterparts are provided to aid the Examiner's consideration of non-English items first cited in the communication from the foreign patent office; or

☐ b. Each item of information contained in the IDS 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 IDS. This statement does not relate to English language counterparts not listed in a communication from the foreign patent office. Such English language counterparts are provided to aid the Examiner's consideration of non-English items first cited in the communication from the foreign patent office; or

☐ c. No item of information contained in the IDS 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 IDS was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of the IDS.

☐ d. Some of the items of information in the IDS were cited in a communication from a foreign patent office. Such items were first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this IDS. This statement does not relate to English language counterparts not listed in a communication from the foreign patent office. Such English language counterparts are provided to aid the Examiner's consideration of non-English items first cited in the communication from the foreign patent office. As to the remaining items of information, to the knowledge of the person signing the certification after making reasonable inquiry, such remaining items were not known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of this statement.

V. FEES

☐ a. This Information Disclosure Statement is being filed concurrently with the filing of a new patent application or Request for Continued Examination. No fee is required.

☐ b. This Information Disclosure Statement is being filed within three months of the filing date of an application. No fee is required.

☑ c. This Information Disclosure Statement is being filed before the mailing date of a first Action on the merits. No fee is required. If a first Office Action on the merits has issued, please consider this IDS under 37 C.F.R. § 1.97(c) and see the statement under 37 C.F.R. § 1.97(e) above. If no statement has been made, charge our deposit account for the required fee.

☐ d. This Information Disclosure Statement is being filed before the mailing date of a Final Office Action or before the mailing date of a Notice of Allowance (see 37 C.F.R. § 1.97(c)(1)).

☐ No statement. The fee as required by 37 C.F.R. § 1.17(p) is provided.

or

☐ See the above statement. No fee is required.

☐ e. This Information Disclosure Statement is being filed after the mailing date of a Final Office Action or after the mailing date of a Notice of Allowance (see 37 C.F.R. § 1.97(d)), see the statement above. The fee as required by 37 C.F.R. § 1.17(p) is provided.

VI. PAYMENT OF FEES

☐ The required fee is listed on the attached Fee Transmittal.

☑ No fee is required.

If the Examiner has any questions concerning this IDS, please contact the undersigned. If it is determined that this IDS has been filed under the wrong rule, the USPTO is requested to consider this IDS under the proper rule and charge the appropriate fee to Deposit Account No. 02-2448.

Dated: March 31, 2010

Respectfully submitted,

DAVID A. BILODEAU
USPTO #42,325

By _____

Esther H. Chong
Registration No.: 40953
BIRCH, STEWART, KOLASCH & BIRCH, LLP
8110 Gatehouse Road, Suite 100 East
P.O. Box 747
Falls Church, VA 22040-0747
703-205-8000

Attachment(s):

- ☑ PTO/SB/08
- ☑ Document(s)
- ☑ Foreign Patent Office Communication
- ☑ Foreign Search Reports
- ☐ Fee
- ☐ Other:

Docket No.: 0465-2287PUS1
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reissue Application of:
Sung Jun PARK et al.

Application No.: 12/538,514 Art Unit: 2617

Filed: August 10, 2009 Examiner: D. D. Bost

For: DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME

THIRD PRELIMINARY AMENDMENT

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

Sir:

INTRODUCTORY COMMENTS

The following preliminary amendments and remarks are respectfully submitted in connection with the above-identified application.

This amendment includes:

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

Remarks/Arguments begin on page 7 of this paper.

AMENDMENTS TO THE CLAIMS

1. (Original) A method of transmitting data by a user equipment through an uplink, the method comprising:

receiving an uplink grant (UL Grant) signal from a base station on a specific message;

determining whether there is data stored in a message 3 (Msg3) buffer when receiving the UL Grant signal on the specific message;

determining whether the specific message is a random access response message; and

transmitting the data stored in the Msg3 buffer to the base station using the UL Grant signal received on the specific message, if there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message.

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

transmitting new data to the base station in correspondence with the UL Grant signal received on the specific message, if there is no data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message or the specific message is not the random access response message.

3. (Original) The method according to claim 2, wherein the transmitting the new data to the base station includes:

acquiring a Medium Access Control Protocol Data Unit (MAC PDU) from a multiplexing and assembly entity; and

transmitting the MAC PDU to the base station.

4. (Currently Amended) The method according to ~~claim 2~~ claim 1, wherein the UL Grant signal received on the specific message is a UL Grant signal received on a Physical Downlink Control Channel (PDCCH), and

wherein the user equipment transmits new data in correspondence with the UL Grant signal received on the PDCCH.

5. (Original) The method according to claim 1, wherein the data stored in the Msg3 buffer is a Medium Access Control Protocol Data Unit (MAC PDU) including a user equipment identifier.

6. (Original) The method according to claim 5, wherein the data stored in the Msg3 buffer further includes information about a buffer status report (BSR) if the user equipment starts a random access procedure for the BSR.

7. (Previously Presented) A user equipment comprising:

a reception module adapted to receive an uplink grant (UL Grant) signal from a base station on a specific message;

a transmission module adapted to transmit data to the base station using the UL Grant signal received on the specific message;

a message 3 (Msg3) buffer adapted to store UL data to be transmitted in a random access procedure; and

a Hybrid Automatic Repeat Request (HARQ) entity adapted to determine whether there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is a random access response message, acquiring the data stored in the Msg3 buffer if there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is the random access response message, and controlling the transmission module to transmit the data stored in the Msg3 buffer to the base station using the UL Grant signal received by the reception module on the specific message.

8. (Original) The user equipment according to claim 7, further comprising a multiplexing and assembly entity used for transmission of new data,

wherein the HARQ entity acquires the new data to be transmitted from the multiplexing and assembly entity if there is no data stored in the Msg3 buffer when the reception module receives the UL Grant signal on the specific message or the received message is not the random access response message, and controls the transmission module to transmit the new data acquired from the multiplexing and assembly entity using the UL Grant signal received by the reception module on the specific message.

9. (Original) The user equipment according to claim 8, further comprising:

one or more HARQ processes; and

HARQ buffers respectively corresponding to the one or more HARQ processes,

wherein the HARQ entity transfers the data acquired from the multiplexing and assembly entity or the Msg3 buffer to a specific HARQ process of the one or more HARQ processes and controls the specific HARQ process to transmit the data acquired from the multiplexing and assembly entity or the Msg3 buffer through the transmission module.

10. (Original) The user equipment according to claim 9, wherein, when the specific HARQ process transmits the data stored in the Msg3 buffer through the transmission module, the data stored in the Msg3 buffer is controlled to be copied into a specific HARQ buffer corresponding to the specific HARQ process, and the data copied into the specific HARQ buffer is controlled to be transmitted through the transmission module.

11. (Currently Amended) The user equipment according to ~~claim 8~~ claim 7, wherein the UL Grant signal received by the reception module on the specific message is a UL Grant signal received on a Physical Downlink Control Channel (PDCCH), and

wherein the HARQ entity controls new data to be transmitted in correspondence with the received UL Grant signal received on the PDCCH.

12. (Original) The user equipment according to claim 7, wherein the UL Grant signal received by the reception module on the specific message is a UL Grant signal received on a random access response message received on Physical Downlink Shared Channel (PDSCH), and

wherein the HARQ entity controls the data stored in the Msg3 buffer to be transmitted using the UL Grant signal received on the random access response message if there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal on the random access response message.

13. (Original) The user equipment according to claim 7, wherein the data stored in the Msg3 buffer is a Medium Access Control Protocol Data Unit (MAC PDU) including a user equipment identifier.

14. (Previously Presented) The method of claim 1, wherein the UL Grant signal received on the specific message is either a UL Grant signal received on a Physical Downlink Control Channel (PDCCH) or a UL Grant signal received on the random access response message.

15. (Previously Presented) The user equipment of claim 7, wherein the UL Grant signal received on the specific message is either a UL Grant signal received on a Physical Downlink Control Channel (PDCCH) or a UL Grant signal received on the random access response message.

REMARKS

Claims 1-15 are pending in this application. Claims 4 and 11 have been amended.

The claims have been amended to comply with the requirements of the KIPO Patent Prosecution Highway (PPH) program. The required documents are enclosed with the proper fee. No new matter has been added.

CONCLUSION

Entry of the above amendments is earnestly solicited. An early and favorable first action on the merits is earnestly solicited.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Michael E. Monaco, Reg. No. 52,041, at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Dated: MAR 0 5 2010

Respectfully submitted,

By Esther Chong

Esther H. Chong
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Attorney for Applicant

Electronic Patent Application Fee Transmittal	
Application Number:	12538514
Filing Date:	10-Aug-2009
Title of Invention:	DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME
First Named Inventor/Applicant Name:	Sung Jun PARK
Filer:	Esther Hyeri Chong/Rolonda Lee
Attorney Docket Number:	0465-2287PUS1
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:				
Petition fee- 37 CFR 1.17(h) (Group III)	1464	1	130	130
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:	7154517
Application Number:	12538514
International Application Number:	
Confirmation Number:	7519
Title of Invention:	DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME
First Named Inventor/Applicant Name:	Sung Jun PARK
Customer Number:	02292
Filer:	Esther Hyeri Chong/Rolonda Lee
Filer Authorized By:	Esther Hyeri Chong
Attorney Docket Number:	0465-2287PUS1
Receipt Date:	05-MAR-2010
Filing Date:	10-AUG-2009
Time Stamp:	18:01:26
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$130
RAM confirmation Number	4730
Deposit Account	022448
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)					
File Listing:					
Document Number	**Document Description**	**File Name**	**File Size(Bytes)/ Message Digest**	**Multi Part /.zip**	**Pages (if appl.)**
1		PPHFILING.pdf	825875 cf7a694fa8c71b42509dfc0e89ae27a2877ae8ac	yes	22

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Miscellaneous Incoming Letter	1	1
Miscellaneous Incoming Letter	2	2
Petition to make special under Patent Prosecution Hwy	3	4
Miscellaneous Incoming Letter	5	5
Miscellaneous Incoming Letter	6	15
Preliminary Amendment	16	16
Claims	17	21
Applicant Arguments/Remarks Made in an Amendment	22	22

Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	fee-info.pdf	30260 4bb164b4d692a1366e5717f53b1617c21250ea71	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	856135		

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/17 (10-08)
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 person are required to respond to a collection of information unless it displays a valid OMB control number

Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2009

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) **130.00**

Complete if Known	
Application Number	12/538,514-Conf. #7519
Filing Date	August 10, 2009
First Named Inventor	Sung Jun PARK
Examiner Name	D. D. Bost
Art Unit	2617
Attorney Docket No.	0465-2287PUS1

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☒ Deposit Account Deposit Account Number: 02-2448 Deposit Account Name: Birch, Stewart, Kolasch & Birch, LLP

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☒ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☒ Credit any overpayments

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

	FILING FEES		SEARCH FEES		EXAMINATION FEES		
Application Type	**Fee ($)**	**Small Entity Fee ($)**	**Fee ($)**	**Small Entity Fee ($)**	**Fee ($)**	**Small Entity Fee ($)**	**Fees Paid ($)**
Utility	330	165	540	270	220	110	
Design	220	110	100	50	140	70	
Plant	220	110	330	165	170	85	
Reissue	330	165	540	270	650	325	
Provisional	220	110	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	**Fee ($)**	**Small Entity Fee ($)**
Each claim over 20 (including Reissues)	52	26
Each independent claim over 3 (including Reissues)	220	110
Multiple dependent claims	390	195

Total Claims	**Extra Claims**	**Fee ($)**	**Fee Paid ($)**
15 - 20 or HP =	_____ x	_____ =	_____

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	**Extra Claims**	**Fee ($)**	**Fee Paid ($)**
2 - 3or HP =	_____ x	_____ =	_____

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims

Fee ($)	**Fee Paid ($)**
_____	_____

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $270 ($135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	**Extra Sheets**	**Number of each additional 50 or fraction thereof**	**Fee ($)**	**Fee Paid ($)**
_____ - 100 =	_____ /50 =	_____ (round up to a whole number) x	_____ =	_____

4. OTHER FEE(S) **Fees Paid ($)**

Non-English Specification, $130 fee (no small entity discount)

Other (e.g., late filing surcharge): **1464 Petitions to the Director not specifically ...** **$130.00**

SUBMITTED BY

Signature	Esther H. Chong	Registration No. (Attorney/Agent)	40,953	Telephone	(703) 205-8000
Name (Print/Type)	Esther H. Chong			Date	MAR 0 5 2010

Birch, Stewart, Kolasch & Birch, LLP

EHC/MEM/rtl

PTO/SB/17p (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 person are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION FEE
Under 37 CFR 1.17(f), (g) & (h)
TRANSMITTAL

(Fees are subject to annual revision)

Send completed form to: Commissioner for Patents
P.O. Box 1450, Alexandria, VA 22313-1450

Application Number	12/538,514-Conf. #7519
Filing Date	August 10, 2009
First Named Inventor	Sung Jun PARK
Art Unit	2617
Examiner Name	D. D. Bost
Attorney Docket Number	0465-2287PUS1

Enclosed is a petition filed under 37 CFR 1.102(d) that requires a processing fee (37 CFR 1.17(f), (g), or (h)). Payment of $ 130.00 is enclosed.

This form should be included with the above-mentioned petition and faxed or mailed to the Office using the appropriate Mail Stop (e.g., Mail Stop Petition), if applicable. *For transmittal of processing fees under 37 CFR 1.17(i), see form PTO/SB/17i.*

Payment of Fees (small entity amounts are NOT available for the petition fees).

[X] The Commissioner is hereby authorized to charge the following fees to Deposit Account No. 02-2448 :
[X] petition fee under 37 CFR 1.17(f), (g) or (h) [X] any deficiency of fees and credit of any overpayments

[ ] Check in the amount of $ _____ is enclosed.

[ ] Payment by credit card (Form PTO-2038 or equivalent enclosed). Do not provide credit card information on this form.

Petition Fees under 37 CFR 1.17(f): Fee $400 Fee Code 1462

For petitions filed under:
§ 1.36(a) – for revocation of a power of attorney by fewer than all applicants
§ 1.53(e) – to accord a filing date.
§ 1.57(a) – to accord a filing date.
§ 1.182 – for decision on a question not specifically provided for.
§ 1.183 – to suspend the rules.
§ 1.378(e) – for reconsideration of decision on petition refusing to accept delayed payment of maintenance fee in an expired patent.
§ 1.741(b) – to accord a filing date to an application under § 1.740 for extension of a patent term.

Petition Fees under 37 CFR 1.17(g): Fee $200 Fee Code 1463

For petitions filed under:
§ 1.12 – for access to an assignment record.
§ 1.14 – for access to an application.
§ 1.47 – for filing by other than all the inventors or a person not the inventor.
§ 1.59 – for expungement of information.
§ 1.103(a) – to suspend action in an application.
§ 1.136(b) – for review of a request for extension of time when the provisions of section 1.136(a) are not available.
§ 1.295 – for review of refusal to publish a statutory invention registration.
§ 1.296 – to withdraw a request for publication of a statutory invention registration filed on or after the date the notice of intent to publish issued.
§ 1.377 – for review of decision refusing to accept and record payment of a maintenance fee filed prior to expiration of a patent.
§ 1.550(c) – for patent owner requests for extension of time in ex parte reexamination proceedings.
§ 1.956 – for patent owner requests for extension of time in inter partes reexamination proceedings.
§ 5.12 – for expedited handling of a foreign filing license.
§ 5.15 – for changing the scope of a license.
§ 5.25 – for retroactive license.

Petition Fees under 37 CFR 1.17(h): Fee $130 Fee Code 1464

For petitions filed under:
§ 1.19(g) – to request documents in a form other than that provided in this part.
§ 1.84 – for accepting color drawings or photographs.
§ 1.91 – for entry of a model or exhibit.
§ 1.102(d) – to make an application special.
§ 1.138(c) – to expressly abandon an application to avoid publication.
§ 1.313 – to withdraw an application from issue.
§ 1.314 – to defer issuance of a patent.

Signature	MAR 05 2010
	Date
Esther H. Chong	40,953
Typed or printed name	Registration No., if applicable

REQUEST FOR PARTICIPATION IN THE PATENT PROSECUTION HIGHWAY (PPH) PROGRAM BETWEEN THE KOREAN INTELLECTUAL PROPERTY OFFICE (KIPO) AND THE USPTO

Application No.:	12/538,514-Conf. #7519	First Named Inventor:	Sung Jun PARK
Filing Date:	August 10, 2009		
Attorney Docket No.:	0465-2287PUS1		
Title of the Invention:	DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME		

THIS REQUEST FOR PARTICIPATION IN THE PPH PROGRAM ALONG WITH THE REQUIRED DOCUMENTS MUST BE SUBMITTED VIA EFS-WEB. INFORMATION REGARDING EFS-WEB IS AVAILABLE AT HTTP://WWW.USPTO.GOV/EBC/EFS_HELP.HTML.

APPLICANT HEREBY REQUESTS PARTICIPATION IN THE PATENT PROSECUTION HIGHWAY (PPH) PROGRAM AND PETITIONS TO MAKE THE ABOVE-IDENTIFIED APPLICATION SPECIAL UNDER THE PPH PROGRAM.

The above-identified application (1) validly claims priority under 35 U.S.C. 119(a) and 37 CFR 1.55 to one or more corresponding KIPO application(s) or to a PCT application that does not contain any priority claim, or (2) is a national stage entry of a PCT application that does not contain any priority claim.

The KIPO/PCT application number(s) is/are: KR10-2009-0057128

The filing date of the KIPO/ PCT application(s) is/are: June 25, 2009

I. List of Required Documents:

a. **A copy of all KIPO office actions which are relevant to patentability (excluding "Decision to Grant a Patent"*) in the above-identified KIPO application(s).**

☐ is attached.

☒ is not attached because the KIPO application was allowed in a first office action.

*It is not necessary to submit a copy of the "Decision to Grant a Patent" and an English translation thereof.

b. **A copy of all claims which were determined to be patentable by the KIPO in the above-identified KIPO application(s).**

☒ is attached.

c. **English translations of the documents in a. and b. above along with a statement that the English translations are accurate are attached (if the documents are not in the English language).**

d. **(1) An information disclosure statement listing the documents cited in the KIPO office actions**

☐ is attached.

☒ has already been filed in the above-identified U.S. application on November 27, 2009

(2) Copies of all documents (except for U.S. patents or U.S. patent application publications)

☐ are attached.

☒ have already been filed in the above-identified U.S. application on November 27, 2009

PTO/SB/20KR (11-09)
Approved for use through 01/31/2012. OMB 0651-0058
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

REQUEST FOR PARTICIPATION IN THE PATENT PROSECUTION HIGHWAY (PPH) PROGRAM BETWEEN THE KOREAN INTELLECTUAL PROPERTY OFFICE (KIPO) AND THE USPTO
(continued)

Application No.:	12/538,514-Conf. #7519
First Named Inventor:	Sung Jun PARK

II. Claims Correspondence Table:

Claims in US Application	Patentable Claims in KIPO Application	Explanation regarding the correspondence
1-15	**1-15**	**Identical**

III. All the claims in the US application sufficiently correspond to the patentable/allowable claims in the KIPO application.

IV. Payment of Fees:

The petition fee under 37 CFR 1.17(h) as required by 37 CFR 1.102(d) must be paid via EFS-Web (using credit card, authorization to charge a deposit account, or electronic funds transfer).

Signature	Esther Chong	Date	MAR 0 5 2010
Name (Print/Typed)	Esther H. Chong	Registration Number	40,953

STATEMENT THAT THE ENGLISH TRANSLATIONS OF CLAIMS FOR THE KOREAN PATENT APPLICATION ARE ACCURATE

I, Jekwan Sohn, hereby declare and state that I am knowledgeable of each of the Korean and English languages. I hereby certify that the attached English translations are complete and accurate translations of the claims for the Korean Patent Application No. 10-2009-0057128 attached with this Request for Participation in the Patent Prosecution Highway Program.

Feb. 2, 2010
(Date)

Jekwan Sohn
(Signature)

Jekwan Sohn
(Typed Name)

Granted Claims of KR10-2009-0057128

1. A method of transmitting data by a user equipment through an uplink, the method comprising:

receiving an uplink grant (UL Grant) signal from a base station on a specific message;

determining whether there is data stored in a message 3 (Msg3) buffer when receiving the UL Grant signal on the specific message;

determining whether the specific message is a random access response message; and

transmitting the data stored in the Msg3 buffer to the base station using the UL Grant signal received on the specific message, if there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message.

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

transmitting new data to the base station in correspondence with the UL Grant signal received on the specific message, if there is no data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message or the specific message is not the random access response message.

3. The method according to claim 2, wherein the transmitting the new data to the base station includes:

acquiring a Medium Access Control Protocol Data Unit (MAC PDU) from a multiplexing and assembly entity; and

transmitting the MAC PDU to the base station.

4. The method according to claim 1, wherein the UL Grant signal received on the specific message is a UL Grant signal received on a Physical Downlink Control Channel (PDCCH), and

wherein the user equipment transmits new data in correspondence with the UL

Grant signal received on the PDCCH.

5. The method according to claim 1, wherein the data stored in the Msg3 buffer is a Medium Access Control Protocol Data Unit (MAC PDU) including a user equipment identifier.

6. The method according to claim 5, wherein the data stored in the Msg3 buffer further includes information about a buffer status report (BSR) if the user equipment starts a random access procedure for the BSR.

7. A user equipment comprising:

a reception module adapted to receive an uplink grant (UL Grant) signal from a base station on a specific message;

a transmission module adapted to transmit data to the base station using the UL Grant signal received on the specific message;

a message 3 (Msg3) buffer adapted to store UL data to be transmitted in a random access procedure; and

a Hybrid Automatic Repeat Request (HARQ) entity adapted to determine whether there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is a random access response message, acquiring the data stored in the Msg3 buffer if there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is the random access response message, and controlling the transmission module to transmit the data stored in the Msg3 buffer to the base station using the UL Grant signal received by the reception module on the specific message.

8. The user equipment according to claim 7, further comprising a multiplexing and assembly entity used for transmission of new data,

wherein the HARQ entity acquires the new data to be transmitted from the multiplexing and assembly entity if there is no data stored in the Msg3 buffer when the reception module receives the UL Grant signal on the specific message or the received message is not the random access response message, and controls the transmission

module to transmit the new data acquired from the multiplexing and assembly entity using the UL Grant signal received by the reception module on the specific message.

9. The user equipment according to claim 8, further comprising:

one or more HARQ processes; and

HARQ buffers respectively corresponding to the one or more HARQ processes,

wherein the HARQ entity transfers the data acquired from the multiplexing and assembly entity or the Msg3 buffer to a specific HARQ process of the one or more HARQ processes and controls the specific HARQ process to transmit the data acquired from the multiplexing and assembly entity or the Msg3 buffer through the transmission module.

10. The user equipment according to claim 9, wherein, when the specific HARQ process transmits the data stored in the Msg3 buffer through the transmission module, the data stored in the Msg3 buffer is controlled to be copied into a specific HARQ buffer corresponding to the specific HARQ process, and the data copied into the specific HARQ buffer is controlled to be transmitted through the transmission module.

11. The user equipment according to claim 7, wherein the UL Grant signal received by the reception module on the specific message is a UL Grant signal received on a Physical Downlink Control Channel (PDCCH), and

wherein the HARQ entity controls new data to be transmitted in correspondence with the received UL Grant signal received on the PDCCH.

12. The user equipment according to claim 7, wherein the UL Grant signal received by the reception module on the specific message is a UL Grant signal received on a random access response message received on Physical Downlink Shared Channel (PDSCH), and

wherein the HARQ entity controls the data stored in the Msg3 buffer to be transmitted using the UL Grant signal received on the random access response message if there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal on the random access response message.

13. The user equipment according to claim 7, wherein the data stored in the Msg3 buffer is a Medium Access Control Protocol Data Unit (MAC PDU) including a user equipment identifier.

14. The method of claim 1, wherein the UL Grant signal received on the specific message is either a UL Grant signal received on a Physical Downlink Control Channel (PDCCH) or a UL Grant signal received on the random access response message.

15. The user equipment of claim 7, wherein the UL Grant signal received on the specific message is either a UL Grant signal received on a Physical Downlink Control Channel (PDCCH) or a UL Grant signal received on the random access response message.

Allowed KR Claims

【특허청구범위】

【청구항 1】

사용자 기기가 상향링크로 데이터를 전송하는 방법에 있어서,

기지국으로부터 특정 메시지를 통해 상향링크 승인(UL Grant) 신호를 수신하는 단계;

상기 특정 메시지를 통한 상향링크 승인 신호 수신 시 메시지3 버퍼(Msg3 Buffer)에 저장된 데이터가 존재하는지 여부를 판정하는 단계;

상기 특정 메시지가 임의접속 응답(Random Access Response) 메시지인지 여부를 판정하는 단계; 및

상기 특정 메시지를 통한 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하며 상기 특정 메시지가 임의접속 응답 메시지인 경우, 상기 특정 메시지를 통해 수신된 상향링크 승인 신호를 이용하여 상기 메시지3 버퍼에 저장된 데이터를 상기 기지국에 전송하는 단계를 포함하는, 데이터 전송 방법.

【청구항 2】

제 1 항에 있어서,

상기 특정 메시지를 통한 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하지 않거나, 또는 상기 수신 메시지가 임의접속 응답 메시지가 아닌 경우, 상기 특정 메시지를 통해 수신된 상향링크 승인 신호에 대응하여 새로운 데이터를 상기 기지국에 전송하는 단계를 추가적으로 포함하는, 데이터 전송 방법.

【청구항 3】

제 2 항에 있어서,

상기 새로운 데이터를 상기 기지국에 전송하는 단계는,

다중화 및 조합 엔터티(Multiplexing and Assembly Entity)로부터 MAC PDU(Medium Access Control Protocol Data Unit)를 획득하는 단계; 및

상기 MAC PDU를 상기 기지국에 전송하는 단계를 포함하는, 데이터 전송 방법.

【청구항 4】

제 1 항에 있어서,

상기 특정 메시지를 통해 수신된 상향링크 승인 신호는 물리하향링크제어채널(PDCCH: Physical Downlink Control Channel)을 통해 수신되는 상향링크 승인 신호이며,

상기 사용자 기기는 상기 물리하향링크제어채널을 통해 수신된 상향링크 승인 신호에 대응하여 새로운 데이터를 전송하는, 데이터 전송 방법.

【청구항 5】

제 1 항에 있어서,

상기 메시지3 버퍼에 저장된 데이터는 상기 사용자 기기 식별자를 포함하는 MAC PDU(Medium Access Control Protocol Data Unit)인, 데이터 전송 방법.

【청구항 6】

제 5 항에 있어서,

상기 사용자 기기가 버퍼 상태 보고(BSR: Buffer Status Report)를 위해 임의접속 과정을 개시한 경우, 상기 메시지3 버퍼에 저장된 데이터는 상기 버퍼 상태 보고 정보를 더 포함하는, 데이터 전송 방법.

【청구항 7】

기지국으로부터 특정 메시지를 통해 상향링크 승인(UL Grant) 신호를 수신하는 수신 모듈;

상기 특정 메시지를 통해 수신된 상향링크 승인 신호를 이용하여 상기 기지국에 데이터를 전송하는 전송 모듈;

임의접속 과정에서 전송되는 상향링크 데이터를 저장하는 메시지3 버퍼(Msg3 Buffer); 및

상기 수신 모듈이 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하는지 여부, 및 상기 특정 메시지가 임의접속 응답(Random Access Response) 메시지인지 여부를 판정하여, 상기 수신 모듈이 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하며 상기 특정 메시지가 임의접속 응답 메시지인 경우, 상기 메시지3 버퍼에 저장된 데이터를 획득하여, 상기 수신 모듈이 상기 특정 메시지를 통해 수신한 상향링크 승인 신호를 이용하여 상기 전송 모듈이 상기 메시지3 버퍼에 저장된 데이터를 상기 기지국에 전송하도록 제어하는 HARQ 엔터티를 포함하는, 사용자 기기.

【청구항 8】

제 7 항에 있어서,

상기 사용자 기기는 새로운 데이터 전송에 이용되는 다중화 및 조합 엔터티(Multiplexing and Assembly Entity)를 더 포함하며,

상기 HARQ 엔터티는 상기 수신 모듈이 상기 특정 메시지를 통해 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하지 않거나, 상기 수신 메시지가 임의접속 응답 메시지가 아닌 경우, 상기 다중화 및 조합 엔터티로부터 전송할 새로운 데이터를 획득하여, 상기 수신 모듈이 상기 특정 메시지를 통해 수신한 상향링크 승인 신호를 이용하여 상기 전송 모듈이 상기 다중화 및 조합 엔터티로부터 획득한 새로운 데이터를 전송하도록 제어하는, 사용자 기기.

【청구항 9】

제 8 항에 있어서,

상기 사용자 기기는

하나 이상의 HARQ 프로세스; 및

상기 하나 이상의 HARQ 프로세스 각각에 대응하는 HARQ 버퍼를 더 포함하며,

상기 HARQ 엔터티는 상기 메시지3 버퍼 또는 상기 다중화 및 조합 엔터티로부터 획득한 데이터를 상기 하나 이상의 HARQ 프로세스 중 특정 HARQ 프로세스에 전달하고, 상기 특정 HARQ 프로세스가 상기 메시지3 버퍼 또는 상기 다중화 및 조합 엔터티로부터 획득한 데이터를 상기 전송 모듈을 통해 전송하도록 제어하는, 사용자 기기.

【청구항 10】

제 9 항에 있어서,

상기 특정 HARQ 프로세스가 상기 메시지3 버퍼에 저장된 데이터를 상기 전송 모듈을 통해 전송하는 경우, 상기 메시지3 버퍼에 저장된 데이터를 상기 특정 HARQ 프로세스에 대응하는 특정 HARQ 버퍼에 복제하고, 상기 특정 HARQ 버퍼에 복제된 데이터를 상기 전송 모듈을 통해 전송하도록 제어하는, 사용자 기기.

【청구항 11】

제 7 항에 있어서,

상기 수신 모듈이 상기 특정 메시지를 통해 수신한 상향링크 승인 신호는 물리하향링크제어채널(PDCCH: Physical Downlink Control Channel)을 통해 수신되는 상향링크 승인 신호이며,

상기 HARQ 엔터티는 상기 물리하향링크제어채널을 통해 수신된 상향링크 승인 신호에 대응하여 새로운 데이터를 전송하도록 제어하는, 사용자 기기.

【청구항 12】

제 7 항에 있어서,

상기 수신 모듈이 상기 특정 메시지를 통해 수신된 상향링크 승인 신호는 물리하향링크공유채널(PDSCH: Physical Downlink Shared Channel)을 통해 수신되는 임의접속응답 메시지를 통해 수신되는 상향링크 승인 신호이며,

상기 HARQ 엔터티는 상기 수신 모듈이 상기 임의접속 응답 메시지를 통해 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하는 경우, 상기 임의접속 응답 메시지를 통해 수신된 상향링크 승인 신호를 이용하여 상기 메시지 3 버퍼에 저장된 데이터를 전송하도록 제어하는, 사용자 기기.

【청구항 13】

제 7 항에 있어서,

상기 메시지3 버퍼에 저장된 데이터는 상기 사용자 기기 식별자를 포함하는 MAC PDU(Medium Access Control Protocol Data Unit)인, 사용자 기기.

【청구항 14】

제 1 항에 있어서,

상기 특정 메시지를 통해 수신되는 상기 상향링크 승인 신호는 물리 하향링크 제어 채널(PDCCH: Physical Downlink Control Channel)을 통해 수신되는 상향링크 승인 신호 또는 상기 임의접속 응답 메시지를 통해 수신되는 상향링크 승인 신호인, 데이터 전송 방법.

【청구항 15】

제 7 항에 있어서,

상기 특정 메시지를 통해 수신된 상기 상향링크 승인 신호는 물리 하향링크 제어 채널(PDCCH: Physical Downlink Control Channel)을 통해 수신되는 상향링크 승인 신호 또는 상기 임의접속 응답 메시지를 통해 수신되는 상향링크 승인 신호인, 사용자 기기.

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/538,514	Filing Date 08/10/2009	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	03/05/2010	(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))	* 15	Minus	** 20	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

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

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

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/YOLANDA MIDDLETON/

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/538,514	08/10/2009	Sung Jun PARK	0465-2287PUS1

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PUBLICATION NOTICE

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Title:DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME

Publication No.US-2010-0035581-A1
Publication Date:02/11/2010

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

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Docket No.: 0465-2287PUS1
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Sung Jun PARK et al.

Application No.: 12/538,514

Confirmation No.: 7519

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Filed: August 10, 2009

Examiner: D. D. Bost

For: DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME

SECOND PRELIMINARY AMENDMENT

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

Madam:

INTRODUCTORY COMMENTS

The following Preliminary Amendments and Remarks are respectfully submitted in connection with the above-identified application.

This amendment includes:

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

Remarks/Arguments begin on page 7 of this paper.

Claim Amendments:

1. (Original) A method of transmitting data by a user equipment through an uplink, the method comprising:

receiving an uplink grant (UL Grant) signal from a base station on a specific message;

determining whether there is data stored in a message 3 (Msg3) buffer when receiving the UL Grant signal on the specific message;

determining whether the specific message is a random access response message; and

transmitting the data stored in the Msg3 buffer to the base station using the UL Grant signal received on the specific message, if there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message.

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

transmitting new data to the base station in correspondence with the UL Grant signal received on the specific message, if there is no data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message or the specific message is not the random access response message.

3. (Original) The method according to claim 2, wherein the transmitting the new data to the base station includes:

acquiring a Medium Access Control Protocol Data Unit (MAC PDU) from a multiplexing and assembly entity; and

transmitting the MAC PDU to the base station.

4. (Original) The method according to claim 2, wherein the UL Grant signal received on the specific message is a UL Grant signal received on a Physical Downlink Control Channel (PDCCH), and

wherein the user equipment transmits new data in correspondence with the UL Grant signal received on the PDCCH.

5. (Original) The method according to claim 1, wherein the data stored in the Msg3 buffer is a Medium Access Control Protocol Data Unit (MAC PDU) including a user equipment identifier.

6. (Original) The method according to claim 5, wherein the data stored in the Msg3 buffer further includes information about a buffer status report (BSR) if the user equipment starts a random access procedure for the BSR.

7. (Currently Amended) A user equipment comprising:

a reception module adapted to receive~~receiving~~ an uplink grant (UL Grant) signal from a base station on a specific message;

a transmission module adapted to transmit~~transmitting~~ data to the base station using the UL Grant signal received on the specific message;

a message 3 (Msg3) buffer adapted to store~~storing~~ UL data to be transmitted in a random access procedure; and

a Hybrid Automatic Repeat Request (HARQ) entity adapted to determine~~determining~~ whether there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is a random access response message, acquiring the data stored in the Msg3 buffer if there is data stored in the Msg3

buffer when the reception module receives the UL Grant signal and the specific message is the random access response message, and controlling the transmission module to transmit the data stored in the Msg3 buffer to the base station using the UL Grant signal received by the reception module on the specific message.

8. (Original) The user equipment according to claim 7, further comprising a multiplexing and assembly entity used for transmission of new data,

wherein the HARQ entity acquires the new data to be transmitted from the multiplexing and assembly entity if there is no data stored in the Msg3 buffer when the reception module receives the UL Grant signal on the specific message or the received message is not the random access response message, and controls the transmission module to transmit the new data acquired from the multiplexing and assembly entity using the UL Grant signal received by the reception module on the specific message.

9. (Original) The user equipment according to claim 8, further comprising:

one or more HARQ processes; and

HARQ buffers respectively corresponding to the one or more HARQ processes,

wherein the HARQ entity transfers the data acquired from the multiplexing and assembly entity or the Msg3 buffer to a specific HARQ process of the one or more HARQ processes and controls the specific HARQ process to transmit the data acquired from the multiplexing and assembly entity or the Msg3 buffer through the transmission module.

10. (Original) The user equipment according to claim 9, wherein, when the specific HARQ process transmits the data stored in the Msg3 buffer through the transmission module, the data stored in the Msg3 buffer is controlled to be copied into a

specific HARQ buffer corresponding to the specific HARQ process, and the data copied into the specific HARQ buffer is controlled to be transmitted through the transmission module.

11. (Original) The user equipment according to claim 8, wherein the UL Grant signal received by the reception module on the specific message is a UL Grant signal received on a Physical Downlink Control Channel (PDCCH), and

wherein the HARQ entity controls new data to be transmitted in correspondence with the received UL Grant signal received on the PDCCH.

12. (Original) The user equipment according to claim 7, wherein the UL Grant signal received by the reception module on the specific message is a UL Grant signal received on a random access response message received on Physical Downlink Shared Channel (PDSCH), and

wherein the HARQ entity controls the data stored in the Msg3 buffer to be transmitted using the UL Grant signal received on the random access response message if there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal on the random access response message.

13. (Original) The user equipment according to claim 7, wherein the data stored in the Msg3 buffer is a Medium Access Control Protocol Data Unit (MAC PDU) including a user equipment identifier.

14. (New) The method of claim 1, wherein the UL Grant signal received on the specific message is either a UL Grant signal received on a Physical Downlink Control Channel (PDCCH) or a UL Grant signal received on the random access response message.

15. (New) The user equipment of claim 7, wherein the UL Grant signal received on the specific message is either a UL Grant signal received on a Physical Downlink Control Channel (PDCCH) or a UL Grant signal received on the random access response message.

REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-15 are pending, with claim 7 amended, claims 14-15 added by the present amendment. Claims 1 and 7 are independent.

Claim 7 is amended and claims 14-15 are added without the introduction of new matter.

CONCLUSION

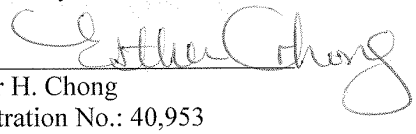
Entry of the above amendments is earnestly solicited. An early and favorable first action on the merits is earnestly solicited.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Michael E. Monaco, Reg. No. 52,041 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Dated: JAN 11 2010

Respectfully submitted,

By 

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Electronic Acknowledgement Receipt

EFS ID:	6788910
Application Number:	12538514
International Application Number:	
Confirmation Number:	7519
Title of Invention:	DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME
First Named Inventor/Applicant Name:	Sung Jun PARK
Customer Number:	02292
Filer:	Esther Hyeri Chong/Amaka Moghalu
Filer Authorized By:	Esther Hyeri Chong
Attorney Docket Number:	0465-2287PUS1
Receipt Date:	11-JAN-2010
Filing Date:	10-AUG-2009
Time Stamp:	18:22:16
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		20100111SecondPreliminaryAmendment.pdf	489671 e24874832a62ba35dcb3757fd38a6601a7c100fa	yes	8

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	1
	Preliminary Amendment	2	8
Warnings:			
Information:			
	Total Files Size (in bytes):	489671	

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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.

AMENDMENT TRANSMITTAL LETTER

Docket No. 0465-2287PUS1			
Application No. 12/538,514-Conf. #7519	Filing Date August 10, 2009	Examiner D. D. Bost	Art Unit 2617

Applicant(s): Sung Jun PARK et al.

Invention: DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME

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

Transmitted herewith is an amendment in the above-identified application.

The fee has been calculated and is transmitted as shown below.

CLAIMS AS AMENDED						
	Claims Remaining After Amendment	Highest Number Previously Paid		Number Extra Claims Present	Rate	
Total Claims	15	- 20	=	0	x 52.00	0.00
Independent Claims	2	- 3	=	0	x 220.00	0.00
Multiple Dependent Claims (check if applicable)	☐					
Other fee (please specify):						
TOTAL ADDITIONAL FEE FOR THIS AMENDMENT:						0.00

[x] Large Entity [ ] Small Entity

[x] No additional fee is required for this amendment.

[ ] Please charge Deposit Account No. _____ in the amount of $ _____.
A duplicate copy of this sheet is enclosed.

[ ] A check in the amount of $ _____ is enclosed.

[ ] Payment by credit card. Form PTO-2038 is attached.

[x] The Director is hereby authorized to charge and credit Deposit Account No. 02-2448 as described below. A duplicate copy of this sheet is enclosed.

[x] Credit any overpayment.

[x] Charge any additional filing or application processing fees required under 37 CFR 1.16 and 1.17.

Esther Chong

Dated: JAN 11 2010

Esther H. Chong
Attorney Reg. No.: 40,953

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PTO/SB/06 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
12/538,514	08/10/2009	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	01/11/2010	(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))	* 15	Minus	** 20	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

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

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

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/RENEE HAWKINS/

PTO/SB/06 (07-06)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/538,514	Filing Date 08/10/2009	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
	01/11/2010	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	Total (37 CFR 1.16(i))	* 15	Minus	** 20	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	**0**

		(Column 1)		(Column 2)	(Column 3)					
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
AMENDMENT	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:
/GLORIA PORTER/

PTO/SB/08b (07-09)
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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	12/538,514-Conf. #7519
Filing Date	August 10, 2009
First Named Inventor	Sung Jun PARK
Art Unit	2617
Examiner Name	D. D. Bost
Attorney Docket Number	0465-2287PUS1

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	AA*	US-2007/0115871-A1	05-24-2007	Zhang et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
	BA	KR-10-2007-0055004-A	05-30-2007			ABS
	BB	KR-10-2007-0107619-A	11-07-2007			ABS
	BC	KR-10-2008-0030941-A	04-07-2008			ABS
	BD	JP-2008-103862-A	05-01-2008			ABS

*EXAMINER: Initial if reference 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. * CITE NO.: Those application(s) which are marked with an single asterisk (*) next to the Cite No. are not supplied (under 37 CFR 1.98(a)(2)(iii)) because that application was filed after June 30, 2003 or is available in the IFW. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]

Examiner Signature		Date Considered	

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[1]Applicant's unique citation designation number (optional). [2]Applicant is to place a check mark here if English language Translation is attached.

Birch, Stewart, Kolasch & Birch, LLP

EHC/klg

Electronic Acknowledgement Receipt

EFS ID:	6532258
Application Number:	12538514
International Application Number:	
Confirmation Number:	7519
Title of Invention:	DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME
First Named Inventor/Applicant Name:	Sung Jun PARK
Customer Number:	02292
Filer:	Esther Hyeri Chong/Kendra Gunter
Filer Authorized By:	Esther Hyeri Chong
Attorney Docket Number:	0465-2287PUS1
Receipt Date:	27-NOV-2009
Filing Date:	10-AUG-2009
Time Stamp:	14:27:00
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		2009-11-27-IDS.PDF	235943 2cc8ac83f8df77d080d86f1ebbacdf13fe320ec2	yes	5

	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	4	
	Information Disclosure Statement (IDS) Filed (SB/08)		5	5	
Warnings:					
Information:					
2	NPL Documents	KR-SearchReport.pdf	286134 4cf0a75b55ba33b3663560bf4fde7089dbed40c2	no	7
Warnings:					
Information:					
3	Foreign Reference	KR-10-2007-0055004-A.pdf	4223903 bed54a37aba759226968d856bb21f8c47f7ce6dc	no	23
Warnings:					
Information:					
4	Foreign Reference	KR-10-2007-0107619-A.pdf	407369 9f2e1754335d774a5d27441a1436c344a0bd6fc6	no	17
Warnings:					
Information:					
5	Foreign Reference	KR-10-2008-0030941-A.pdf	1303740 886768694153968 68f13fbf988fcab1e6c805c82	no	25
Warnings:					
Information:					
6	Foreign Reference	JP-2008-103862-A.pdf	519868 02018a71b0dba36172e462bc93b645279125fd76	no	14
Warnings:					
Information:					
		Total Files Size (in bytes):	6976957		

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Docket No.: 0465-2287PUS1
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Sung Jun PARK et al.

Application No.: 12/538,514 | Confirmation No.: 7519

Filed: August 10, 2009 | Art Unit: 2617

For: DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME | Examiner: D. D. Bost

INFORMATION DISCLOSURE STATEMENT

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

Sir:

Applicant(s) hereby submit(s) an Information Disclosure Statement for consideration by the Examiner.

I. LIST OF PATENTS, PUBLICATIONS OR OTHER INFORMATION

The patents, publications, or other information submitted for consideration by the Office are listed on the PTO-SB08.

II. COPIES

☒ a. Copies of foreign patent documents, non-patent literature and other information.

☐ b. REFERENCES PREVIOUSLY CITED OR SUBMITTED: Copies of any information not provided can be found in one or more of the following applications which has been relied upon for an earlier filing date under 35 U.S.C. § 120:

III. CONCISE EXPLANATION OF THE RELEVANCE

☒ a. NON-ENGLISH LANGUAGE DOCUMENTS: A concise explanation of the relevance of all non-English language patents, publications, or other information listed is as follows: English language Abstracts for KR-10-2007-0055004-A, KR-10-2007-0107619-A, KR-10-2008-0030941-A and JP-2008-103862-A are attached.

☒ b. ENGLISH LANGUAGE SEARCH REPORT OR FOREIGN PATENT OFFICE COMMUNICATION: An English language version of the search report or Foreign Patent Office communication that indicates the degree of relevance is attached.

☐ c. OTHER: The following additional information is provided.

IV. STATEMENT UNDER 37 C.F.R. § 1.97(e)

The undersigned hereby states that:

☐ a. Each item of information contained in the IDS was first cited in any communication from a foreign patent office in a counterpart foreign application not more than **30 days** prior to the filing of this IDS. This statement does not relate to English language counterparts not listed in a communication from the foreign patent office. Such English language counterparts are provided to aid the Examiner's consideration of non-English items first cited in the communication from the foreign patent office; or

☐ b. Each item of information contained in the IDS 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 IDS. This statement does not relate to English language counterparts not listed in a communication from the foreign patent office. Such English language counterparts are provided to aid the Examiner's consideration of non-English items first cited in the communication from the foreign patent office; or

☐ c. No item of information contained in the IDS 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 IDS was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of the IDS.

☐ d. Some of the items of information in the IDS were cited in a communication from a foreign patent office. Such items were first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this IDS. This statement does not relate to English language counterparts not listed in a communication from the foreign patent office. Such English language counterparts are provided to aid the Examiner's consideration of non-English items first cited in the communication from the foreign patent office. As to the remaining items of information, to the knowledge of the person signing the certification after making reasonable inquiry, such remaining items were not known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of this statement.

V. FEES

☐ a. This Information Disclosure Statement is being filed concurrently with the filing of a new patent application or Request for Continued Examination. No fee is required.

☐ b. This Information Disclosure Statement is being filed within three months of the filing date of an application. No fee is required.

☒ c. This Information Disclosure Statement is being filed before the mailing date of a first Action on the merits. No fee is required. If a first Office Action on the merits has issued, please consider this IDS under 37 C.F.R. § 1.97(c) and see the statement under 37 C.F.R. § 1.97(e) above. If no statement has been made, charge our deposit account for the required fee.

☐ d. This Information Disclosure Statement is being filed before the mailing date of a Final Office Action or before the mailing date of a Notice of Allowance (see 37 C.F.R. § 1.97(c)(1)).

☐ No statement. The fee as required by 37 C.F.R. § 1.17(p) is provided.

or

☐ See the above statement. No fee is required.

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VI. PAYMENT OF FEES

☐ The required fee is listed on the attached Fee Transmittal.

☒ No fee is required.

If the Examiner has any questions concerning this IDS, please contact the undersigned. If it is determined that this IDS has been filed under the wrong rule, the USPTO is requested to consider this IDS under the proper rule and charge the appropriate fee to Deposit Account No. 02-2448.

Dated: NOV 27 2009

Respectfully submitted,

By _____
Esther H. Chong, Registration No.: 40,953
BIRCH, STEWART, KOLASCH & BIRCH, LLP
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Attorney for Applicant

Attachment(s):
☒ PTO/SB/08
☒ Documents
☒ Foreign Patent Office Communication

PTO/SB/08a (07-09)
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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	12/538,514-Conf. #7519
Filing Date	August 10, 2009
First Named Inventor	Sung Jun PARK
Art Unit	2617
Examiner Name	Not Yet Assigned
Attorney Docket Number	0465-2287PUS1

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
	CA	3GPP TS 36.321 V8.2.0., "3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA) Medium Access Control (MAC) protocol specification (Release 8), pgs. 1-33, May 2008	
	CB	3rd Generation Partnership Project (3GPP), "Enforcing New Transmission After Flushing HARQ Process", pgs. 1-6, February 9-13, 2009, Athens, Greece, XP050323002	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference 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. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

Electronic Acknowledgement Receipt

EFS ID:	6193001
Application Number:	12538514
International Application Number:	
Confirmation Number:	7519
Title of Invention:	DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME
First Named Inventor/Applicant Name:	Sung Jun PARK
Customer Number:	02292
Filer:	Esther Hyeri Chong/Ruth Calendine
Filer Authorized By:	Esther Hyeri Chong
Attorney Docket Number:	0465-2287PUS1
Receipt Date:	02-OCT-2009
Filing Date:	10-AUG-2009
Time Stamp:	18:09:25
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	GBOA.pdf	282825 1329724dd1afdd76d5f27e8e7b68af4f47b1403e	no	6

Warnings:	
Information:	

2	NPL Documents	3GPPTS36321.pdf	1498170 8cc6abb35f78aef573fa24121db8486eb574bd8b	no	33
Warnings:					
Information:					
3	NPL Documents	XP050323002.pdf	165104 ccd861ce982734a1f8d989a0165aeb877486a663	no	6
Warnings:					
Information:					
4		IDS.PDF	252491 3e8107b2f0dcd54ec2684c43ac61b281ffb9258e	yes	5

Multipart Description/PDF files in .zip description

Document Description	Start	End
Transmittal Letter	1	4
Information Disclosure Statement (IDS) Filed (SB/08)	5	5

Warnings:	
Information:	
Total Files Size (in bytes):	2198590

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.

Docket No.: 0465-2287PUS1
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Sung Jun PARK et al.

Application No.: 12/538,514 Confirmation No.: 7519

Filed: August 10, 2009 Art Unit: 2617

For: DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME Examiner: Not Yet Assigned

INFORMATION DISCLOSURE STATEMENT

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

Sir:

Applicant(s) hereby submit(s) an Information Disclosure Statement for consideration by the Examiner.

I. LIST OF PATENTS, PUBLICATIONS OR OTHER INFORMATION

The patents, publications, or other information submitted for consideration by the Office are listed on the PTO-SB08.

II. COPIES

☒ a. Copies of foreign patent documents, non-patent literature and other information.

☐ b. REFERENCES PREVIOUSLY CITED OR SUBMITTED: Copies of any information not provided can be found in one or more of the following applications which has been relied upon for an earlier filing date under 35 U.S.C. § 120:

III. CONCISE EXPLANATION OF THE RELEVANCE

☐ a. NON-ENGLISH LANGUAGE DOCUMENTS: A concise explanation of the relevance of all non-English language patents, publications, or other information listed is as follows:

☒ b. ENGLISH LANGUAGE SEARCH REPORT OR FOREIGN PATENT OFFICE COMMUNICATION: An English language version of the search report or Foreign Patent Office communication that indicates the degree of relevance is attached. An Office Action issued August 20, 2009 in corresponding Great Britain Application No. 0912850.5 is submitted herewith.

☐ c. OTHER: The following additional information is provided.

IV. STATEMENT UNDER 37 C.F.R. § 1.97(e)

The undersigned hereby states that:

☐ a. Each item of information contained in the IDS was first cited in any communication from a foreign patent office in a counterpart foreign application not more than **30 days** prior to the filing of this IDS. This statement does not relate to English language counterparts not listed in a communication from the foreign patent office. Such English language counterparts are provided to aid the Examiner's consideration of non-English items first cited in the communication from the foreign patent office; or

☐ b. Each item of information contained in the IDS 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 IDS. This statement does not relate to English language counterparts not listed in a communication from the foreign patent office. Such English language counterparts are provided to aid the Examiner's consideration of non-English items first cited in the communication from the foreign patent office; or

☐ c. No item of information contained in the IDS 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 IDS was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of the IDS.

☐ d. Some of the items of information in the IDS were cited in a communication from a foreign patent office. Such items were first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this IDS. This statement does not relate to English language counterparts not listed in a communication from the foreign patent office. Such English language counterparts are provided to aid the Examiner's consideration of non-English items first cited in the communication from the foreign patent office. As to the remaining items of information, to the knowledge of the person signing the certification after making reasonable inquiry, such remaining items were not known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of this statement.

V. FEES

☐ a. This Information Disclosure Statement is being filed concurrently with the filing of a new patent application or Request for Continued Examination. No fee is required.

☒ b. This Information Disclosure Statement is being filed within three months of the filing date of an application. No fee is required.

☐ c. This Information Disclosure Statement is being filed before the mailing date of a first Action on the merits. No fee is required. If a first Office Action on the merits has issued, please consider this IDS under 37 C.F.R. § 1.97(c) and see the statement under 37 C.F.R. § 1.97(e) below. If no statement has been made, charge our deposit account for the required fee.

☐ d. This Information Disclosure Statement is being filed before the mailing date of a Final Office Action or before the mailing date of a Notice of Allowance (see 37 C.F.R. § 1.97(c)(1)).

☐ No statement. The fee as required by 37 C.F.R. § 1.17(p) is provided.

or

☐ See the above statement. No fee is required.

☐ e. This Information Disclosure Statement is being filed after the mailing date of a Final Office Action or after the mailing date of a Notice of Allowance (see 37 C.F.R. § 1.97(d)), see the statement above. The fee as required by 37 C.F.R. § 1.17(p) is provided.

VI. PAYMENT OF FEES

☐ The required fee is listed on the attached Fee Transmittal.

☒ No fee is required.

If the Examiner has any questions concerning this IDS, please contact the undersigned. If it is determined that this IDS has been filed under the wrong rule, the USPTO is requested to consider this IDS under the proper rule and charge the appropriate fee to Deposit Account No. 02-2448.

Dated: October 2, 2009

Respectfully submitted,

By _____

Esther H. Chong
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Attorney for Applicant

Attachment(s):
☒ PTO/SB/08
☒ Documents
☒ Foreign Patent Office Communication
☐ Foreign Search Report
☐ Fee
☐ Other:

별첨 사본은 아래 출원의 원본과 동일함을 증명함.

This is to certify that the following application annexed hereto is a true copy from the records of the Korean Intellectual Property Office.

출 원 번 호 : 10-2009-0057128
Application Number

출 원 년 월 일 : 2009년 06월 25일
Filing Date JUN. 25, 2009

출 원 인 : 엘지전자 주식회사
Applicant(s) LG Electronics Inc.

2009년 09월 16일

특 허 청
COMMISSIONER

제출 일자 : 2009-06-25

【서지사항】

【서류명】 특허출원서

【참조번호】 0003

【출원구분】 특허출원

【출원인】

【명칭】 엘지전자 주식회사

【출원인코드】 1-2002-012840-3

【대리인】

【성명】 김용인

【대리인코드】 9-1998-000022-1

【포괄위임등록번호】 2007-001879-5

【대리인】

【성명】 박영복

【대리인코드】 9-2006-001451-3

【포괄위임등록번호】 2007-001886-1

【발명의 국문명칭】 데이터 전송 방법 및 이를 위한 사용자 기기

【발명의 영문명칭】 Data Transmission Method And User Equipment For the Same

【발명자】

【성명】 박성준

【성명의 영문표기】 PARK,Sung Jun

【주민등록번호】 780316-1XXXXXX

【우편번호】 431-080

【주소】 경기도 안양시 동안구 호계동 533번지 LG 제1연구단지

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【발명자】

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【성명의 영문표기】 CHUN,Sung Duck

【주민등록번호】 761223-1XXXXXX

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【우편번호】 431-080

【주소】 경기도 안양시 동안구 호계동 533번지 LG 제1연구단지

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【성명】 이승준

【성명의 영문표기】 YI,Seung June

【주민등록번호】 720625-1XXXXXX

【우편번호】 431-080

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【국적】 KR

【발명자】

【성명】 이영대

【성명의 영문표기】 LEE,Young Dae

【주민등록번호】 731215-1XXXXXX

【우편번호】 431-080

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제출 일자 : 2009-06-25

【국적】 KR

【우선권 주장】

【출원국명】 US

【출원번호】 61/087,988

【출원일자】 2008.08.11

【증명서류】 미첨부

【심사청구】 청구

위와 같이 특허청장에게 제출합니다.

대리인 김용인 (서명 또는 인) 대리인 박영복 (서명 또는 인)

【수수료】

【출원료】	0	면	38,000 원
【가산출원료】	54	면	0 원
【우선권주장료】	1	건	20,000 원
【심사청구료】	13	항	650,000 원
【합계】	708,000 원		

제출 일자 : 2009-06-25

【요약서】

【요약】

이하의 설명은 이동통신 기술에 대한 것으로서, 구체적으로 메시지3 버퍼(Msg3 Buffer)에 저장된 데이터를 효율적으로 전송하는 방법 및 이를 위한 사용자 기기에 대한 것이다. 구체적으로 사용자 기기가 상향링크로 데이터를 전송함에 있어서, 기지국으로부터 특정 메시지를 통해 상향링크 승인(UL Grant) 신호를 수신하고, 이 특정 메시지를 통한 상향링크 승인 신호 수신 시 메시지3 버퍼(Msg3 Buffer)에 저장된 데이터가 존재하는지 여부를 판정할뿐만 아니라 이 특정 메시지가 임의접속 응답(Random Access Response) 메시지인지 여부를 판정한 후, 이 특정 메시지를 통한 상향링크 승인 신호 수신 시 메시지3 버퍼에 저장된 데이터가 존재하며 이 특정 메시지가 임의접속 응답 메시지인 경우에 한하여, 이 특정 메시지를 통해 수신된 상향링크 승인 신호를 이용하여 메시지3 버퍼에 저장된 데이터를 상기 기지국에 전송하는 것을 제안한다.

【대표도】

도 9

【색인어】

RACH, UL Grant, Msg 3 Buffer

제출 일자 : 2009-06-25

【명세서】

【발명의 명칭】

데이터 전송 방법 및 이를 위한 사용자 기기{Data Transmission Method And User Equipment For the Same}

【발명의 상세한 설명】

【기술분야】

<1> 이하의 설명은 이동통신 기술에 대한 것으로서, 구체적으로 메시지3 버퍼(Msg3 Buffer)에 저장된 데이터를 효율적으로 전송하는 방법 및 이를 위한 사용자 기기에 대한 것이다.

【배경기술】

<2> 본 발명이 적용될 수 있는 이동통신 시스템의 일례로서 3GPP LTE (3rd Generation Partnership Project Long Term Evolution; 이하 "LTE"라 함) 통신 시스템에 대해 개략적으로 설명한다.

<3> 도 1은 이동통신 시스템의 일례로서 E-UMTS 망구조를 개략적으로 도시한 도면이다.

<4> E-UMTS(Evolved Universal Mobile Telecommunications System) 시스템은 기존 UMTS(Universal Mobile Telecommunications System)에서 진화한 시스템으로서, 현재 3GPP에서 기초적인 표준화 작업을 진행하고 있다. 일반적으로 E-UMTS는 LTE 시스템이라고 할 수도 있다.

<5> E-UMTS망은 크게 E-UTRAN(101)과 CN(Core Network: 102)으로 구분할 수 있다. E-UTRAN(Evolved-UMTS Terrestrial Radio Access Network; 101)은 단말(User Equipment; 이하 "UE"로 약칭; 103)과 기지국(이하 "eNode B" 또는 "eNB"로 약칭; 104), 망의 종단에 위치하여 외부망과 연결되는 접속게이트웨이(Access Gateway; 이하 "AG"로 약칭; 105)로 구성된다. AG(105)는 사용자 트래픽 처리를 담당하는 부분과 제어용 트래픽을 처리하는 부분으로 나누어질 수도 있다. 이 때 새로운 사용자 트래픽 처리를 위한 AG와 제어용 트래픽을 처리하는 AG 사이에 새로운 인터페이스를 사용하여 서로 통신할 수도 있다.

<6> 하나의 eNode B에는 하나 이상의 셀(Cell)이 존재할 수 있다. eNode B간에는 사용자 트래픽 혹은 제어 트래픽 전송을 위한 인터페이스가 사용될 수도 있다. CN(102)은 AG(105)와 기타 UE(103)의 사용자 등록 등을 위한 노드 등으로 구성될 수도 있다. 또한, E-UTRAN(101)과 CN(102)을 구분하기 위한 인터페이스가 사용될 수도 있다.

<7> 단말과 망사이의 무선인터페이스 프로토콜 (Radio Interface Protocol)의 계층들은 통신시스템에서 널리 알려진 개방형시스템간상호접속(Open System Interconnection; OSI) 기준모델의 하위 3개 계층을 바탕으로 L1 (제1계층), L2 (제2계층) 및 L3(제3계층)로 구분될 수 있다. 이 중에서 제 1 계층에 속하는 물리계층은 물리채널(Physical Channel)을 이용한 정보전송서비스(Information Transfer Service)를 제공하며, 제 3 계층에 위치하는 무선자원제어(Radio Resource Control; 이하 RRC라 약칭함)계층은 단말과 망간에 무선자원을 제어하는

역할을 수행한다. 이를 위해 RRC계층은 단말과 망간에 RRC메시지를 서로 교환한다. RRC계층은 eNode B(104)와 AG(105) 등 망 노드들에 분산되어 위치할 수도 있고, eNode B(104) 또는 AG(105)에만 위치할 수도 있다.

<8> 도 2 및 도 3은 3GPP 무선접속망 규격을 기반으로 한 단말과 UTRAN 사이의 무선인터페이스 프로토콜의 구조를 나타낸다.

<9> 도 2 및 도 3의 무선인터페이스 프로토콜은 수평적으로 물리계층(Physical Layer), 데이터링크계층(Data Link Layer) 및 네트워크계층(Network Layer)으로 이루어지며, 수직적으로는 데이터정보 전송을 위한 사용자평면(User Plane)과 제어신호(Signaling)전달을 위한 제어평면(Control Plane)으로 구분된다. 구체적으로 도 2는 무선프로토콜 제어평면의 각 계층을, 도 3은 무선프로토콜 사용자평면의 각 계층을 나타낸다. 도 2 및 도 3의 프로토콜 계층들은 통신시스템에서 널리 알려진 개방형시스템간상호접속(OSI) 기준모델의 하위 3개 계층을 바탕으로 L1(제1계층), L2(제2계층), L3(제3계층)로 구분될 수 있다.

<10> 이하에서 도 2의 무선프로토콜 제어평면과 도 3의 무선프로토콜 사용자평면의 각 계층을 설명한다.

<11> 제 1 계층인 물리(Physical; PHY) 계층은 물리채널(Physical Channel)을 이용하여 상위 계층에게 정보전송서비스(Information Transfer Service)를 제공한다. PHY 계층은 상위의 매체접속제어(Medium Access Control; MAC) 계층과 전송채널(Transport Channel)을 통해 연결되어 있으며, 이 전송채널을 통해 MAC 계층과 PHY 계층 사이의 데이터가 이동한다. 이때, 전송채널은 크게 채널의 공유 여부에 따라

전용(Dedicated) 전송채널과 공용(Common) 전송채널로 나뉜다. 그리고, 서로 다른 PHY 계층 사이, 즉 송신측과 수신측의 PHY 계층 사이는 무선 자원을 이용한 물리채널을 통해 데이터가 이동한다.

<12> 제 2 계층에는 여러 가지 계층이 존재한다. 먼저 매체접속제어(Medium Access Control; MAC) 계층은 다양한 논리채널(Logical Channel)을 다양한 전송채널에 매핑시키는 역할을 하며, 또한 여러 논리채널을 하나의 전송채널에 매핑시키는 논리채널 다중화(Multiplexing)의 역할을 수행한다. MAC 계층은 상위계층인 RLC (Radio Link COntrol) 계층과는 논리채널 (Logical Channel)로 연결되어 있으며, 논리채널은 크게 전송되는 정보의 종류에 따라 제어평면(Control Plane)의 정보를 전송하는 제어채널 (Control Channel)과 사용자평면(User Plane)의 정보를 전송하는 트래픽채널 (Traffic Channel)로 나뉠 수 있다.

<13> 제 2 계층의 무선링크제어(Radio Link Control; RLC) 계층은 상위계층으로부터 수신한 데이터를 분할(Segmentation) 및 연결(Concatenation)하여 하위계층이 무선 구간으로 데이터를 전송하기에 적합하도록 데이터 크기를 조절하는 역할을 수행한다. 또한, 각각의 무선베어러(Radio Bearer; RB)가 요구하는 다양한 QoS(Quality of Service)를 보장할 수 있도록 하기 위해 TM (Transparent Mode, 투명모드), UM (Un-acknowledged Mode, 무응답모드), 및 AM (Acknowledged Mode, 응답모드)의 세가지 동작 모드를 제공하고 있다. 특히, AM RLC는 신뢰성 있는 데이터 전송을 위해 자동 반복 및 요청(Automatic Repeat and Request; ARQ) 기능을 통한 재전송 기능을 수행하고 있다.

<14> 제 2 계층의 패킷데이터수렴(Packet Data Convergence Protocol; 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. 이는 데이터의 헤더(Header) 부분에서 반드시 필요한 정보만을 전송하도록 하여, 무선 구간의 전송효율을 증가시키는 역할을 한다. 또한, LTE 시스템에서는 PDCP 계층이 보안(Security) 기능도 수행하는데, 이는 제 3자의 데이터 감청을 방지하는 암호화(Ciphering)와 제 3자의 데이터 조작을 방지하는 무결성 보호(Integrity protection)로 구성된다.

<15> 제 3 계층의 가장 상부에 위치한 무선자원제어(Radio Resource Control; RRC) 계층은 제어평면에서만 정의되며, 무선베어러 (Radio Bearer; RB)들의 설정(Configuration), 재설정 (Re-configuration) 및 해제 (Release)와 관련되어 논리채널, 전송채널 및 물리채널들의 제어를 담당한다. 여기서 RB는 단말과 UTRAN간의 데이터 전달을 위해 무선 프로토콜의 제1 및 제 2계층에 의해 제공되는 논리적 경로(path)를 의미하고, 일반적으로 RB가 설정된다는 것은 특정 서비스를 제공하기 위해 필요한 무선 프로토콜 계층 및 채널의 특성을 규정하고, 각각의 구체적인 파라미터 및 동작 방법을 설정하는 과정을 의미한다. RB는 다시 SRB(Signaling RB)와 DRB(Data RB) 두가지로 나누어 지는데, SRB는 제어 평면(C-plane)에서 RRC 메시지를 전송하는 통로로 사용되며, DRB는 사용자 평면(U-plane)에서 사용자 데이터를 전송하는 통로로 사용된다.

<16> 망에서 단말로 데이터를 전송하는 하향전송채널로는 시스템정보를 전송하는 BCH(Broadcast Channel)와 그 이외에 사용자 트래픽이나 제어메시지를 전송하는 하향 SCH(Shared Channel)가 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 상향전송채널로는 초기 제어메시지를 전송하는 RACH(Random Access Channel)와 그 이외에 사용자 트래픽이나 제어메시지를 전송하는 상향 SCH(Shared Channel)가 있다.

<17> 그리고, 하향전송채널로 전달되는 정보를 망과 단말 사이의 무선구간으로 전송하는 하향물리채널로는, BCH의 정보를 전송하는 PBCH(Physical Broadcast Channel), MCH의 정보를 전송하는 PMCH(Physical Multicast Channel), PCH와 하향 SCH의 정보를 전송하는 PDSCH(Physical Downlink shared Channel), 그리고 하향 또는 상향 무선자원 할당정보(DL/UL Scheduling Grant)등과 같이 제1계층과 제2계층에서 제공하는 제어 정보를 전송하는 PDCCH(Physical Downlink Control Channel, 또는 DL L1/L2 control channel 이라고도 함)가 있다. 한편, 상향전송채널로 전달되는 정보를 망과 단말 사이의 무선구간으로 전송하는 상향 물리채널로는 상향 SCH의 정보를 전송하는 PUSCH(Physical Uplink Shared Channel), RACH 정보를 전송하는 PRACH(Physical Random Access Channel), 그리고 HARQ ACK 또는 NACK, 스케줄링 요청(SR; Scheduling Request), CQI(Channel Quality Indicator) 보고 등과 같이 제1계층과 제2계층에서 제공하는 제어 정보를 전송하는 PUCCH(Physical Uplink

Control Channel)이 있다.

<18> 상술한 설명을 바탕으로 이하에서는 LTE 시스템에서 제공하는 임의 접속 과정 (Random Access procedure)에 대해 개략적으로 살펴본다.

<19> 먼저, 단말이 임의 접속 과정을 수행하는 경우로는 다음과 같은 경우가 있다.

<20> - 단말이 기지국과의 RRC 연결(RRC Connection)이 없어, 초기 접속 (initial access)을 하는 경우

<21> - 단말이 핸드오버 과정에서, 타겟(target) 셀로 처음 접속하는 경우

<22> - 기지국의 명령에 의해 임의 접속 과정이 요청되는 경우

<23> - 상향링크의 시간 동기가 맞지 않거나, 무선자원을 요청하기 위해 사용되는 지정된 무선자원이 할당되지 않은 상황에서, 상향링크로 전송할 데이터가 발생하는 경우

<24> - 무선 연결 실패(radio link failure) 또는 핸드오버 실패(handover failure) 시 복구 과정을 수행하는 경우

<25> LTE 시스템에서는 임의접속 프리앰블을 선택하는 과정에서, 특정한 집합 안에서 단말이 임의로 하나의 프리엠블을 선택하여 사용하는 경쟁 기반 랜덤 액세스 과정(contention based random access procedure)과 기지국이 특정 단말에게만 할당해준 임의접속 프리앰블을 사용하는 비 경쟁 기반 랜덤 액세스 과정 (non-contention based random access procedure)을 모두 제공한다. 다만, 비 경쟁 기반

랜덤 액세스 과정은, 상술한 핸드오버 과정이나 기지국의 명령에 의해 요청되는 경우에 한하여 사용될 수 있다.

<26> 한편, 단말이 특정 기지국과 임의접속을 수행하는 과정은 크게 (1) 단말이 기지국에 임의접속 프리엠블을 전송하는 단계(이하 혼동이 없는 경우 "제 1 메시지(message 1)" 전송 단계), (2) 전송된 임의접속 프리엠블에 대응하여 기지국으로부터 임의접속 응답을 수신하는 단계(이하 혼동이 없는 경우 "제 2 메시지(message 2)" 수신 단계), (3) 임의접속 응답 메시지에서 수신된 정보를 이용하여 상향링크 메시지를 전송하는 단계(이하 혼동이 없는 경우 "제 3 메시지(message 3)" 전송 단계) 및 (4) 상기 상향링크 메시지에 대응하는 메시지를 기지국으로부터 수신하는 단계(이하 혼동이 없는 경우 "제 4 메시지(message 4)" 수신 단계)을 포함할 수 있다.

<27> 이와 같은 임의접속 과정 중 단말은 상술한 제 3 메시지를 통해 전송할 데이터를 메시지3 버퍼(Message 3 buffer; 또는 간단히 Msg3 Buffer)에 저장하고, 이 메시지3 버퍼에 저장된 데이터를 상향링크 승인(Uplink Grant; 또는 간단히 UL Grant) 신호 수신에 대응하여 전송하게 된다. 상향링크 승인 신호는 단말이 기지국으로 신호를 전송할 때 이용할 수 있는 상향링크 무선 자원에 대한 정보를 알려주신 신호로서 상술한 LTE 시스템의 경우 물리하향링크제어채널(PDCCH), 또는 물리하향링크공유채널(PUSCH)를 통해 수신되는 임의접속응답(Random Access Response) 메시지를 통해 수신된다. 현재 LTE 시스템 표준에 따르면 메시지3 버퍼에 데이터가 저장되어 있는 상태에서 상향링크 승인 신호가 수신되는 경우 상향링크 승인 신호

수신 형태에 관계없이 메시지3 버퍼에 저장되어 있는 데이터를 전송하도록 규정하고 있다. 다만, 상술한 바와 같이 모든 상향링크 승인 신호 수신에 대응하여 메시지3 버퍼에 저장된 데이터를 전송하는 경우에 어떠한 문제가 발생할 수 있으며, 이를 개선하기 위한 방안에 대해 좀더 구체적인 연구가 필요하다.

【발명의 내용】

【해결하고자 하는 과제】

<28> 이하에서는 상향링크 승인 신호의 수신 형태에 따라 메시지3 버퍼에 저장된 데이터를 전송할 때 발생할 수 있는 문제점에 대해 문제점에 대해 고찰하고, 이를 개선하기 위한 데이터 전송 방법 및 사용자 기기 구성을 제시하고자 한다.

【과제 해결 수단】

<29> 상술한 바와 같은 과제를 해결하기 위한 본 발명의 일측면에서는 사용자 기기가 상향링크로 데이터를 전송하는 방법에 있어서, 기지국으로부터 특정 메시지를 통해 상향링크 승인(UL Grant) 신호를 수신하는 단계; 상기 특정 메시지를 통한 상향링크 승인 신호 수신 시 메시지3 버퍼(Msg3 Buffer)에 저장된 데이터가 존재하는지 여부를 판정하는 단계; 상기 특정 메시지가 임의접속 응답(Random Access Response) 메시지인지 여부를 판정하는 단계; 및 상기 특정 메시지를 통한 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하며 상기 수신 메시지가 임의접속 응답 메시지인 경우, 상기 특정 메시지를 통해 수신된 상향링크 승인 신호를 이용하여 상기 메시지3 버퍼에 저장된 데이터를 상기 기지국에 전송하

는 단계를 포함하는 데이터 전송 방법을 제안한다.

<30> 이때, 상기 특정 메시지를 통한 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하지 않거나, 상기 수신 메시지가 임의접속 응답 메시지가 아닌 경우에는, 상기 특정 메시지를 통해 수신된 상향링크 승인 신호에 대응하여 새로운 데이터를 상기 기지국에 전송할 수 있다.

<31> 또한, 상기 특정 메시지를 통해 수신된 상향링크 승인 신호는 물리하향링크제어채널(PDCCH: Physical Downlink Control Channel)을 통해 수신되는 상향링크 승인 신호일 수 있으며, 이 경우 상기 사용자 기기는 상기 물리하향링크제어채널을 통해 수신된 상향링크 승인 신호에 대응하여 새로운 데이터를 전송할 수 있다.

<32> 또한, 상기 특정 메시지를 통해 수신된 상향링크 승인 신호는 물리하향링크공유채널(PDSCH: Physical Downlink Shared Channel)을 통해 수신되는 임의접속응답 메시지를 통해 수신되는 상향링크 승인 신호일 수 있으며, 이 경우 상기 사용자 기기는 상기 임의접속 응답 메시지를 통한 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하는 경우, 상기 임의접속 응답 메시지를 통해 수신된 상향링크 승인 신호를 이용하여 상기 메시지 3 버퍼에 저장된 데이터를 전송할 수 있다.

<33> 여기서, 상기 메시지3 버퍼에 저장된 데이터는 상기 사용자 기기 식별자를 포함하는 MAC PDU(Medium Access Control Protocol Data Unit)일 수 있으며, 상기 사용자 기기가 버퍼 상태 보고(BSR: Buffer Status Report)를 위해 임의접속 과정을 개시한 경우에 상기 메시지3 버퍼에 저장된 데이터는 상기 버퍼 상태 보고 정보

를 더 포함할 수 있다.

<34> 한편, 상술한 바와 같은 과제를 해결하기 위한 본 발명의 다른 일 측면에서는 기지국으로부터 특정 메시지를 통해 상향링크 승인(UL Grant) 신호를 수신하는 수신 모듈; 상기 특정 메시지를 통해 수신된 상향링크 승인 신호를 이용하여 상기 기지국에 데이터를 전송하는 전송 모듈; 임의접속 과정에서 전송되는 상향링크 데이터를 저장하는 메시지3 버퍼(Msg3 Buffer); 및 상기 수신 모듈이 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하는지 여부, 및 상기 특정 메시지가 임의접속 응답(Random Access Response) 메시지인지 여부를 판정하여, 상기 수신 모듈이 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하며 상기 특정 메시지가 임의접속 응답 메시지인 경우, 상기 메시지3 버퍼에 저장된 데이터를 획득하여, 상기 수신 모듈이 상기 특정 메시지를 통해 수신한 상향링크 승인 신호를 이용하여 상기 전송 모듈이 상기 메시지3 버퍼에 저장된 데이터를 상기 기지국에 전송하도록 제어하는 HARQ 엔터티를 포함하는 사용자 기기를 제안한다.

<35> 이때, 상기 사용자 기기는 새로운 데이터 전송에 이용되는 다중화 및 조합 엔터티(Multiplexing and Assembly Entity)를 더 포함할 수 있으며, 이 경우 상기 HARQ 엔터티는 상기 수신 모듈이 상기 특정 메시지를 통해 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하지 않거나, 상기 수신 메시지가 임의접속 응답 메시지가 아닌 경우, 상기 다중화 및 조합 엔터티로부터 전송할 새로운 데이터를 획득하여, 상기 수신 모듈이 상기 특정 메시지를 통해 수신한 상향

링크 승인 신호를 이용하여 상기 전송 모듈이 상기 다중화 및 조합 엔터티로부터 획득한 새로운 데이터를 전송하도록 제어할 수 있다.

<36> 또한, 상기 사용자 기기는 하나 이상의 HARQ 프로세스; 및 상기 하나 이상의 HARQ 프로세스 각각에 대응하는 HARQ 버퍼를 더 포함할 수 있으며, 이 경우 상기 HARQ 엔터티는 상기 메시지3 버퍼 또는 상기 다중화 및 조합 엔터티로부터 획득한 데이터를 상기 하나 이상의 HARQ 프로세스 중 특정 HARQ 프로세스에 전달하고, 상기 특정 HARQ 프로세스가 상기 메시지3 버퍼 또는 상기 다중화 및 조합 엔터티로부터 획득한 데이터를 상기 전송 모듈을 통해 전송하도록 제어할 수 있다.

<37> 또한, 상기 특정 HARQ 프로세스가 상기 메시지3 버퍼에 저장된 데이터를 상기 전송 모듈을 통해 전송하는 경우, 상기 메시지3 버퍼에 저장된 데이터를 상기 특정 HARQ 프로세스에 대응하는 특정 HARQ 버퍼에 복제하고, 상기 특정 HARQ 버퍼에 복제된 데이터를 상기 전송 모듈을 통해 전송하도록 제어할 수 있다.

<38> 또한, 상기 수신 모듈이 상기 특정 메시지를 통해 수신한 상향링크 승인 신호는 물리하향링크제어채널(PDCCH: Physical Downlink Control Channel)을 통해 수신되는 상향링크 승인 신호일 수 있으며, 이 경우 상기 HARQ 엔터티는 상기 물리하향링크제어채널을 통해 수신된 상향링크 승인 신호에 대응하여 새로운 데이터를 전송하도록 제어할 수 있다.

<39> 또한, 상기 수신 모듈이 상기 특정 메시지를 통해 수신된 상향링크 승인 신호는 물리하향링크공유채널(PDSCH: Physical Downlink Shared Channel)을 통해 수신되는 임의접속응답 메시지를 통해 수신되는 상향링크 승인 신호일 수 있으며, 상

기 HARQ 엔터티는 상기 수신 모듈이 상기 임의접속 응답 메시지를 통해 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하는 경우, 상기 임의접속 응답 메시지를 통해 수신된 상향링크 승인 신호를 이용하여 상기 메시지 3 버퍼에 저장된 데이터를 전송하도록 제어할 수 있다.

【효과】

<40> 상술한 바와 같은 본 발명의 실시형태들에 따를 경우 상향링크 승인 신호의 수신 형태에 따라 메시지3 버퍼에 저장된 데이터를 혼동 없이 전송할 수 있다.

【발명의 실시를 위한 구체적인 내용】

<41> 이하, 본 발명에 따른 바람직한 실시 형태를 첨부된 도면을 참조하여 상세하게 설명한다. 첨부된 도면과 함께 이하에 개시될 상세한 설명은 본 발명의 예시적인 실시형태를 설명하고자 하는 것이며, 본 발명이 실시될 수 있는 유일한 실시형태를 나타내고자 하는 것이 아니다. 이하의 상세한 설명은 본 발명의 완전한 이해를 제공하기 위해서 구체적 세부사항을 포함한다. 그러나, 당업자는 본 발명이 이러한 구체적 세부사항 없이도 실시될 수 있음을 안다. 예를 들어, 이하의 상세한 설명은 이동통신 시스템이 3GPP LTE 시스템인 경우를 가정하여 구체적으로 설명하나, 3GPP LTE의 특유한 사항을 제외하고는 다른 임의의 이동통신 시스템에도 적용 가능하다.

<42> 몇몇 경우, 본 발명의 개념이 모호해지는 것을 피하기 위하여 공지의 구조 및 장치는 생략되거나, 각 구조 및 장치의 핵심기능을 중심으로 한 블록도 형식으

로 도시될 수 있다. 또한, 본 명세서 전체에서 동일한 구성요소에 대해서는 동일한 도면 부호를 사용하여 설명한다.

<43> 아울러, 이하의 설명에 있어서 단말은 UE(User Equipment), MS(Mobile Station) 등 이동 또는 고정형의 사용자단 기기를 통칭하는 것을 가정한다. 또한, 기지국은 Node B, eNode B, Base Station 등 단말과 통신하는 네트워크 단의 임의의 노드를 통칭하는 것을 가정한다.

<44> 상술한 바와 같이 이하의 설명에서는 상향링크 승인 신호의 수신 형태에 따라 메시지3 버퍼에 저장된 데이터를 전송할 때 발생할 수 있는 문제점에 대해 구체적으로 고찰해보고 이를 해결하기 위한 방법을 살펴본다. 이를 위해 먼저 상술한 임의접속 과정 및 HARQ 기법을 이용한 신호 송수신에 대해 각각 구체적으로 살펴본다.

<45> 도 4는 비 경쟁 기반 임의접속 과정에서의 단말과 기지국의 동작 과정을 나타낸다.

<46> (1) 임의접속 프리앰블 할당

<47> 상술한 바와 같이, 비 경쟁 기반 임의접속 과정은 (1) 핸드오버 과정의 경우, 및 (2) 기지국의 명령에 의해 요청되는 경우에서 수행될 수 있다. 물론, 상기 두 경우에도 경쟁 기반 임의접속 과정이 수행될 수도 있다.

<48> 먼저, 비 경쟁 기반 임의접속 과정을 위해서는 충돌의 가능성이 없는 지정된 임의접속 프리앰블을 기지국으로부터 수신 받는 것이 중요하다. 상기 임의접속 프

리앰블을 지시받는 방법으로는 핸드오버 명령을 통한 방법 및 PDCCH 명령을 통한 방법이 있다. 이를 통해 단말은 임의접속 프리엠블을 할당받는다(S401).

<49> (2) 제 1 메시지 전송

<50> 단말은 상술한 바와 같이 자신에게만 지정된 임의접속 프리앰블을 기지국으로 할당 받은 후에, 상기 프리앰블을 기지국으로 전송한다(S402).

<51> (3) 제 2 메시지 수신

<52> 단말은 상기 단계 S402에서와 같이 임의접속 프리앰블을 전송 후에, 기지국이 시스템 정보 또는 핸드오버 명령을 통해 지시된 임의접속 응답 수신 윈도우 내에서 자신의 임의접속 응답의 수신을 시도한다(S403). 좀더 자세하게, 임의접속 응답 정보는 MAC PDU(MAC Packet Data Unit)의 형식으로 전송될 수 있으며, 상기 MAC PDU는 PDSCH(Physical Downlink Shared CHaneel)을 통해 전달될 수 있다. 또한 상기 PDSCH로 전달되는 정보를 단말이 적절하게 수신하기 위해 단말은 PDCCH(Physical Downlink Control CHaneel)를 모니터링하는 것이 바람직하다. 즉, PDCCH에는 상기 PDSCH를 수신해야 하는 단말의 정보와, 상기 PDSCH의 무선자원의 주파수 그리고 시간 정보, 그리고 상기 PDSCH의 전송 형식 등이 포함되어 있는 것이 바람직하다. 일단 단말이 자신에게 전송되는 PDCCH의 수신에 성공하면, 상기 PDCCH의 정보들에 따라 PDSCH로 전송되는 임의접속 응답을 적절히 수신할 수 있다. 그리고 상기 임의접속 응답에는 랜덤 액세스 프리앰블 구별자(ID; 예를 들어, RA-RNTI(Random Access Preamble identifier)), 상향링크 무선자원을 알려주는 상향링크 승인 (UL Grant), 임시 셀 식별자 (Temporary C-RNTI) 그리고 시간 동기 보정

값 (Timing Advance Command: TAC)들이 포함될 수 있다.

<53> 상술한 바와 같이 임의접속 응답에서 임의접속 프리앰블 구분자가 필요한 이유는, 하나의 임의접속 응답에는 하나 이상의 단말들을 위한 임의접속 응답 정보가 포함될 수 있기 때문에, 상기 상향링크 승인(UL Grant), 임시 셀 식별자 그리고 TAC가 어느 단말에게 유효한지를 알려주기 위는 것이 필요하기 때문이다. 본 단계에서 단말은 단계 S402에서 자신이 선택한 임의접속 프리앰블과 일치하는 임의접속 프리앰블 식별자는 것을 선택하는 것을 가정한다.

<54> 비 경쟁 기반 임의접속 과정에서는 임의접속 응답 정보를 수신함으로써 임의접속 과정이 정상적으로 수행되었다고 판단하고 임의접속 과정을 종료할 수 있다.

<55> 도 5는 경쟁 기반 임의접속 과정에서 단말과 기지국의 동작 과정을 설명하기 위한 도면이다.

<56> (1) 제 1 메시지 전송

<57> 먼저, 단말은 시스템 정보 또는 핸드오버 명령(Handover Command)을 통해 지시된 임의접속 프리앰블의 집합에서 임의로(randomly) 하나의 임의접속 프리앰블을 선택하고, 상기 임의접속 프리앰블을 전송할 수 있는 PRACH(Physical RACH) 자원을 선택하여 전송할 수 있다(S501).

<58> (2) 제 2 메시지 수신

<59> 임의접속 응답 정보를 수신하는 방법은 상술한 비 경쟁 기반 임의접속 과정에서와 유사하다. 즉, 단말은 상기 단계 S501에서와 같이 임의접속 프리앰블을 전

송 후에, 기지국이 시스템 정보 또는 핸드오버 명령을 통해 지시된 임의접속 응답 수신 윈도우 내에서 자신의 임의접속 응답의 수신을 시도하며, 대응되는 임의접속 식별자 정보를 통해 PDSCH를 수신하게 된다(S502). 이를 통해 상향링크 승인 (UL Grant), 임시 셀 식별자 (Temporary C-RNTI) 및 시간 동기 보정 값 (Timing Advance Command: TAC) 등을 수신할 수 있다.

<60> (3) 제 3 메시지 전송

<61> 단말이 자신에게 유효한 임의접속 응답을 수신한 경우에는, 상기 임의접속 응답에 포함된 정보들을 각각 처리한다. 즉, 단말은 TAC을 적용시키고, 임시 셀 식별자를 저장한다. 또한 유효한 임의접속 응답 수신에 대응하여 전송할 데이터를 메시지3 버퍼에 저장할 수 있다. 이와 같은 메시지3 버퍼에 데이터를 저장하고, 이를 전송하는 과정에 대해서는 이하 도 7에서 구체적인 예를 들어 후술하기로 한다.

<62> 한편, 단말은 수신된 UL 승인을 이용하여, 데이터(즉, 제 3 메시지)를 기지국으로 전송한다(S503). 제 3 메시지는 단말의 식별자가 포함되어야 한다. 경쟁 기반 랜덤 액세스 과정에서는 기지국에서 어떠한 단말들이 상기 임의접속 과정을 수행하는지 판단할 수 없는데, 차후에 충돌해결을 하기 위해서는 단말을 식별해야 하기 때문이다.

<63> 단말의 식별자를 포함시키는 방법으로는 두 가지 방법이 논의되었다. 첫 번째 방법은 단말이 상기 임의접속 과정 이전에 이미 해당 셀에서 할당 받은 유효한 셀 식별자를 가지고 있었다면, 단말은 상기 UL 승인에 대응하는 상향링크 전송 신호를 통해 자신의 셀 식별자를 전송한다. 반면에, 만약 임의접속 과정 이전에 유효

한 셀 식별자를 할당 받지 못하였다면, 단말은 자신의 고유 식별자(예를 들면, S-TMSI 또는 임의 ID(Random Id))를 포함하여 전송한다. 일반적으로 상기의 고유 식별자는 셀 식별자보다 길다. 단말은 상기 UL 승인에 대응하는 데이터를 전송하였다면, 충돌 해결을 위한 타이머 (contention resolution timer; 이하 "CR 타이머")를 개시한다.

<64> (4) 제 4 메시지 수신

<65> 단말이 임의접속 응답에 포함된 UL 승인를 통해 자신의 식별자를 포함한 데이터를 전송 한 이후, 충돌 해결을 위해 기지국의 지시를 기다린다. 즉, 특정 메시지를 수신하기 위해 PDCCH의 수신을 시도한다(S504). 상기 PDCCH를 수신하는 방법에 있어서도 두 가지 방법이 논의되었다. 앞에서 언급한 바와 같이 상기 UL 승인에 대응하여 전송된 제 3 메시지가 자신의 식별자가 셀 식별자를 이용하여 전송된 경우, 자신의 셀 식별자를 이용하여 PDCCH의 수신을 시도하고, 상기 식별자가 고유 식별자인 경우에는, 임의접속 응답에 포함된 임시 셀 식별자를 이용하여 PDCCH의 수신을 시도할 수 있다. 그 후, 전자의 경우, 만약 상기 충돌 해결 타이머가 만료되기 전에 자신의 셀 식별자를 통해 PDCCH를 수신한 경우에, 단말은 정상적으로 임의접속 과정이 수행되었다고 판단하고, 임의접속 과정을 종료한다. 후자의 경우에는 상기 충돌 해결 타이머가 만료되기 전에 임시 셀 식별자를 통해 PDCCH를 수신하였다면, 상기 PDCCH가 지시하는 PDSCH이 전달하는 데이터를 확인한다. 만약 상기 데이터의 내용에 자신의 고유 식별자가 포함되어 있다면, 단말은 정상적으로 임의접속 과정이 수행되었다고 판단하고, 임의접속 과정을 종료한다.

<66> 한편, 이하에서는 LTE 시스템을 예를 들어 MAC 계층의 HARQ 동작을 상향링크 데이터 전송의 경우를 중심으로 설명한다.

<67> 도 6은 상향링크 HARQ 동작 방식을 설명하기 위한 도면이다.

<68> 단말은 HARQ 방식으로 데이터를 기지국에 전송하기 위해서, 먼저 기지국으로부터 PDCCH를 통해서 UL 승인 정보 또는 상향링크 스케줄링 정보(Uplink Scheduling Information; 이하 "UL 스케줄링 정보") 을 수신할 수 있다(단계 S601). 일반적으로 UL 스케줄링 정보에는 단말 식별자(예를 들어, C-RNTI 또는 Semi-Persistent Scheduling C-RNTI), 할당된 무선자원의 위치(Resource block assignment), 전송 파라미터(Modulation, Coding scheme 및 redundancy version), NDI 등이 포함할 수 있다. LTE 시스템의 경우 단말은 8개의 HARQ 프로세스들을 가지고 있으며, 상기 HARQ 프로세스들은 TTI(Transmission Time Interval)와 동기적(Synchronous)으로 작동한다. 즉, TTI 1에서는 HARQ 프로세스 1번, TTI 2에서는 HARQ 프로세스 2번, ..., TTI 8에서는 HARQ 프로세스 8번이 사용된 후, 다시 TTI 9에서는 HARQ 프로세스 1번, TTI 10에서는 HARQ 프로세스 2번이 사용되는 방식으로 각 데이터 수신 시점에 따라 특정 HARQ 프로세스가 순차적으로 할당될 수 있다.

<69> 또한, HARQ 프로세스들은 상술한 바와 같이 동기적으로 할당되기 때문에, 특정 데이터의 초기 전송을 위한 PDCCH를 수신받은 TTI와 연결된 HARQ 프로세스가 상기 데이터의 전송에 이용된다. 예를 들면, 단말이 N번째 TTI에서 UL 스케줄링 정보를 포함한 PDCCH를 수신하였다고 가정하면, 단말은 N+4번째 TTI에서 데이터를 전송한다. 다시 말해, N+4번째 TTI에서 할당되는 HARQ 프로세스 K번이 상기 데이터 전

송에 이용되는 것이다. 즉, 단말은 매 TTI마다 PDCCH를 모니터링(Monitoring)해서 자신에게 오는 UL 스케줄링 정보를 확인한 후, 상기 UL 스케줄링 정보에 따라 단말은 데이터를 PUSCH 를 통해 기지국으로 전송할 수 있다(단계 S602).

<70> 기지국은 단말로부터 데이터를 수신하면 이를 소프트 버퍼(soft buffer)에 저장한 후 상기 데이터의 디코딩을 시도한다. 기지국은 이 데이터의 디코딩에 성공하면 ACK 신호를, 실패하면 NACK 신호를 단말에 전송한다. 도 6에서는 기지국이 데이터 디코딩에 실패하여 NACK 신호를 PHICH (Physical HARQ Indicator Channel)을 통해 전송하는 예를 도시하고 있다(단계 S603).

<71> 단말은 기지국으로부터 ACK 신호를 수신하면 기지국으로의 데이터 전송이 성공했음을 감지하고 다음 데이터를 전송한다. 다만, 도 6의 예에서와 같이 단말이 기지국으로부터 NACK 신호를 수신하면, 기지국으로의 데이터 전송이 실패했음을 감지하고 동일 데이터를 동일한 형식 또는 새로운 형식으로 재전송할 수 있다(단계 S604).

<72> 단말의 HARQ 재전송은 비적응적(Non-adaptive) 방식으로 동작할 수 있다. 즉, 특정 데이터의 첫번째 전송(Initial transmission)은 UL 스케줄링 정보를 포함하는 PDCCH를 수신해야만 가능하지만, 재전송은 PDCCH를 수신하지 않아도 가능하다. 상기 비 적응적 방식의 HARQ 재전송은 PDCCH 수신 없이도 다음번 해당 HARQ 프로세스가 할당된 TTI에서 첫번째 전송과 동일한 UL 스케줄링 정보를 이용하여, 상기 데이터를 재전송한다.

<73> 한편, 단말의 HARQ 재전송은 적응적(Adaptive) 방식으로 동작할 수도 있다.

이 경우 재전송에 대한 전송 파라미터를 PDCCH를 통해 수신하는데, 상기 PDCCH에 포함된 UL 스케줄링 정보는 채널 상황에 따라 초기 전송과는 다를 수 있다. 예를 들면, 채널 상황이 초기 전송 때보다 좋은 상황이라면 높은 비트 레이트(Bit Rate)로의 전송을 지시하고, 반대로 채널 상황이 좋지 않은 경우에는 초기 전송 때보다 낮은 비트 레이트로의 전송을 지시할 수 있다.

<74> 만약 단말이 PDCCH를 통해 UL 스케줄링 정보를 수신한 경우, 이번에 전송해야 하는 데이터가 초기전송(initial transmission)되는 데이터인지 아니면 이전 데이터를 재전송(retransmission)해야 하는지는 PDCCH 안에 있는 NDI 필드를 보고 알 수 있다. 상기 NDI 필드는 상술한 바와 같이 새로운 데이터가 전송될 때마다 0 -> 1 -> 0 -> 1 -> ...과 같은 방식으로 토글링되며, 재전송에 대해서는 초기전송과 같은 값을 갖는다. 따라서, 단말은 NDI 필드가 이전에 전송된 값과 같은지를 비교하여 데이터의 재전송 여부를 알 수 있다.

<75> 단말은 HARQ 방식으로 데이터를 한 번 전송할 때마다 전송 횟수(CURRENT_TX_NB)를 카운트하고, RRC 계층에서 설정한 최대 전송 횟수에 CURRENT_TX_NB가 도달하게 되면 HARQ 버퍼에 있는 상기 데이터를 지운다.

<76> 한편, 기지국은 재전송된 데이터를 수신하면, 이를 이전에 디코딩에 실패한 채로 소프트 버퍼에 저장되어 있는 데이터와 다양한 방식으로 결합하여 다시 디코딩을 시도하고, 디코딩에 성공했을 경우 ACK 신호를, 실패했을 경우 NACK 신호를 단말에 전송한다. 기지국은 데이터의 디코딩에 성공할 때까지 NACK 신호를 보내고 재전송을 받는 과정을 반복한다. 도 6의 예에서 기지국은 단계 S604에서 재전송된

데이터를 이전에 수신되어 저장된 데이터와 결합을 통해 디코딩을 시도한다. 기지국이 수신 데이터 디코딩에 성공한 경우 ACK 신호를 PHICH를 통해 단말에게 전송한다(단계 S605). 또한 기지국은 단말에게 다음 데이터 전송을 위한 UL 스케줄링 정보를 PDCCH를 통해 전송할 수 있으며, 이 UL 스케줄링 정보가 적응형 재전송을 위해 이용되는 것이 아니라 새로운 데이터 전송을 위해 이용하는 것임을 알려 주기 위해 NDI를 1로 토글링하여 전송할 수 있다(단계 S606). 이에 따라 단말은 기지국에 새로운 데이터를 수신된 UL 스케줄링 정보에 대응하는 PUSCH를 통해 전송할 수 있다(단계 S607).

<77> 한편, 상술한 바와 같이 임의접속 동작은 상술한 여러 경우들에 트리거(Trigger)될 수 있지만, 단말이 상향링크의 무선자원을 요청하는 경우를 위주로 설명하면 다음과 같다.

<78> 도 7은 임의접속 과정에서 제 3 메시지를 전송하는 방법을 상향링크 무선자원을 요청하는 경우의 예를 들어 설명하기 위한 도면이다.

<79> 단말은 단말의 전송 버퍼(601), 예를 들어, RLC 버퍼 및 PDCP 버퍼에 새로운 데이터가 발생하면 일반적으로 이 데이터 발생에 대한 정보를 기지국에 알려야 한다. 좀더 정확히 설명하면, 단말의 전송 버퍼에 저장된 데이터보다 우선순위가 높은 데이터가 발생하는 경우에 이 사실을 기지국으로 알리는 것이다.

<80> 이는 발생된 데이터의 전송을 위해 기지국으로 무선자원을 요청하는 것을 의미하며, 기지국은 상기 정보에 따라 단말에게 적절한 무선자원을 할당할 수 있다. 상술한 바와 같은 데이터 발생에 대한 정보는 버퍼 상태 보고 (Buffer Status

Report: 이하 "BSR"이라 칭함)라고 한다. 또한, 이하에서는 상술한 바와 같이 BSR 전송이 요구되는 것을 BSR 전송이 트리거되었다고 표현하기로 한다(S6100). 이와 같이 BSR 전송이 트리거 된 경우에, 단말은 BSR을 기지국으로 전송을 해야 하지만, 만약 이 BSR을 전송하기 위한 무선자원이 없는 경우에, 단말은 임의접속 동작을 트리거하여, 무선자원요청을 시도할 수 있다(S6200).

<81> 상술한 바와 같이 기지국에 무선 자원 요청을 위한 임의접속 동작이 트리거링된 경우, 단말은 도 4 및 도 5와 관련하여 상술한 바와 같이 임의접속 프리앰블을 기지국으로 전송하고, 이에 대한 임의접속 응답 메시지를 수신할 수 있다. 또한, 임의접속 응답 메시지에 포함된 상향링크 승인 신호를 통해 단말의 MAC 계층에서 BSR 및 단말의 식별자를 포함한 제 3 메시지(즉, MAC PDU(Medium Access Control Protocol Data Unit)를 생성하여 메시지3 버퍼(Msg3 buffer; 602)에 저장할 수 있다. 그리고 상기 상향링크 승인 정보가 지시하는 HARQ 프로세스의 버퍼(603)에 다시 메시지3 버퍼(602)에 저장된 제 3 메시지를 복사하여 저장할 수 있다. 도 7에서는 제 3 메시지 전송에 HARQ 프로세스 A가 이용되는 경우를 예를 들어 도시하고 있으며 이에 따라 HARQ 프로세스A에 대응하는 HARQ 버퍼(603)에 제 3 메시지가 복사되는 것을 도시하고 있다. 이와 같이 HARQ 버퍼(603)에 저장된 제 3 메시지는 물리상향링크공유채널(PUSCH)를 통해 기지국에 전송될 수 있다.

<82> 한편, 단말이 경쟁에서 실패하여 임의접속 재시도를 수행해야 하는 경우, 단말은 다시 임의접속 프리앰블을 기지국으로 전송하고, 임의접속 응답을 수신할 수 있다(S6300). 하지만, 재시도되는 임의접속 과정인 경우에는, 단말은 새롭게 제 3

메시지를 생성하지 않고, 기존에 메시지3 버퍼(602)에 저장되어 있는 제 3 메시지를 다시 사용하게 된다. 즉, 단말은 재시도된 임의접속 과정에서 수신된 임의접속 응답에 포함된 상향링크 승인 신호에 따라, 메시지3 버퍼(602)에 저장된 제 3 메시지에 해당하는 MAC PDU를 해당 HARQ 버퍼(604)에 복사하여 저장하고, 이를 전송할 수 있다. 도 7에서는 재시도된 임의접속 과정이 HARQ 프로세스 B에 의해 수행되는 것을 도시하고 있으며, 이에 따라 메시지3 버퍼(602)에 저장된 데이터는 HARQ 버퍼 B에 복사되어 재전송될 수 있다.

<83> 상술한 바와 같이 단말은 임의접속 동작이 진행되는 과정에서 임의접속 응답이 수신하면 메시지3 버퍼에 저장된 제 3 메시지를 HARQ 버퍼에 저장하고 이를 전송한다. 다만, 상술한 바와 같이 현재 LTE 시스템의 HARQ 동작에 대한 표준에서는 임의의 상향링크 승인 신호 수신에 의해 메시지3 버퍼에 저장된 데이터의 전송이 트리거링되는 것으로 규정하고 있다. 이에 따라 CR 타이머가 잘못 구동되어 잘못된 충돌 해결 과정이 이루어질 수 있다. 이러한 잘못된 충돌 해결 과정으로 인해 상술한 바와 같은 BSR이 정상적으로 전송되지 않아 단말이 교착상태에 빠질 수 있는 문제점이 발생하게 된다. 이러한 문제에 대해 아래 도 8을 참조하여 좀 더 구체적으로 설명하면 다음과 같다.

<84> 도 8은 임의접속응답 메시지 이외의 메시지를 통해 수신되는 상향링크 승인 신호에 의해 메시지3 버퍼에 저장된 데이터가 전송되는 경우의 문제를 설명하기 위한 도면이다.

<85> 도 7과 관련하여 상술한 바와 같이, 단말은 우선순위가 높은 데이터가 발생

함에 따라 BSR을 트리거하고, 이 BSR을 기지국으로 전송하기 위해 임의접속 프리앰블을 전송하고(S801), 이에 대해 임의접속 응답을 수신할 수 있다(S802).

<86> 그 후, 단말은 단계 S802에서 수신된 임의접속 응답 메시지에 포함된 상향링크 승인 정보를 통해 BSR이 포함된 제 3 메시지를 전송할 수 있다(S803). 이와 같이 제 3 메시지가 전송되는 경우 도 5와 관련하여 상술한 바와 같이 CR 타이머를 작동하게 된다.

<87> 상기 CR 타이머가 만료될 때까지 임의접속 과정을 완료하지 못한 경우, 단말은 임의접속과정이 성공적으로 완료되지 못한 것으로 판정하게 된다(S804). 이 경우 단말은 다시 임의접속 과정을 임의접속 프리엠블 전송에서부터 재개하는 것을 시도할 수 있다.

<88> 다만, 이 시점에서 기지국은 아직 단말이 임의접속 과정을 수행하는지 모르기 때문에, 임의접속 과정과는 별개의 상향링크 승인 신호를 단말의 식별자로 마스크(Mask)된 PDCCH를 통해 전송할 수 있다(S805). 이러한 경우, 현재 LTE 시스템 표준에 따른다면 단말은 단계 S805에서 PDCCH를 통해 수신된 상향링크 승인 신호에 따라 메시지3 버퍼 안에 저장되어 있는 제 3 메시지를 전송하게 된다(S806). 또한 제 3 메시지를 전송함에 따라 CR 타이머가 다시 개시되게 된다. 즉, 단말은 단계 S806에서 임의접속 프리앰블 전송 및 임의접속 응답 메시지 수신 절차를 수행하지 않았지만, CR 타이머를 다시 개시하게 되는 것이다.

<89> 단말이 단계 S807에서 제 3 메시지를 전송함에 따라 CR 타이머가 개시되었으나, 기지국의 입장에서는 임의접속 프리엠블 수신 및 임의접속 응답 메시지 전송의

과정을 거치지 않았기 때문에 여전히 단말에서 임의접속 절차가 진행 중이라는 사실을 알지 못할 수 있다. 이에 따라 만약 또 다른 상향링크 승인 신호가 단말의 식별자를 포함한 PDCCH로 수신되는 경우(S807), 단말은 진행중인 임의접속 과정이 성공적으로 완료되었다고 판단하게 된다. 이에 따라 단말은 진행 중인 CR 타이머를 종료할 수 있다(S808).

<90> 이와 같은 상황에서 단계 S806에서 기지국에 전송된 제 3 메시지가 기지국에서 성공적으로 수신되지 않은 경우(A), 단말은 더 이상 BSR이 포함된 제3 메시지를 전송하지 못하게 된다. 따라서, 만약 추가적인 데이터 발생이 없는 경우에는, 단말이 전송 버퍼에 발생한 데이터를 기지국으로 전송하지 못하는 교착상태가 발생할 수 있다.

<91> 상술한 바와 같은 문제점을 정리하면 다음과 같다.

<92> 현재 LTE 시스템 표준에 따르면, 메시지3 버퍼에 데이터가 저장되어 있는 상태에서 상향링크 승인 신호가 수신되는 경우, 단말은 메시지3 버퍼에 저장된 데이터를 기지국에 전송하게 된다. 이때 기지국이 전송한 상향링크 승인 신호는 메시지 3 버퍼에 저장된 데이터 전송을 위한 것이 아니고, 별도의 데이터 전송을 위한 경우가 존재할 수 있으며, 이에 따라 잘못된 CR 타이머가 개시될 수 있다.

<93> 또한, 기지국이 단말에서 잘못된 CR 타이머가 개시되고 있음을 알지 못하고 상기 도 8과 관련하여 상술한 바와 같이 다른 데이터 전송을 위한 상향링크 승인 신호를 전송하는 경우, 제 3 메시지를 통해 전송하고자 하는 정보(예를 들어, BSR)이 유실되는 문제가 발생할 수 있다.

<94> 또한, 단말이 진행 중인 임의접속 과정에 대해서도 올바른 충돌 해결 절차 종료를 위한 제 4 메시지의 수신이 불가능하게 될 수 있다.

<95> 상술한 바와 같은 문제를 해결하기 위한 본 발명의 바람직한 일 실시형태에서는 메시지3 버퍼에 저장된 데이터를 전송하는 경우를 기지국으로부터 상향링크 승인 신호를 수신하는 모든 경우가 아니라, 기지국으로부터 수신된 상향링크 승인 신호가 임의접속 응답 메시지를 통해 수신된 경우로 한정하는 것을 제안한다. 만일, 메시지 3 버퍼에 데이터가 저장되어 있는 상태에서 임의접속 응답 메시지가 아니라 단말의 식별자(C-RNTI(Cell Radio Network Temporary Identifier) 또는 SPS-RNTI (Semi Persistent Scheduling Radio Network Temporary Identifier))에 의해 마스킹된 PDCCH로 상향링크 승인 신호가 수신된 경우에는 메시지3 버퍼에 저장된 데이터가 아니라 새로운 데이터(MAC PDU)를 획득하여 기지국으로 전송하는 방법을 제안한다.

<96> 도 9는 본 발명의 바람직한 일 실시형태에 따라 단말이 상향링크 데이터를 전송하는 방법을 설명하기 위한 순서도이다. 구체적으로, 도 9는 매 TTI(Transmission Time Interval)에서, 본 발명의 일 실시형태에 따른 단말의 HARQ 엔터티의 동작을 설명하고 있다.

<97> 먼저, 단말의 HARQ 엔터티는 해당 TTI에 관련된 HARQ 프로세스를 지정할 수 있다(S901). 이와 같이 해당 TTI와 관련된 HARQ 프로세스가 지정된 경우, 단말의 HARQ 엔터티는 해당 TTI에 기지국으로부터 수신된 상향링크 승인 신호가 수신되었는지 여부를 판정할 수 있다(S902). 만일, 해당 TTI에 대해 수신된 상향링크 승인

신호에 대한 정보가 없는 경우 단말은 해당 HARQ 프로세스에 대응하는 HARQ 버퍼가 비어있는지 여부를 판정하고, 해당 HARQ 버퍼에 데이터가 있는 경우 도 6과 관련하여 상술한 바와 같이 비 적응형 재전송을 수행할 수 있다(S903).

<98> 한편, 해당 TTI에 대해 기지국으로부터 수신된 상향링크 승인 신호가 존재하는 경우, (1) 이 상향링크 승인 신호가 임시 셀 식별자(Temporary C-RNTI)에 의해 지칭되는 PDCCH로 수신되지 않았고, NDI가 해당 HARQ 프로세스의 이전 전송시 값에 비해 토글링되었는지 여부, (2) 이전 NDI값이 없어, 금번 전송이 해당 HARQ 프로세스의 최초 전송인지 여부, (3) 상기 상향링크 승인 신호가 셀 식별자(C-RNTI)에 대한 PDCCH로 수신되고, 해당 HARQ 프로세스의 HARQ 버퍼가 비어있는지 여부, 또는 (4) 상기 상향링크 승인 신호가 임의접속 응답 메시지를 통해 수신되었는지 여부를 판정할 수 있다(S904). 단계 S904에서 상술한 (1) 내지 (4)의 조건 중 어느 하나 이상을 만족하는 경우(A), 단계 S906으로 진행한다. 한편, 단계 S904에서 상술한 (1) 내지 (4)의 조건 중 어느 하나도 만족하지 않는 경우(B), 단계 S905로 진행하여 수신된 상향링크 승인 신호를 이용하여 적응형 재전송을 수행할 수 있다(S905).

<99> 한편, 단계 S906에서 단말은 메시지3 버퍼에 데이터가 존재하는지 여부를 판정한다(S906). 추가적으로 단말은 메시지3 버퍼에 데이터가 존재하는 경우에도, 수신된 상향링크 승인 신호가 임의접속 응답 메시지를 통해 수신된 것인지 여부를 판정한다(S907). 즉, 본 실시형태에 따른 단말은 상향링크 승인 신호 수신 시 메시지3 버퍼에 데이터가 존재하고, 이 상향링크 승인 신호가 임의접속 응답 메시지를 통해 수신된 경우에 한하여 메시지3 버퍼에 저장된 데이터를 전송하는 것을 제안한다

(S908). 만일, 상향링크 승인 신호 수신 시 메시지3 버퍼에 저장된 데이터가 없거나, 수신된 상향링크 승인 신호가 임의접속 응답 메시지를 통해 수신되지 않은 경우 단말은 기지국이 메시지3 버퍼에 저장된 데이터의 전송이 아니라 새로운 데이터의 전송을 요청하는 것으로 판정하여 새로운 데이터를 전송하는 절차를 수행하게 된다(S909). 구체적으로 단말의 HARQ 엔터티는 다중화 및 조합 엔터티(Multiplexing and Assembly Entity)로부터 새로운 데이터를 포함하는 MAC PDU를 획득하고, 이를 해당 HARQ 프로세스를 통해 전송하도록 제어할 수 있다.

<100> 이하에서는 도 9와 관련하여 설명한 실시형태에 따라 동작하는 단말이 상기 도 8과 같이 BSR을 전송하는 과정에 적용된 예를 들어 설명한다.

<101> 도 10은 본 발명의 일 실시형태에 따른 단말에서 BSR이 트리거되는 경우, 상향링크 데이터를 전송하는 방법을 설명하기 위한 도면이다.

<102> 상술한 바와 같이 단말의 RLC 및 PDCP 버퍼에 새로운 데이터가 발생할 수 있다. 이때 발생한 새로운 데이터는 RLC 및 PDCP 버퍼에 이미 저장되어 있는 데이터보다 우선순위가 높은 것을 가정한다. 이에 따라 단말은 상기 데이터 발생에 대한 정보를 기지국으로 알리기 위해 BSR 전송을 트리거할 수 있다(단계 1).

<103> 단말은 상술한 BSR 전송 트리거에 따라 BSR을 전송해야 하지만, 특정한 경우 이와 같은 BSR을 전송하기 위한 무선자원이 없는 경우가 있을 수 있다. 이러한 경우 단말은 상기 BSR 전송을 위한 임의접속 동작을 트리거할 수 있다. 본 실시예에서 트리거되는 임의접속 동작은 도 5와 관련하여 상술한 경쟁 기반 임의접속 동작인 것을 가정한다.

<104> 상술한 바와 같은 임의접속 동작의 트리거에 따라 단말은 임의접속 프리엠블을 기지국으로 전송할 수 있다(단계 2).

<105> 기지국은 단계 2에서 단말이 전송한 임의접속 프리엠블을 수신함에 따라 상기 단말에게 임의접속 응답 메시지를 전송할 수 있다(단계 3). 단말은 이 임의접속 응답 메시지를 수신할 수 있다.

<106> 단말은 단계 3에서 수신된 임의접속 응답 메시지에 포함된 상향링크 승인 신호에 따라 BSR과 단말의 식별자 등을 포함한 제 3 메시지를 생성하고, 이 제 3 메시지를 메시지3 버퍼에 저장할 수 있다(단계 4).

<107> 단말은 단계 3에서 수신된 임의접속 응답 메시지에 포함된 상향링크 승인 정보에 따라 HARQ 프로세스를 선택하고, 선택된 HARQ 프로세스의 버퍼에 메시지3 버퍼에 저장된 제 3 메시지를 복사하여 저장할 수 있다. 그 후, 도 6과 관련하여 상술한 상향링크 HARQ 동작에 따라 HARQ 버퍼에 있는 데이터를 기지국으로 전송할 수 있다(단계 5). 또한, 단말은 제 3 메시지의 전송에 따라 CR 타이머를 개시 (또는 재 개시)하게 된다.

<108> 상기 CR 타이머가 만료됨에 따라, 단말은 임의접속 과정을 재시도할 수 있다. 즉, 임의접속 프리엠블과 PRACH(Physical Random Access Channel) 자원을 선택하여 기지국에 전송할 것을 준비할 수 있다. 하지만, CR 타이머가 동작 중이지 않은 상황에서 단말은 단말의 식별자로 마스크된 PDCCH를 통해 기지국으로부터 상향링크 승인 신호를 수신할 수 있다(단계 6).

<109> 단말은 단계 6에서와 같이 PDCCH를 통해 상향링크 승인 신호를 수신한 경우, 메시지3 버퍼에 저장되어 있는 제 3 메시지를 단계 6에서 수신된 상향링크 승인 정보에 따라 전송하는 도 8의 실시예에서의 동작과 달리, 상기 메시지3 버퍼에 저장된 데이터와 다른 새로운 데이터를 단계 6에서 수신된 상향링크 승인 정보에 따라 새로운 MAC PDU로서 생성하게 된다(단계 7). 구체적으로 단말은 단계 6에서 상향링크 승인 신호를 수신하였으나, 이 상향링크 승인 신호가 임의접속응답 메시지를 통해 수신된 것이 아닌 경우, 메시지3 버퍼에 저장된 데이터를 전송하는 것이 아니라 다중화 및 조합(Multiplexing and Assembly) 엔터티로부터 새로운 데이터 전송을 위한 MAC PDU를 획득하여, 이를 대응하는 HARQ 프로세스를 이용하여 전송할 수 있다.

<110> 이와 같이 새로운 MAC PDU를 생성한 후, 본 실시형태에 따른 단말은 단계 6에서 수신된 상향링크 승인 정보에 따라 HARQ 프로세스를 선택하고, 상기 HARQ 프로세스의 버퍼에 단계 7에서 새롭게 만든 MAC PDU를 저장하고, 상향링크 HARQ 동작에 따라 상기 MAC PDU를 기지국으로 전송할 수 있다(단계 8).

<111> 이후 단말은 정상적으로 임의접속 프리엠블의 전송 및 임의접속응답 수신 등을 포함하는 임의접속 과정을 수행하여 메시지3 버퍼에 저장된 BSR을 기지국으로 전송할 수 있다.

<112> 상술한 바와 같은 실시형태에 따를 경우 상술한 바와 같이 기지국이 메시지3 버퍼에 저장된 데이터 전송이 아닌 새로운 데이터 전송을 위해 전송한 상향링크 승인 신호로 인하여 잘못된 CR 타이머가 동작하는 것을 방지할 수 있으며, 이로 인하

여 제 3 메시지가 유실되는 문제도 해결할 수 있다. 아울러, 단말의 임의접속 과정이 기지국과 정상적으로 이루어지도록 할 수 있다.

<113> 상술한 실시형태와 달리 본 발명의 다른 일 실시형태로서 단말의 임의접속 과정 수행 중에 기지국으로부터 단말의 식별자로 마스크된 PDCCH를 통해 상향링크 승인 신호가 수신되는 경우 이를 무시하고 처리하는 방안도 가능하다. 이 경우 단말은 정상적인 임의접속 과정을 통해 제 3 메시지를 기지국에 전달할 수 있고, 기지국은 단말의 임의접속 과정 종료 후 새로운 데이터 전송을 위한 상향링크 승인 신호를 다시 전송할 수 있다.

<114> 이하에서는 상술한 바와 같은 본 발명의 실시형태를 구현하기 위한 단말의 구성에 대해 설명한다.

<115> 도 11은 본 발명의 일 실시형태에 따른 단말 구성을 개략적으로 도시한 도면이다.

<116> 도 11에 도시된 바와 같이 본 실시형태에 따른 단말은 기지국으로부터 특정 메시지를 통해 상향링크 승인(UL Grant) 신호를 수신하기 위한 수신 모듈(Rx Module; 1101), 수신된 상향링크 승인 신호를 이용하여 기지국에 데이터를 전송하기 위한 전송 모듈(Tx Module; 1102), 임의접속 과정에서 전송되는 상향링크 데이터를 저장하는 메시지3 버퍼(Msg3 Buffer; 1103), 및 단말의 상향링크 데이터 전송을 제어하는 HARQ 엔터티(1104)를 포함할 수 있다.

<117> 특히 본 실시형태에 따른 단말의 HARQ 엔터티(1104)는 수신 모듈(1101)이 상

향링크 승인 신호 수신 시 메시지3 버퍼(1103)에 저장된 데이터가 존재하는지 여부 및 수신 모듈(1101)이 상향링크 승인 신호를 임의접속 응답 메시지를 통해 수신하였는지 여부를 판정하는 기능을 수행하는 것을 제안한다. 이에 따라 만일 수신 모듈(1101)이 상향링크 승인 신호 수신 시 메시지3 버퍼(1103)에 저장된 데이터가 존재하며 수신 모듈(1101)이 임의접속 응답 메시지를 통해 상향링크 승인 신호를 수신한 경우에 한하여, 메시지3 버퍼(1103)에 저장된 데이터를 획득하여, 기지국으로 전송하도록 제어하는 것을 제안한다. 만일, 수신 모듈(1101)이 상향링크 승인 신호 수신 시 메시지3 버퍼(1103)에 저장된 데이터가 존재하지 않거나 수신 모듈(1101)이 임의접속 응답 메시지가 아닌 PDCCH를 통해 상향링크 승인 신호를 수신한 경우, 메시지3 버퍼(1103)에 저장된 데이터를 전송하는 것이 아니라 다중화 및 조합 엔터티(1105)로부터 새로운 데이터를 MAC PDU 형태로 획득하여 이를 기지국으로 전송하는 것을 제안한다.

<118> 또한, 상향링크 HARQ 동작을 수행하기 위해 본 실시형태에 따른 단말은 하나 이상의 HARQ 프로세스(1106)와 각 HARQ 프로세스(1106)에 대응하는 HARQ 버퍼(1107)를 포함할 수 있다. 현재 LTE 시스템의 경우 8개의 독립적인 HARQ 프로세스를 이용하는 것을 규정하고 있으나, 본 발명은 이에 한정될 필요는 없다.

<119> 한편, 본 실시형태에 따른 HARQ 엔터티(1104)는 상술한 구성을 이용하여 메시지3 버퍼(1103) 또는 다중화 및 조합 엔터티(1105)로부터 획득한 데이터를 특정 HARQ 프로세스(1106)에 전달하고, 이 특정 HARQ 프로세스(1106)가 메시지3 버퍼(1103) 또는 다중화 및 조합 엔터티(1105)로부터 획득한 데이터를 전송 모듈(110

2)을 통해 전송하도록 제어하도록 설정할 수 있다. 또한, 상술한 바와 같이 특정 HARQ 프로세스(1106)가 상술한 바와 같이 메시지3 버퍼(1103)에 저장된 데이터를 전송 모듈(1102)을 통해 전송하는 경우, 메시지3 버퍼(1103)에 저장된 데이터를 특정 HARQ 프로세스(1106)에 대응하는 특정 HARQ 버퍼(1107)에 복제하고, 이와 같이 특정 HARQ 버퍼(1107)에 복제된 데이터를 전송 모듈(1102)을 통해 전송하도록 제어하도록 설정할 수 있다.

<120> 이때 메시지3 버퍼(1103)에 저장된 데이터는 단말 식별자를 포함하는 MAC PDU이며, 각 임의접속 과정의 목적에 따라 상술한 BSR 등의 정보를 추가적으로 포함할 수 있다.

<121> 도 11에 도시된 바와 같은 단말 구성에서 전송 모듈(1102) 및 수신 모듈(1101)은 물리계층 프로세싱 모듈(1108)로서 구성할 수 있으며, HARQ 엔터티(1104), 다중화 및 조합 엔터티(1105) 및 하나 이상의 HARQ 프로세스(1106)는 MAC 계층 모듈(1109)로서 구성할 수 있으나, 본 발명은 이에 한정될 필요는 없다. 또한, 메시지3 버퍼(1103) 및 각 HARQ 프로세스(1106)에 대응하는 HARQ 버퍼(1107)는 임의의 저장 매체를 이용하여 구현할 수 있다.

<122> 상술한 바와 같이 개시된 본 발명의 바람직한 실시예들에 대한 상세한 설명은 당업자가 본 발명을 구현하고 실시할 수 있도록 제공되었다. 상기에서는 본 발명의 바람직한 실시예들을 참조하여 설명하였지만, 해당 기술 분야의 숙련된 당업자는 하기의 특허 청구의 범위에 기재된 본 발명의 사상 및 영역으로부터 벗어나지 않는 범위 내에서 본 발명을 다양하게 수정 및 변경시킬 수 있음을 이해할 수 있을

것이다. 따라서, 본 발명은 여기에 나타난 실시형태들에 제한되려는 것이 아니라, 여기서 개시된 원리들 및 신규한 특징들과 일치하는 최광의 범위를 부여하려는 것이다.

【산업상이용가능성】

<123> 상술한 바와 같은 신호 송수신 기술 및 이를 위한 단말 구조는 3GPP LTE 시스템에 적용되는 예를 중심으로 설명하였으나, 3GPP LTE 시스템 이외에도 유사한 과정을 가지는 다른 다양한 이동통신 시스템에 적용하는 것이 가능하다.

【특허청구범위】

【청구항 1】

사용자 기기가 상향링크로 데이터를 전송하는 방법에 있어서,

기지국으로부터 특정 메시지를 통해 상향링크 승인(UL Grant) 신호를 수신하는 단계;

상기 특정 메시지를 통한 상향링크 승인 신호 수신 시 메시지3 버퍼(Msg3 Buffer)에 저장된 데이터가 존재하는지 여부를 판정하는 단계;

상기 특정 메시지가 임의접속 응답(Random Access Response) 메시지인지 여부를 판정하는 단계; 및

상기 특정 메시지를 통한 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하며 상기 특정 메시지가 임의접속 응답 메시지인 경우, 상기 특정 메시지를 통해 수신된 상향링크 승인 신호를 이용하여 상기 메시지3 버퍼에 저장된 데이터를 상기 기지국에 전송하는 단계를 포함하는, 데이터 전송 방법.

【청구항 2】

제 1 항에 있어서,

상기 특정 메시지를 통한 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하지 않거나, 또는 상기 수신 메시지가 임의접속 응답 메시지가 아닌 경우, 상기 특정 메시지를 통해 수신된 상향링크 승인 신호에 대응하여 새로운 데이터를 상기 기지국에 전송하는 단계를 추가적으로 포함하는, 데이터 전송

방법.

【청구항 3】

제 2 항에 있어서,

상기 새로운 데이터를 상기 기지국에 전송하는 단계는,

다중화 및 조합 엔터티(Multiplexing and Assembly Entity)로부터 MAC PDU(Medium Access Control Protocol Data Unit)를 획득하는 단계; 및

상기 MAC PDU를 상기 기지국에 전송하는 단계를 포함하는, 데이터 전송 방법.

【청구항 4】

제 1 항에 있어서,

상기 특정 메시지를 통해 수신된 상향링크 승인 신호는 물리하향링크제어채널(PDCCH: Physical Downlink Control Channel)을 통해 수신되는 상향링크 승인 신호이며,

상기 사용자 기기는 상기 물리하향링크제어채널을 통해 수신된 상향링크 승인 신호에 대응하여 새로운 데이터를 전송하는, 데이터 전송 방법.

【청구항 5】

제 1 항에 있어서,

상기 메시지3 버퍼에 저장된 데이터는 상기 사용자 기기 식별자를 포함하는 MAC PDU(Medium Access Control Protocol Data Unit)인, 데이터 전송 방법.

【청구항 6】

제 5 항에 있어서,

상기 사용자 기기가 버퍼 상태 보고(BSR: Buffer Status Report)를 위해 임의접속 과정을 개시한 경우, 상기 메시지3 버퍼에 저장된 데이터는 상기 버퍼 상태 보고 정보를 더 포함하는, 데이터 전송 방법.

【청구항 7】

기지국으로부터 특정 메시지를 통해 상향링크 승인(UL Grant) 신호를 수신하는 수신 모듈;

상기 특정 메시지를 통해 수신된 상향링크 승인 신호를 이용하여 상기 기지국에 데이터를 전송하는 전송 모듈;

임의접속 과정에서 전송되는 상향링크 데이터를 저장하는 메시지3 버퍼(Msg3 Buffer); 및

상기 수신 모듈이 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하는지 여부, 및 상기 특정 메시지가 임의접속 응답(Random Access Response) 메시지인지 여부를 판정하여, 상기 수신 모듈이 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하며 상기 특정 메시지가 임의접속 응답 메시지인 경우, 상기 메시지3 버퍼에 저장된 데이터를 획득하여, 상기 수신 모듈이 상기 특정 메시지를 통해 수신한 상향링크 승인 신호를 이용하여 상기 전송 모듈이 상기 메시지3 버퍼에 저장된 데이터를 상기 기지국에 전송하도록 제어

하는 HARQ 엔터티를 포함하는, 사용자 기기.

【청구항 8】

제 7 항에 있어서,

상기 사용자 기기는 새로운 데이터 전송에 이용되는 다중화 및 조합 엔터티(Multiplexing and Assembly Entity)를 더 포함하며,

상기 HARQ 엔터티는 상기 수신 모듈이 상기 특정 메시지를 통해 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하지 않거나, 상기 수신 메시지가 임의접속 응답 메시지가 아닌 경우, 상기 다중화 및 조합 엔터티로부터 전송할 새로운 데이터를 획득하여, 상기 수신 모듈이 상기 특정 메시지를 통해 수신한 상향링크 승인 신호를 이용하여 상기 전송 모듈이 상기 다중화 및 조합 엔터티로부터 획득한 새로운 데이터를 전송하도록 제어하는, 사용자 기기.

【청구항 9】

제 8 항에 있어서,

상기 사용자 기기는

하나 이상의 HARQ 프로세스; 및

상기 하나 이상의 HARQ 프로세스 각각에 대응하는 HARQ 버퍼를 더 포함하며,

상기 HARQ 엔터티는 상기 메시지3 버퍼 또는 상기 다중화 및 조합 엔터티로부터 획득한 데이터를 상기 하나 이상의 HARQ 프로세스 중 특정 HARQ 프로세스에 전달하고, 상기 특정 HARQ 프로세스가 상기 메시지3 버퍼 또는 상기 다중화 및 조

함 엔터티로부터 획득한 데이터를 상기 전송 모듈을 통해 전송하도록 제어하는, 사용자 기기.

【청구항 10】

제 9 항에 있어서,

상기 특정 HARQ 프로세스가 상기 메시지3 버퍼에 저장된 데이터를 상기 전송 모듈을 통해 전송하는 경우, 상기 메시지3 버퍼에 저장된 데이터를 상기 특정 HARQ 프로세스에 대응하는 특정 HARQ 버퍼에 복제하고, 상기 특정 HARQ 버퍼에 복제된 데이터를 상기 전송 모듈을 통해 전송하도록 제어하는, 사용자 기기.

【청구항 11】

제 7 항에 있어서,

상기 수신 모듈이 상기 특정 메시지를 통해 수신한 상향링크 승인 신호는 물리하향링크제어채널(PDCCH: Physical Downlink Control Channel)을 통해 수신되는 상향링크 승인 신호이며,

상기 HARQ 엔터티는 상기 물리하향링크제어채널을 통해 수신된 상향링크 승인 신호에 대응하여 새로운 데이터를 전송하도록 제어하는, 사용자 기기.

【청구항 12】

제 7 항에 있어서,

상기 수신 모듈이 상기 특정 메시지를 통해 수신된 상향링크 승인 신호는 물리하향링크공유채널(PDSCH: Physical Downlink Shared Channel)을 통해 수신되는

임의접속응답 메시지를 통해 수신되는 상향링크 승인 신호이며,

상기 HARQ 엔터티는 상기 수신 모듈이 상기 임의접속 응답 메시지를 통해 상향링크 승인 신호 수신 시 상기 메시지3 버퍼에 저장된 데이터가 존재하는 경우, 상기 임의접속 응답 메시지를 통해 수신된 상향링크 승인 신호를 이용하여 상기 메시지 3 버퍼에 저장된 데이터를 전송하도록 제어하는, 사용자 기기.

【청구항 13】

제 7 항에 있어서,

상기 메시지3 버퍼에 저장된 데이터는 상기 사용자 기기 식별자를 포함하는 MAC PDU(Medium Access Control Protocol Data Unit)인, 사용자 기기.

【도면의 간단한 설명】

<124> 도 1은 이동통신 시스템의 일례로서 E-UMTS 망구조를 개략적으로 도시한 도면이다.

<125> 도 2 및 도 3은 3GPP 무선접속망 규격을 기반으로 한 단말과 UTRAN 사이의 무선인터페이스 프로토콜의 구조를 나타낸다.

<126> 도 4는 비 경쟁 기반 임의접속 과정에서의 단말과 기지국의 동작 과정을 나타낸다.

<127> 도 5는 경쟁 기반 임의접속 과정에서 단말과 기지국의 동작 과정을 설명하기 위한 도면이다.

<128> 도 6은 상향링크 HARQ 동작 방식을 설명하기 위한 도면이다.

<129> 도 7은 임의접속 과정에서 제 3 메시지를 전송하는 방법을 상향링크 무선자원을 요청하는 경우의 예를 들어 설명하기 위한 도면이다.

<130> 도 8은 임의접속응답 메시지 이외의 메시지를 통해 수신되는 상향링크 승인 신호에 의해 메시지3 버퍼에 저장된 데이터가 전송되는 경우의 문제를 설명하기 위한 도면이다.

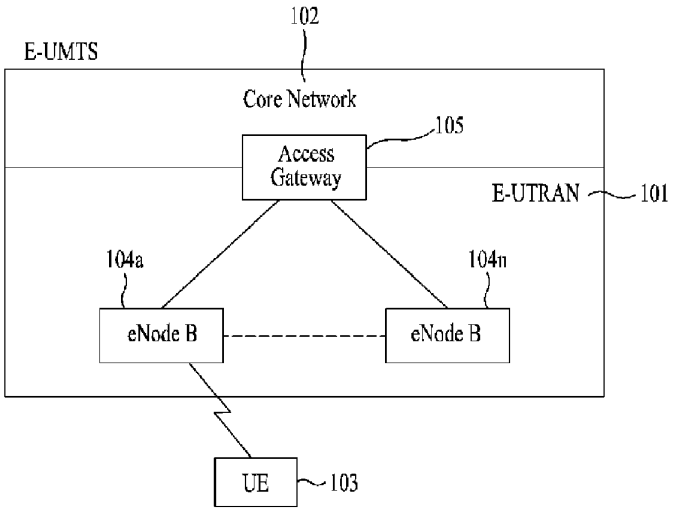
<131> 도 9는 본 발명의 바람직한 일 실시형태에 따라 단말이 상향링크 데이터를 전송하는 방법을 설명하기 위한 순서도이다.

<132> 도 10은 본 발명의 일 실시형태에 따른 단말에서 BSR이 트리거되는 경우, 상향링크 데이터를 전송하는 방법을 설명하기 위한 도면이다.

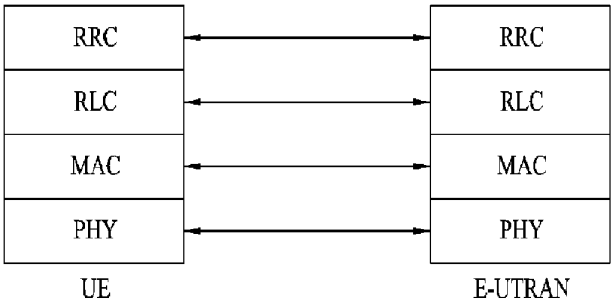
<133> 도 11은 본 발명의 일 실시형태에 따른 단말 구성을 개략적으로 도시한 도면이다.

【도면】

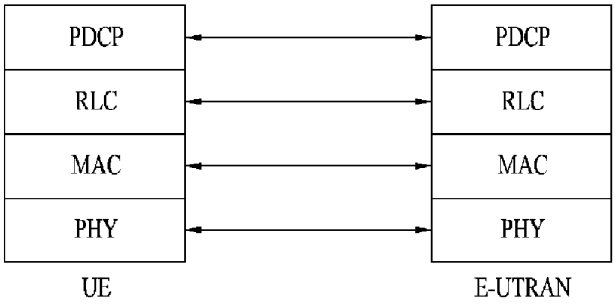
【도 1】


102
E-UMTS
Core Network
105
Access Gateway
E-UTRAN
101
104a
104n
eNode B
eNode B
UE
103

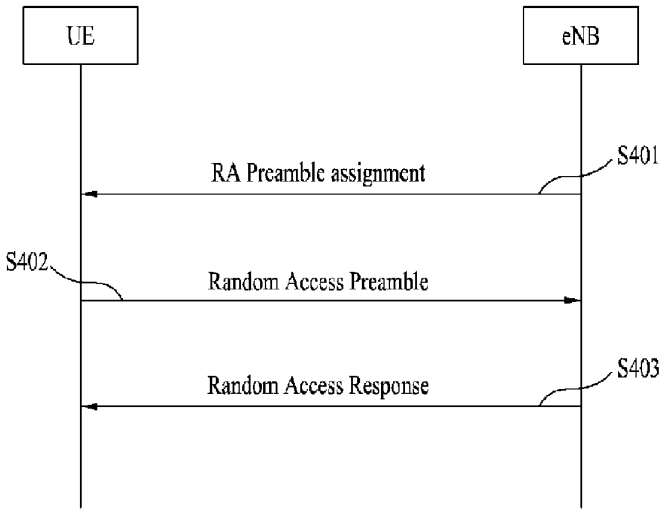
【도 2】


RRC
RLC
MAC
PHY
UE
RRC
RLC
MAC
PHY
E-UTRAN

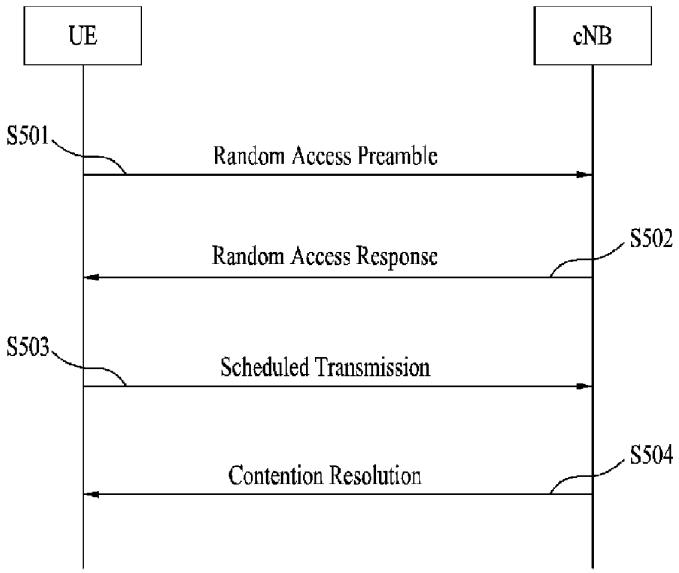
【도 3】


PDCP
RLC
MAC
PHY
UE
PDCP
RLC
MAC
PHY
E-UTRAN

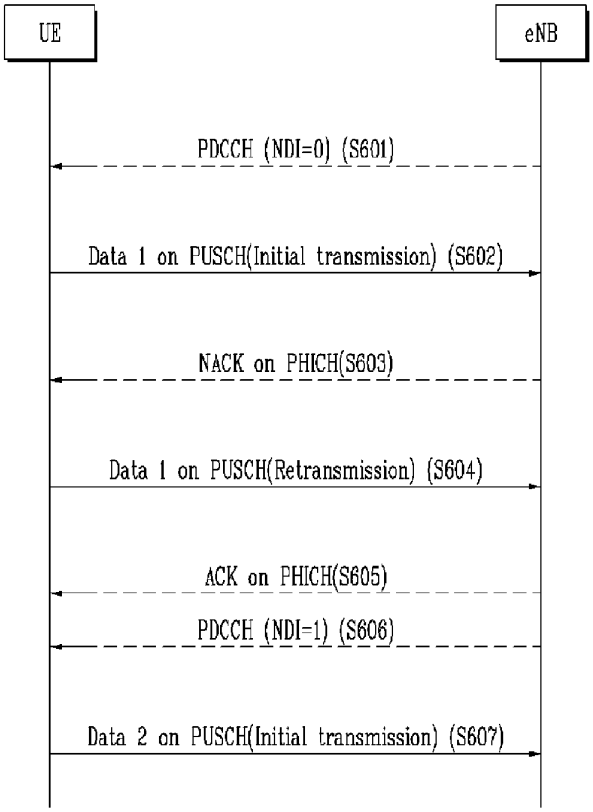
【도 4】


UE
eNB
S401
RA Preamble assignment
S402
Random Access Preamble
S403
Random Access Response

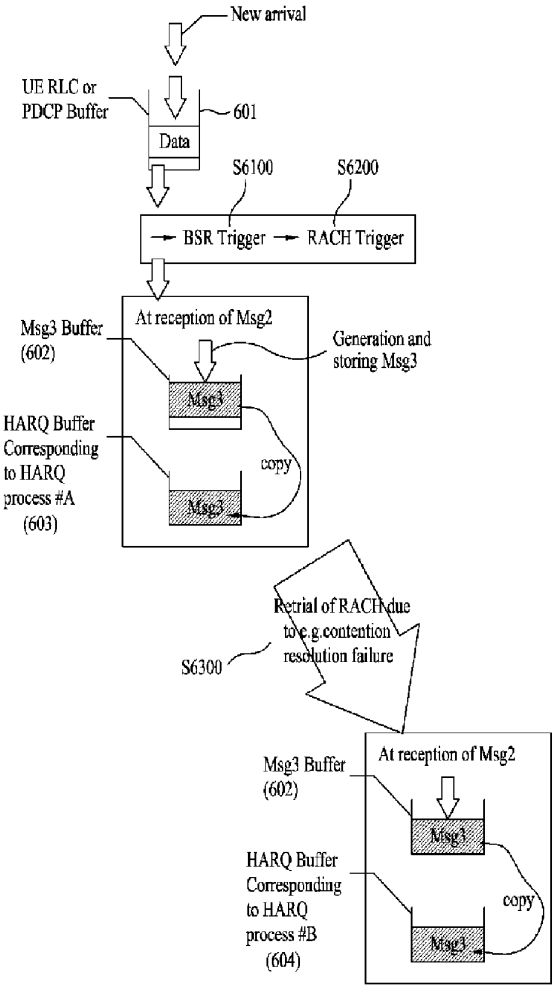
【도 5】


UE
eNB
S501
Random Access Preamble
S502
Random Access Response
S503
Scheduled Transmission
S504
Contention Resolution

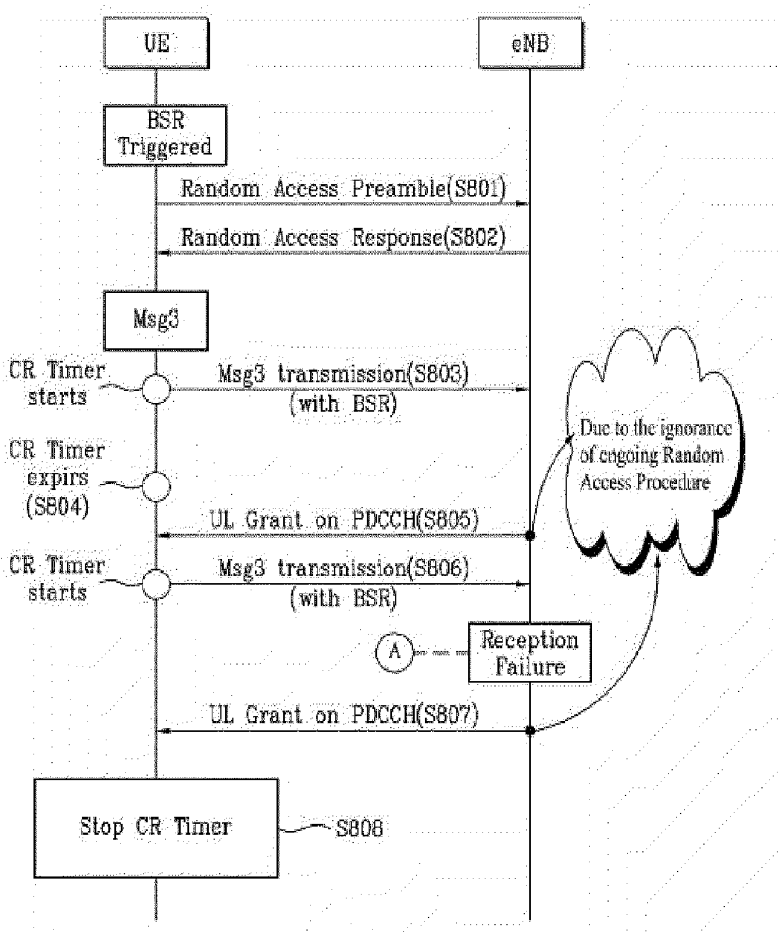
【도 6】


UE
eNB
PDCCH (NDI=0) (S601)
Data 1 on PUSCH(Initial transmission) (S602)
NACK on PHICH(S603)
Data 1 on PUSCH(Retransmission) (S604)
ACK on PHICH(S605)
PDCCH (NDI=1) (S606)
Data 2 on PUSCH(Initial transmission) (S607)

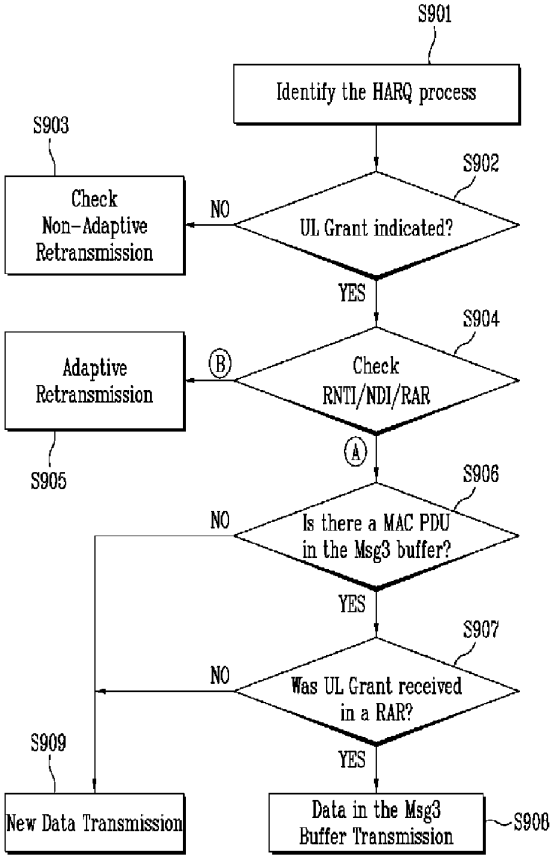
【도 7】


New arrival
UE RLC or
PDCP Buffer
601
Data
S6100
S6200
BSR Trigger
RACH Trigger
At reception of Msg2
Msg3 Buffer
(602)
Generation and
storing Msg3
Msg3
HARQ Buffer
Corresponding
to HARQ
process #A
(603)
copy
Msg3
Retrial of RACH due
to e.g.contention
resolution failure
S6300
At reception of Msg2
Msg3 Buffer
(602)
Msg3
HARQ Buffer
Corresponding
to HARQ
process #B
(604)
copy
Msg3

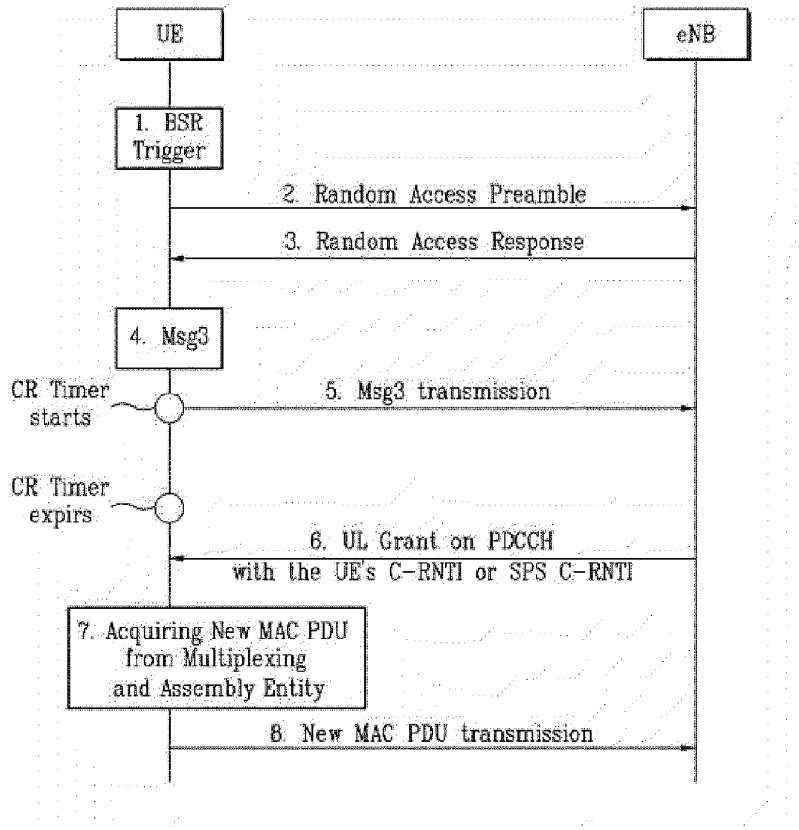
【도 8】


UE
eNB
BSR Triggered
Random Access Preamble(S801)
Random Access Response(S802)
Msg3
CR Timer starts
Msg3 transmission(S803) (with BSR)
Due to the ignorance of ongoing Random Access Procedure
CR Timer expirs (S804)
UL Grant on PDCCH(S805)
CR Timer starts
Msg3 transmission(S806) (with BSR)
A
Reception Failure
UL Grant on PDCCH(S807)
Stop CR Timer
S808

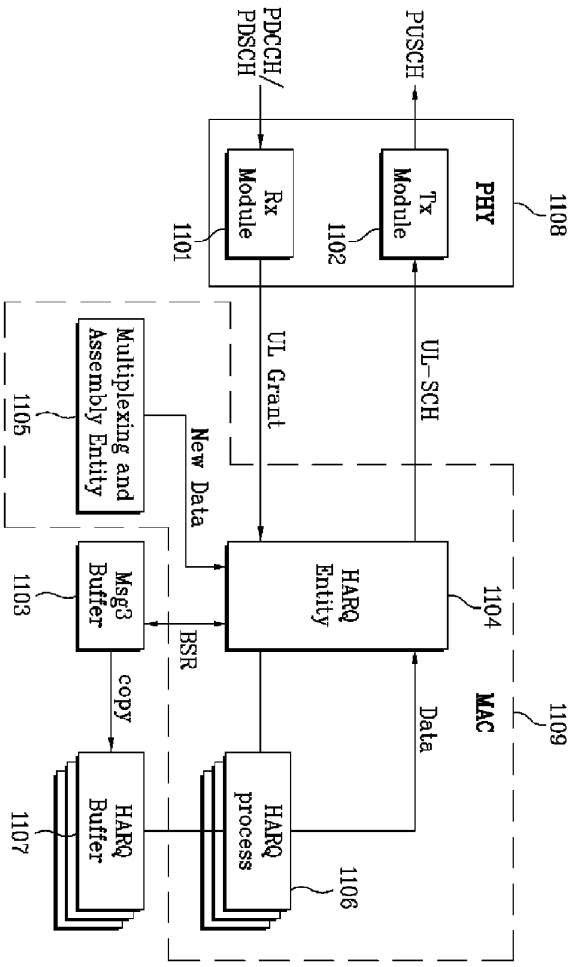
【도 9】


S901
Identify the HARQ process
S902
UL Grant indicated?
NO
S903
Check
Non-Adaptive
Retransmission
YES
S904
Check
RNTI/NDI/RAR
Ⓑ
Adaptive
Retransmission
S905
Ⓐ
S906
Is there a MAC PDU
in the Msg3 buffer?
NO
YES
S907
Was UL Grant received
in a RAR?
NO
YES
S909
New Data Transmission
Data in the Msg3
Buffer Transmission
S908

【도 10】


UE
eNB
1. BSR Trigger
2. Random Access Preamble
3. Random Access Response
4. Msg3
CR Timer starts
5. Msg3 transmission
CR Timer expirs
6. UL Grant on PDCCH with the UE's C-RNTI or SPS C-RNTI
7. Acquiring New MAC PDU from Multiplexing and Assembly Entity
8. New MAC PDU transmission

【도 11】


PDCCH/
PDSCH
PUSCH
PHY
1108
Rx
Module
1101
Tx
Module
1102
UL Grant
UL-SCH
Multiplexing and
Assembly Entity
1105
New Data
Msg3
Buffer
1103
HARQ
Entity
1104
BSR
copy
MAC
1109
Data
HARQ
Buffer
1107
HARQ
process
1106

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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
12/538,514	08/10/2009	2617	1090	0465-2287PUS1	13	2

CONFIRMATION NO. 7519

2292
BIRCH STEWART KOLASCH & BIRCH
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FILING RECEIPT

Date Mailed: 08/27/2009

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**

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Power of Attorney: The patent practitioners associated with Customer Number 02292

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/087,988 08/11/2008

Foreign Applications

REPUBLIC OF KOREA 10-2009-0057128 06/25/2009

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The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/538,514**

Projected Publication Date: 02/11/2010

Non-Publication Request: No

Early Publication Request: No

Title

DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME

Preliminary Class

455

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UTILITY PATENT APPLICATION TRANSMITTAL

(ONLY FOR NEW NONPROVISIONAL APPLICATIONS UNDER 37 CFR 1.53(B))

Attorney Docket No.	0465-2287PUS1
First Inventor	Sung Jun PARK
Title	DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME
Express Mail Label No.	

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: **Commissioner for Patents**
P.O. Box 1450
Alexandria, VA 22313-1450

1. [X] **Fee Transmittal Form** (e.g., PTO/SB/17)
2. [ ] **Applicant claims small entity status.** See 37 CFR 1.27.
3. [X] **Specification** [*Total Pages* 51]
   Both the claims and abstract must start on a new page
   (For information on the preferred arrangement, see MPEP 608.01(a))
4. [X] **Drawing(s)** *(35 U.S.C. 113)* [*Total Sheets* 10]
5. **Oath or Declaration** [*Total Sheets* 4]
   a. [X] Newly executed (original or copy)
   b. [ ] A copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional with Box 18 completed)*
      i. [ ] DELETION OF INVENTOR(S)
      Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. [ ] **Application Data Sheet.** See 37 CFR 1.76
7. [ ] **CD-ROM or CD-R** in duplicate, large table or Computer Program *(Appendix)*
   [ ] Landscape Table on CD
8. **Nucleotide and/or Amino Acid Sequence Submission** *(if applicable, items a. – c. are required)*
   a. [ ] Computer Readable Form (CRF)
   b. Specification Sequence Listing on:
      i. [ ] CD-ROM or CD-R (2 copies); or ii. [ ] Paper
   c. [ ] Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

9. [ ] **Assignment Papers** (cover sheet & document(s))
   Name of Assignee
10. [ ] **37 CFR 3.73(b) Statement** *(when there is an assignee)* [ ] **Power of Attorney**
11. [ ] **English Translation Document** *(if applicable)*
12. [ ] **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    [ ] Copies of citations attached
13. [X] **Preliminary Amendment**
14. [ ] **Return Receipt Postcard** (MPEP 503) *(Should be specifically itemized)*
15. [ ] **Certified Copy of Priority Document(s)** *(if foreign priority is claimed)*
16. [ ] **Nonpublication Request** under 35 U.S.C.122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
17. [ ] Other:

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:*
    [ ] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No.:
    Prior application information: Examiner _____ *Art Unit:* _____

19. CORRESPONDENCE ADDRESS

[X] The address associated with Customer Number: 02292 *OR* [ ] Correspondence address below

Name					
Address					
City		State		Zip Code	
Country		Telephone		Email	

Signature	Esther Chong	Date	August 10, 2009
Name (Print/Type)	Esther H. Chong	Registration No. (Attorney/Agent)	40,953

Birch, Stewart, Kolasch & Birch, LLP

EHC/tda

PTO/SB/17 (10-08)
Approved for use through 06/30/2010. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2009

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT	($) 1,090.00

Complete if Known	
Application Number	NEW
Filing Date	August 10, 2009
First Named Inventor	Sung Jun PARK
Examiner Name	Not Yet Assigned
Art Unit	Not Yet Assigned
Attorney Docket No.	0465-2287PUS1

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☒ Deposit Account Deposit Account Number: 02-2448 Deposit Account Name: Birch, Stewart, Kolasch & Birch, LLP

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☒ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☒ Credit any overpayments

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

	FILING FEES		SEARCH FEES		EXAMINATION FEES		
Application Type	Fee ($)	Small Entity Fee ($)	Fee ($)	Small Entity Fee ($)	Fee ($)	Small Entity Fee ($)	Fees Paid ($)
Utility	330	165	540	270	220	110	1,090.00
Design	220	110	100	50	140	70	
Plant	220	110	330	165	170	85	
Reissue	330	165	540	270	650	325	
Provisional	220	110	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	52	26
Each independent claim over 3 (including Reissues)	220	110
Multiple dependent claims	390	195

Total Claims	Extra Claims	Fee ($)	Fee Paid ($)
13	- 20 or HP = _____	x _____	= _____

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	Extra Claims	Fee ($)	Fee Paid ($)
2	- 3 or HP = _____	x _____	= _____

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims	
Fee ($)	Fee Paid ($)
_____	_____

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $270 ($135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee ($)	Fee Paid ($)
61	- 100 = _____	/50 = _____ (round up to a whole number) x	_____	= _____

4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	
Other (e.g., late filing surcharge): _____	

SUBMITTED BY

Signature	Esther C Chong	Registration No. (Attorney/Agent)	40,953	Telephone	(703) 205-8000
Name (Print/Type)	Esther H. Chong			Date	August 10, 2009

Birch, Stewart, Kolasch & Birch, LLP

EHC/tda

Docket No.: 0465-2287PUS1
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Sung Jun PARK et al.

Application No.: NEW

Art Unit: Not Yet Assigned

Filed: August 10, 2009

Examiner: Not Yet Assigned

For: DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME

PRELIMINARY AMENDMENT

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

Madam:

INTRODUCTORY COMMENTS

The following preliminary amendments and remarks are respectfully submitted in connection with the above-identified application.

This amendment includes:

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

Remarks/Arguments begin on page 3 of this paper.

AMENDMENTS TO THE SPECIFICATION

In the Specification

Page 2

Please amend paragraph [0002] of the Specification as follows:

[0002] This application claims the benefit of Korean Patent Application No. 10-2009-0057128, filed on ~~May 21, 2009~~ June 25, 2009, which is hereby incorporated by reference as if fully set forth herein.

REMARKS

The specification has been amended to correct minor clerical errors. Claims 1-13 are pending in the application.

Conclusion

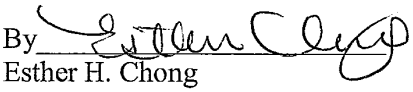
Entry of the above amendments is earnestly solicited. An early and favorable first action on the merits is earnestly solicited.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Esther H. Chong (Reg. No. 40,953) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Dated: August 10, 2009

Respectfully submitted,

By 

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Electronic Patent Application Fee Transmittal	
Application Number:	
Filing Date:	
Title of Invention:	DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME
First Named Inventor/Applicant Name:	Sung Jun PARK
Filer:	Esther Hyeri Chong/Abebech Gudeta
Attorney Docket Number:	0465-2287PUS1
Filed as Large Entity	

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	330	330
Utility Search Fee	1111	1	540	540
Utility Examination Fee	1311	1	220	220
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1090**

Electronic Acknowledgement Receipt	
EFS ID:	5858980
Application Number:	12538514
International Application Number:	
Confirmation Number:	7519
Title of Invention:	DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME
First Named Inventor/Applicant Name:	Sung Jun PARK
Customer Number:	02292
Filer:	Esther Hyeri Chong/Donna Lizama/tda
Filer Authorized By:	Esther Hyeri Chong
Attorney Docket Number:	0465-2287PUS1
Receipt Date:	10-AUG-2009
Filing Date:	
Time Stamp:	16:11:28
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1090
RAM confirmation Number	2360
Deposit Account	022448
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)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		spec.PDF	2264737 a0290688a068e3c2a85bfa81b0a87ba3b499a5ee	yes	65

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	44
Claims	45	50
Abstract	51	51
Oath or Declaration filed	52	55
Drawings-only black and white line drawings	56	65

Warnings:

Information:

2		20090810Transmittals.pdf	163022 22c979588e886c4df24f6f2c1291a7d7be44543d	yes	5

Multipart Description/PDF files in .zip description

Document Description	Start	End
Transmittal of New Application	1	1
Miscellaneous Incoming Letter	2	2
Preliminary Amendment	3	3
Specification	4	4
Applicant Arguments/Remarks Made in an Amendment	5	5

Warnings:

Information:

3	Fee Worksheet (PTO-875)	fee-info.pdf	33182 e1b3ac86a5416c1d190b023579afd6d00885464f	no	2

Warnings:

Information:

Total Files Size (in bytes):	2460941

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT APPLICATION

OF

[Sung Jun PARK, Seung June YI, Young Dae LEE and Sung Duck CHUN]

FOR

DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of US Provisional Application No. 61/087,988, filed on August 11, 2008, which is hereby incorporated by reference as if fully set forth herein.

[0002] This application claims the benefit of Korean Patent Application No. 10-2009-0057128, filed on May 21, 2009, which is hereby incorporated by reference as if fully set forth herein.

BACKGROUND OF THE INVENTION

Field of the Invention

[0003] The present invention relates to a mobile communication technology, and more particularly, to a method for efficiently transmitting data stored in a message 3 (Msg3) buffer and a user equipment for the same.

Discussion of the Related Art

[0004] As an example of a mobile communication system to which the present invention is applicable, a 3rd Generation Partnership Project Long Term Evolution (3GPP LTE) communication system will be schematically described.

[0005] FIG. 1 is a schematic view showing the network architecture of an Evolved Universal Mobile Telecommunication

System (E-UMTS) as an example of a mobile communication system.

[0006] The E-UMTS is evolved from the existing UMTS and has been currently standardized in the 3GPP. Generally, the E-UMTS may be called an LTE system.

[0007] An E-UMTS network may be largely divided into an Evolved UMTS Terrestrial Radio Access Network (E-UTRAN) 101 and a Core Network (CN) 102. The E-UTRAN 101 may include a User Equipment (UE) 103, a base station (hereinafter, referred to as an "eNode B" or "eNB") 104, and an Access Gateway (AG) 105 positioned at the end of the network and connected to an external network. The AG 105 may be divided into a portion for processing user traffic and a portion for processing control traffic. At this time, an AG for processing new user traffic and an AG for processing control traffic may communicate with each other using a new interface.

[0008] One or more cells may exist in one eNode B. A plurality of eNode Bs may be connected by an interface for transmitting the user traffic or control traffic. The CN 102 may include the AG 105 and a node for registering a user of the UE 103. An interface for distinguishing between the E-UTRAN 101 and the CN 102 may be used.

[0009] Layers of radio interface protocol between the UE and the network may be classified into a first layer L1, a second layer L2 and a third layer L3 based on three lower

layers of an Open System Interconnection (OSI) reference model that is widely known in the field of communication systems. A physical layer belonging to the first layer provides an information transfer service using a physical channel. A Radio Resource Control (RRC) layer belonging to the third layer serves to control radio resources between the UE and the network. The UE and the network exchange an RRC message via the RRC layer. The RRC layer may be distributed and located at network nodes of the eNode B 104 and the AG 105. Alternatively, the RRC layer may be located at only the eNode B 104 or the AG 105.

[0010] FIGs. 2 and 3 show the structures of radio interface protocols between the UE and the UTRAN based on a 3GPP radio access network standard.

[0011] The radio interface protocols of FIGs. 2 and 3 are horizontally formed of a physical layer, a data link layer and a network layer. The radio interface protocols are vertically formed of a user plane for transmitting data information and a control plane for transmitting control signals. In detail, FIG. 2 shows the layers of a radio protocol control plane and FIG. 3 shows the layers of a radio protocol user plane. The protocol layers of FIGs. 2 and 3 may be divided into a first layer (L1), a second layer (L2) and a third layer (L3) based on three lower layers of an OSI

reference model that is widely known in the field of communication systems.

[0012] Hereinafter, the layers of the control plane of the radio protocol of FIG. 2 and the user plane of the radio protocol of FIG. 3 will be described.

[0013] A physical (PHY) layer of the first layer provides an information transfer service to an upper layer using a physical channel. The PHY layer is connected to an upper layer, such as a Medium Access Control (MAC) layer, via a transport channel. Data is transferred between the MAC layer and the PHY layer via the transport channel. At this time, the transport channel is largely divided into a dedicated transport channel and a common transport channel, depending on whether or not a channel is shared. Data is also transferred between different PHY layers, such as a physical layer of a transmitting side and a physical layer of a receiving side, via a physical channel using radio resources.

[0014] Various layers exist in the second layer. First, the MAC layer serves to map various logical channels to various transport channels and serves to multiplex several logical channels into one transport channel. The MAC layer is connected to a Radio Link Control (RLC) layer, which is an upper layer, by the logical channel. The logical channel may be largely divided into a control channel for transmitting information about the control plane and a traffic channel for

transmitting information about the user plane according to the kinds of information transmitted.

[0015] The RLC layer of the second layer serves to segment and concatenate data received from an upper layer so as to adjust data size such that a lower layer transmits data in a radio section. In addition, the RLC provides three modes, namely, a Transparent Mode (TM), an Unacknowledged Mode (UM) and an Acknowledged Mode (AM) in order to guarantee various Quality of Services (QoSs) requested by Radio Bearers (RBs). In particular, the AM RLC performs a retransmission function using an Automatic Repeat and Request (ARQ) function for reliable data transmission.

[0016] A Packet Data Convergence Protocol (PDCP) layer of the second layer performs a header compression function to reduce the size of an Internet Protocol (IP) packet header that includes unnecessary control information and has a relatively large size, for effective transmission in a radio section having a relatively small bandwidth when transmitting an IP packet such as an IPv4 packet or an IPv6 packet. Therefore, only necessary information in a header portion of data is transmitted so as to improve transmission efficiency of the radio section. In the LTE system, the PDCP layer also performs a security function, which includes ciphering for preventing data from being intercepted by a third party and

integrity protection for preventing data from being handled by a third party.

[0017] A Radio Resource Control (RRC) located at a highest portion of the third layer is defined only in the control plane. The RRC layer handles logical channels, transport channels and physical channels for the configuration, re-configuration and release of RBs. Here, the RBs refer to logical paths provided by the first and second layers of the radio protocol, for data transfer between the UE and the UTRAN, and the configuration of the RBs refers to a process of defining the characteristics of the radio protocol layer and channel necessary for providing a specific service, and setting detailed parameters and operation methods. Each of the RBs is divided into a signaling RB and a data RB. The SRB is used as a path for transmitting an RRC message in the control plane (C-plane), and the DRB is used as a path for transmitting user data in the user plane (U-plane).

[0018] Downlink transport channels for transmitting data from a network to a UE may include a Broadcast Channel (BCH) for transmitting system information and a downlink Shared Channel (SCH) for transmitting user traffic or a control message. The traffic or the control message of a downlink multicast or broadcast service may be transmitted via the downlink SCH or via a separate Downlink Multicast Channel (MCH). Uplink transport channels for transmitting data from

a UE to a network may include a Random Access Channel (RACH) for transmitting an initial control message and an uplink SCH for transmitting user traffic or a control message.

[0019] Downlink physical channels for transmitting information transferred via the downlink transport channels in a radio section between a network and a UE may include a Physical Broadcast Channel (PBCH) for transmitting information about a BCH, a Physical Multicast Channel (PMCH) for transmitting information about an MCH, a Physical Downlink Shared Channel (PDSCH) for transmitting information about a PCH and a downlink SCH, and a Physical Downlink Control Channel (PDCCH) (also referred to as a DL L1/L2 control channel) for transmitting control information provided by the first layer and the second layer, such as downlink (DL) or uplink (UL) scheduling grant information. Uplink physical channels for transmitting information transferred via the uplink transport channels in a radio section between a network and a UE may include a Physical Uplink Shared Channel (PUSCH) for transmitting information about an uplink SCH, a Physical Random Access Channel (PRACH) for transmitting information about an RACH, and a Physical Uplink Control Channel (PUCCH) for transmitting control information provided by the first layer and the second layer, such as a HARQ ACK or NACK, a Scheduling Request (SR), a Channel Quality Indicator (CQI) report.

[0020] Hereinafter, a random access procedure provided by an LTE system will be schematically described based on the above description.

[0021] First, a UE performs the random access procedure in the following cases.

[0022] - when the UE performs initial access because there is no RRC Connection with an eNode B,

[0023] - when the UE initially accesses a target cell in a handover procedure,

[0024] - when the random access procedure is requested by a command of an eNode B,

[0025] - when there is uplink data transmission in a situation where uplink time synchronization is not aligned or where a specific radio resource used for requesting radio resources is not allocated, and

[0026] - when a recovery procedure is performed in case of radio link failure or handover failure.

[0027] In the LTE system, there are provided two procedures in selecting a random access preamble: one is a contention based random access procedure in which the UE randomly selects one preamble within a specific group for use, and another is a non-contention based random access procedure in which the UE uses a random access preamble allocated only to a specific UE by the eNode B. The non-contention based random access procedure may be used only in the handover

procedure or when it is requested by the command of the base station, as described above.

[0028] A random access procedure of a UE with a specific eNode B may largely include (1) a step of, at the UE, transmitting a random access preamble to the eNode B (hereinafter, referred to as a "message 1" transmitting step if such use will not lead to confusion), (2) a step of receiving a random access response from the eNode B in correspondence with the transmitted random access preamble (hereinafter, referred to as a "message 2" receiving step if such use will not lead to confusion), (3) a step of transmitting an uplink message using the information received by the random access response message (hereinafter, referred to as a "message 3" transmitting step if such use will not lead to confusion), and (4) a step of receiving a message corresponding to the uplink message from the eNode B (hereinafter, referred to as a "message 4" receiving step if such use will not lead to confusion).

[0029] In the random access procedure, the UE stores data to be transmitted via the message 3 in a message 3 (Msg3) buffer and transmits the data stored in the msg3 buffer in correspondence with the reception of an Uplink (UL) Grant signal. The UL Grant signal indicates information about uplink radio resources which may be used when the UE transmits a signal to the eNode B, and is received on a

random access response message received on a PDCCH or a PUSCH in the LTE system. According to the current LTE system standard, it is defined that, if the UL Grant signal is received in a state in which data is stored in the Msg3 buffer, the data stored in the Msg3 buffer is transmitted regardless of the reception mode of the UL Grant signal. As described above, if the data stored in the Msg3 buffer is transmitted in correspondence with the reception of all UL Grant signals, problems may occur. Accordingly, there is a need for research to solve such problems.

SUMMARY OF THE INVENTION

[0030] Accordingly, the present invention is directed to a data transmission method and a user equipment for the same that substantially obviate one or more problems due to limitations and disadvantages of the related art.

[0031] An object of the present invention is to provide a data transmission method and a user equipment for the same, which is capable of solving a problem which may occur when data stored in a message 3 (Msg3) buffer is transmitted according to a reception mode of an Uplink (UL) Grant signal.

[0032] Additional advantages, objects, and features of the invention will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following

or may be learned from practice of the invention. The objectives and other advantages of the invention may be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

[0033] To achieve these objects and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, a method of transmitting data by a user equipment through an uplink includes receiving an uplink grant (UL Grant) signal from a base station on a specific message, determining whether there is data stored in a message 3 (Msg3) buffer when receiving the UL Grant signal on the specific message, determining whether the specific message is a random access response message, and transmitting the data stored in the Msg3 buffer to the base station using the UL Grant signal received on the specific message, if there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message.

[0034] If there is no data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message or the specific message is not the random access response message, new data may be transmitted to the base station in correspondence with the UL Grant signal received on the specific message.

[0035] The UL Grant signal received on the specific message may be a UL Grant signal received on a Physical Downlink Control Channel (PDCCH). In this case, the user equipment may transmit new data in correspondence with the UL Grant signal received on the PDCCH.

[0036] The UL Grant signal received on the specific message may be a UL Grant signal received on a random access response message received on Physical Downlink Shared Channel (PDSCH). In this case, if there is data stored in the Msg3 buffer when receiving the UL Grant signal on the random access response message, the user equipment may transmit the data stored in the buffer in the Msg3 buffer using the UL Grant signal received on the random access response message.

[0037] The data stored in the Msg3 buffer may be a Medium Access Control Protocol Data Unit (MAC PDU) including a user equipment identifier, and the data stored in the Msg3 buffer further include information about a buffer status report (BSR) if the user equipment starts the random access procedure for the BSR.

[0038] In another aspect of the present invention, a user equipment includes a reception module receiving an uplink grant (UL Grant) signal from a base station on a specific message, a transmission module transmitting data to the base station using the UL Grant signal received on the specific message, a message 3 (Msg3) buffer storing UL data to be

transmitted in a random access procedure, and a Hybrid Automatic Repeat Request (HARQ) entity determining whether there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is a random access response message, acquiring the data stored in the Msg3 buffer if there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is the random access response message, and controlling the transmission module to transmit the data stored in the Msg3 buffer to the base station using the UL Grant signal received by the reception module on the specific message.

[0039] The user equipment may further include a multiplexing and assembly entity used for transmission of new data. In this case, the HARQ entity may acquire the new data to be transmitted from the multiplexing and assembly entity if there is no data stored in the Msg3 buffer when the reception module receives the UL Grant signal on the specific message or the received message is not the random access response message, and control the transmission module to transmit the new data acquired from the multiplexing and assembly entity using the UL Grant signal received by the reception module on the specific message.

[0040] The user equipment may further include one or more HARQ processes, and HARQ buffers respectively corresponding

to the one or more HARQ processes. In this case, the HARQ entity may transfer the data acquired from the multiplexing and assembly entity or the Msg3 buffer to a specific HARQ process of the one or more HARQ processes and control the specific HARQ process to transmit the data acquired from the multiplexing and assembly entity or the Msg3 buffer through the transmission module.

[0041] When the specific HARQ process transmits the data stored in the Msg3 buffer through the transmission module, the data stored in the Msg3 buffer may be controlled to be copied into a specific HARQ buffer corresponding to the specific HARQ process, and the data copied into the specific HARQ buffer may be controlled to be transmitted through the transmission module.

[0042] The UL Grant signal received by the reception module on the specific message may be a UL Grant signal received on a Physical Downlink Control Channel (PDCCH). In this case, the HARQ entity may control new data to be transmitted in correspondence with the received UL Grant signal received on the PDCCH.

[0043] The UL Grant signal received by the reception module on the specific message may be a UL Grant signal received on a random access response message received on Physical Downlink Shared Channel (PDSCH), and the HARQ entity may control the data stored in the Msg3 buffer to be

transmitted using the UL Grant signal received on the random access response message if there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal on the random access response message.

[0044] According to the above-described embodiments of the present invention, it is possible to transmit data stored in a Msg3 buffer according to a reception mode of a UL Grant signal, without confusion.

[0045] 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.

BRIEF DESCRIPTION OF THE DRAWINGS

[0046] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

[0047] FIG. 1 is a schematic view showing the network architecture of an Evolved Universal Mobile Telecommunication System (E-UMTS) as an example of a mobile communication system;

[0048] FIGs. 2 and 3 are views showing the structures of radio interface protocols between a user equipment (UE) and a UMTS Terrestrial Radio Access Network (UTRAN) based on a 3rd Generation Partnership Project (3GPP) radio access network standard;

[0049] FIG. 4 is a view illustrating an operating procedure of a UE and a base station (eNode B) in a non-contention based random access procedure;

[0050] FIG. 5 is a view illustrating an operating procedure of a UE and an eNode B in a contention based random access procedure;

[0051] FIG. 6 is a view illustrating an uplink Hybrid Automatic Repeat Request (HARQ) scheme;

[0052] FIG. 7 is a view illustrating a method of transmitting a message 3 in a random access procedure when uplink radio resources are requested;

[0053] FIG. 8 is a view illustrating a problem which may occur when data stored in a message 3 buffer is transmitted by an Uplink (UL) Grant signal received on a message other than a random access response message;

[0054] FIG. 9 is a flowchart illustrating a method of transmitting uplink data by a UE according to a preferred embodiment of the present invention;

[0055] FIG. 10 is a view illustrating a method of transmitting uplink data when a Buffer status Report (BSR) is

triggered in a UE, according to an embodiment of the present invention; and

[0056] FIG. 11 is a schematic view showing the configuration of a UE according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0057] Hereinafter, the preferred embodiments of the present invention will be described with reference to the accompanying drawings. It is to be understood that the detailed description which will be disclosed along with the accompanying drawings is intended to describe the exemplary embodiments of the present invention, and is not intended to describe a unique embodiment which the present invention can be carried out. Hereinafter, the detailed description includes detailed matters to provide full understanding of the present invention. However, it will be apparent to those skilled in the art that the present invention can be carried out without the detailed matters. For example, the following description will be made on the assumption that a mobile communication system is a 3rd Generation Partnership Project Long Term Evolution (3GPP LTE) system, but the present invention is applicable to other mobile communication systems excluding the 3GPP LTE system.

[0058] In some instances, well-known structures and devices are omitted in order to avoid obscuring the concepts of the present invention and the important functions of the structures and devices are shown in block diagram form. The same reference numbers will be used throughout the drawings to refer to the same or like parts.

[0059] In the following description, it is assumed that a terminal includes a mobile or fixed user end device such as a user equipment (UE) and a mobile station (MS), and a base station includes a node of a network end communicating with a terminal, such as a Node-B, an eNode B, and a base station.

[0060] As described above, in the following description, a problem which may occur when data stored in a message 3 (Msg3) buffer is transmitted according to a reception mode of an Uplink (UL) Grant signal will be described in detail and a method of solving the problem will be described. Transmission and reception of a signal using a random access procedure and a Hybrid Automatic Repeat Request (HARQ) scheme will be described in detail.

[0061] FIG. 4 is a view illustrating an operating procedure of a terminal (UE) and a base station (eNode B) in a non-contention based random access procedure.

[0062] (1) Random Access Preamble Assignment

[0063] As described above, a non-contention based random access procedure may be performed (1) in a handover procedure

and (2) when the random access procedure is requested by a command of an eNode B. Even in these cases, a contention based random access procedure may be performed.

[0064] First, it is important that a specific random access preamble without the possibility of collision is received from the eNode B, for the non-contention based random access procedure. Methods of receiving the random access preamble may include a method using a handover command and a method using a Physical Downlink Control Channel (PDCCH) command. The UE receives an assigned random access preamble (S401).

[0065] (2) Message 1 Transmission

[0066] The UE transmits the preamble to the eNode B after receiving the assigned random access preamble from the eNode B as described above (S402).

[0067] (3) Message 2 Transmission

[0068] The UE attempts to receive a random access response within a random access response reception window indicated by the eNode B through a handover command or system information after transmitting the random access preamble in step S402 (S403). More specifically, the random access response information may be transmitted in the form of a Medium Access Control (MAC) Packet Data Unit (PDU), and the MAC PDU may be transferred via a Physical Downlink Shared Channel (PDSCH). In addition, the UE preferably monitors the PDCCH in order to

enable to the UE to properly receive the information transferred via the PDSCH. That is, the PDCCH may preferably include information about a UE that should receive the PDSCH, frequency and time information of radio resources of the PDSCH, a transfer format of the PDSCH, and the like. Here, if the PDCCH has been successfully received, the UE may appropriately receive the random access response transmitted on the PDSCH according to information of the PDCCH. The random access response may include a random access preamble identifier (e.g. Random Access-Radio Network Temporary Identifier (RA-RNTI)), an UL Grant indicating uplink radio resources, a temporary C-RNTI, a Time Advance Command (TAC), and the like.

[0069] As described above, the reason why the random access response includes the random access preamble identifier is because a single random access response may include random access response information of at least one UE and thus it is reported to which UE the UL Grant, the Temporary C-RNTI and the TAC are valid. In this step, it is assumed that the UE selects a random access preamble identifier matched to the random access preamble selected by the UE in step S402.

[0070] In the non-contention based random access procedure, it is determined that the random access procedure is normally

performed, by receiving the random access response information, and the random access procedure may be finished.

[0071] FIG. 5 is a view illustrating an operating procedure of a UE and an eNode B in a contention based random access procedure.

[0072] (1) Message 1 transmission

[0073] First, the UE may randomly select a single random access preamble from a set of random access preambles indicated through system information or a handover command, and select and transmit a Physical Random Access Channel (PRACH) capable of transmitting the random access preamble (S501).

[0074] (2) Message 2 reception

[0075] A method of receiving random access response information is similar to the above-described non-contention based random access procedure. That is, the UE attempts to receive its own random access response within a random access response reception window indicated by the eNode B through the system information or the handover command, after the random access preamble is transmitted in step S501, and receives a Physical Downlink Shared Channel (PDSCH) using random access identifier information corresponding thereto (S502). Accordingly, the UE may receive a UL Grant, a Temporary C-RNTI, a TAC and the like.

[0076] (3) Message 3 transmission

[0077] If the UE has received the random access response valid for the UE, the UE may process all of the information included in the random access response. That is, the UE applies the TAC, and stores the temporary C-RNTI. In addition, data which will be transmitted in correspondence with the reception of the valid random access response may be stored in a Msg3 buffer. A process of storing the data in the Msg3 buffer and transmitting the data will be described later with reference to FIG. 7.

[0078] The UE uses the received UL Grant so as to transmit the data (that is, the message 3) to the eNode B (S503). The message 3 should include a UE identifier. In the contention based random access procedure, the eNode B may not determine which UEs are performing the random access procedure, but later the UEs should be identified for contention resolution.

[0079] Here, two different schemes for including the UE identifier may be provided. A first scheme is to transmit the UE's cell identifier through an uplink transmission signal corresponding to the UL Grant if the UE has already received a valid cell identifier allocated by a corresponding cell prior to the random access procedure. Conversely, the second scheme is to transmit the UE's unique identifier (e.g., S-TMSI or random ID) if the UE has not received a valid cell identifier prior to the random access procedure. In general, the unique identifier is longer than the cell identifier. If

the UE has transmitted data corresponding to the UL Grant, the UE starts a contention resolution (CR) timer.

[0080] (4) Message 4 reception

[0081] After transmitting the data with its identifier through the UL Grant included in the random access response, the UE waits for an indication (instruction) from the eNode B for contention resolution. That is, the UE attempts to receive the PDCCH so as to receive a specific message (S504). Here, there are two schemes to receive the PDCCH. As described above, the UE attempts to receive the PDCCH using its own cell identifier if the message 3 transmitted in correspondence with the UL Grant is transmitted using the UE's cell identifier, and the UE attempts to receive the PDCCH using the temporary C-RNTI included in the random access response if the identifier is its unique identifier. Thereafter, in the former scheme, if the PDCCH is received through its own cell identifier before the contention resolution timer is expired, the UE determines that the random access procedure has been normally performed and completes the random access procedure. In the latter scheme, if the PDCCH is received through the temporary C-RNTI before the contention resolution timer has expired, the UE checks data transferred by the PDSCH indicated by the PDCCH. If the unique identifier of the UE is included in the data, the UE

determines that the random access procedure has been normally performed and completes the random access procedure.

[0082] Hereinafter, the LTE system, by way of example, a uplink Hybrid Automatic Repeat Request (HARQ) scheme of a MAC layer will be described, concentrating on the transmission of uplink data.

[0083] FIG. 6 is a view illustrating an HARQ scheme.

[0084] A UE may receive UL Grant information or UL scheduling information from an eNode B on a PDCCH (step S601), in order to transmit data to the eNode B by the HARQ scheme. In general, the UL scheduling information may include a UE identifier (e.g., a C-RNTI or a Semi-Persistent Scheduling C-RNTI), resource block assignment, transmission parameters (modulation, coding scheme and redundancy version), and a New Data Indicator (NDI). In the LTE system, the UE has eight HARQ processes and the HARQ processes are synchronously performed with Transmission Time Intervals (TTIs). That is, specific HARQ processes may be sequentially assigned according to points in time when data is received, in a manner of using the first HARQ process at TTI 9 and using the second HARQ process at TTI 10 after a first HARQ process is used at TTI 1, a second HARQ process is used at TTI 2, …, and an eighth HARQ process is used at TTI 8.

[0085] In addition, since the HARQ processes are synchronously assigned as described above, a HARQ process

connected to a TTI in which a PDCCH for initial transmission of specific data is received is used for the transmission of the data. For example, if it is assumed that the UE has received a PDCCH including UL scheduling information at an N^{th} TTI, the UE transmits data at an $(N+4)^{th}$ TTI. In other words, a K^{th} HARQ process assigned at the $(N+4)^{th}$ TTI is used for the transmission of the data. That is, the UE may transmit the data to the eNode B on a PUSCH according to the UL scheduling information after checking the UL scheduling information transmitted to the UE by monitoring the PDCCH at every TTI (step S602).

[0086] When the data has been received, the eNode B stores the data in a soft buffer and attempts to decode the data. The eNode B transmits an ACK signal if the decoding of the data succeeds and transmits an NACK signal if the decoding of the data fails. An example in which the decoding of the data fails and the eNode B transmits the NACK signal on a Physical HARQ Indicator Channel (PHICH) is shown in FIG. 6 (step S603).

[0087] When the ACK signal has been received from the eNode B, the UE determines that the transmission of the data to the eNode B succeeds and transmits next data. However, when the UE receives the NACK signal as shown in FIG. 6, the UE may determine that the transmission of the data to the eNode B has failed and retransmit the same data by the same scheme or a new scheme (step S604).

[0088] The HARQ retransmission of the UE may be performed by a non-adaptive scheme. That is, the initial transmission of specific data may be performed when the PDCCH including the UL scheduling information should be received, but the retransmission may be performed even when the PDCCH is not received. In the non-adaptive HARQ retransmission, the data is retransmitted using the same UL scheduling information as the initial transmission at a TTI at which a next HARQ process is assigned, without receiving the PDCCH.

[0089] The HARQ retransmission of the UE may be performed by an adaptive scheme. In this case, transmission parameters for retransmission are received on the PDCCH, but the UL scheduling information included in the PDCCH may be different from that of the initial transmission according to channel statuses. For example, if the channel status is better than that of the initial transmission, transmission may be performed at a high bit rate. In contrast, if the channel status is worse than that of the initial transmission, transmission may be performed at a lower bit rate than that of the initial transmission.

[0090] If the UE receives the UL scheduling information on the PDCCH, it is determined whether data which should be transmitted at this time is data which is initially transmitted or previous data which is retransmitted, by an NDI field included in the PDCCH. The NDI field is toggled in

the order of 0, 1, 0, 1, ... whenever new data is transmitted as described above, and the NDI field of the retransmission has the same value as that of the initial transmission. Accordingly, the UE may compare the NDI field with the previously transmitted value so as to determine whether or not the data is retransmitted.

[0091] The UE counts the number of times of transmission (CURRENT_TX_NB) whenever data is transmitted by the HARQ scheme, and deletes the data stored in the HARQ buffer when CURRENT_TX_NB has reached a maximum transmission number set in an RRC layer.

[0092] When the retransmitted data is received, the eNode B attempts to combine the received data and the data stored in the soft buffer due to the failure of the decoding by various schemes and decodes the combined data. The eNode B transmits an ACK signal to the UE if the decoding succeeds and transmits an NACK signal to the UE if the decoding fails. The eNode B repeats a process of transmitting the NACK signal and receiving the retransmitted data until the decoding of the data succeeds. In the example of FIG. 6, the eNode B attempts to combine the data retransmitted in step S604 and the data which is previously received and stored and decodes the combined data. The eNode B transmits the ACK signal to the UE on the PHICH if the decoding of the received data succeeds (step S605). The UE may transmit the UL scheduling

information for the transmission of next data to the UE on the PDCCH, and may transmit the NDI toggled to 1 in order to report that the UL scheduling information is not used for the adaptive retransmission, but is used for the transmission of new data (step S606). The UE may transmit new data to the eNode B on the PUSCH corresponding to the received UL scheduling information (step S607).

[0093] The random access procedure may be triggered in the above-described cases as described above. Hereinafter, the case where the UE requests UL radio resources will be described.

[0094] FIG. 7 is a view illustrating a method of transmitting a message 3 in a random access procedure when UL radio resources are requested.

[0095] When new data is generated in a transfer buffer 601 of the UE, for example, an RLC buffer and a PDCP buffer, the UE should generally inform the eNode B of information about the generation of the data. More accurately, when data having priority higher than that of data stored in the transfer buffer of the UE is generated, the UE informs the eNode B that the data is generated.

[0096] This indicates that the UE requests radio resources to the eNode B in order to transmit the generated data. The eNode B may assign proper radio resources to the UE according to the above information. The information about the

generation of the data is called a buffer status report (hereinafter, referred to as "BSR"). Hereinafter, as described above, the request for the transmission of the BSR is represented by triggering of the BSR transmission (S6100). If the BSR transmission is triggered, the UE should transmit the BSR to the eNode B. However, if the radio resources for transmitting the BSR are not present, the UE may trigger a random access procedure and attempt to request radio resources (S6200).

[0097] As described above, if the random access procedure for requesting the radio resources to the eNode B is triggered, the UE may transmit a random access preamble to the eNode B and receive a random access response message corresponding thereto as described with reference to FIGs. 4 and 5. In addition, a message 3 (that is, a MAC PDU) including a UE identifier and a BSR may be generated and stored in a Msg3 buffer 602, in a MAC layer of the UE through a UL Grant signal included in the random access response message. The message 3 stored in the Msg3 buffer 602 may be copied and stored in a HARQ process buffer 603 indicated by the UL Grant information. FIG. 7 shows, by way of example, the case where the HARQ process A is used for the transmission of the message 3. Thus, the message 3 is copied to the HARQ buffer 603 corresponding to the HARQ process A.

The message 3 stored in the HARQ buffer 603 may be transmitted to the eNode B on a PUSCH.

[0098] Meanwhile, if the UE should perform retrial of the random access procedure due to contention resolution failure, the UE may transmit the random access preamble to the eNode B again and receive a random access response (S6300). However, in the retried random access procedure, the UE uses the message 3 stored in the Msg3 buffer 602 again, without generating a new message 3. That is, the UE may copy and store the MAC PDU corresponding to the message 3 stored in the Msg3 buffer 602 in a HARQ buffer 604, and transmit the MAC PDU, according to the UL Grant signal included in the random access response received in the retried random access procedure. FIG. 7 shows the case where the reattempted random access procedure is performed by a HARQ process B. The data stored in the Msg3 buffer 602 may be copied into the HARQ buffer B and transmitted.

[0099] As described above, if the random access response is received while the random access procedure is performed, the UE stores the message 3 stored in the Msg3 buffer in the HARQ buffer and transmits the message 3. As described above, in the current the LTE system standard for the HARQ process, it is defined that the transmission of the data stored in the Msg3 buffer is triggered by the reception of any UL Grant signal. Accordingly, the CR timer may be erroneously driven

such that an erroneous contention resolution process is performed. Due to the erroneous contention resolution procedure, the above-described BSR may not be normally transmitted and the UE may come to deadlock. This problem will be described in detail with reference to FIG. 8.

[00100] FIG. 8 is a view illustrating a problem which may occur when data stored in a Msg3 buffer is transmitted by an Uplink (UL) Grant signal received on a message other than a random access response message.

[00101] As described with reference to FIG. 7, the UE may trigger the BSR when high priority data is generated, transmit the random access preamble in order to transmit the BSR to the eNode B (S801), and receive the random access response corresponding thereto (S802).

[00102] Thereafter, the UE may transmit a message 3 including the BSR via UL Grant information included in the random access response message received in step S802 (S803). If the message 3 is transmitted, the CR timer is operated as described with reference to FIG. 5.

[00103] If the random access procedure is completed before the CR timer expires, the UE determines that the random access procedure has not been successfully completed (S804). In this case, the UE may try to restart the random access procedure from the transmission of the random access preamble.

[00104] At this time, since the eNode B does not yet know that the UE is performing the random access procedure, the eNode B may transmit a UL Grant signal independent of the random access procedure on a masked PDCCH (S805). In this case, according to the current LTE system standard, the UE transmits the message 3 stored in the Msg3 buffer according to the UL Grant signal received on the PDCCH in step S805 (S806). In addition, when the message 3 is transmitted, the CR timer is restarted. That is, even when the UE does not perform the transmission of the random access preamble and the reception of the random access response message, the CR timer is restarted in step S806.

[00105] Although the CR timer is started as the UE transmits the message 3 in step S806, the eNode B may not know that the UE is performing the random access procedure because the reception of the random access preamble and the transmission of the random access response message are not performed. If another UL Grant signal is received on the PDCCH including the UE identifier (S807), the UE determines that the ongoing random access procedure is successfully completed. Accordingly, the UE may stop the ongoing CR time (S808).

[00106] If the message 3 transmitted to the eNode B in step S806 is not successfully received by the eNode B (A), the UE no longer transmits the message 3 including the BSR.

Accordingly, if additional data is not generated, the UE may not transmit the data generated in the transfer buffer to the eNode B.

[00107] The above-described problem will be described as follows.

[00108] According to the current LTE system standard, if the UL Grant signal is received in a state in which the data is stored in the Msg3 buffer, the UE transmits the data stored in the Msg3 buffer to the eNode B. At this time, the UL Grant signal may be transmitted by the eNode B, not for the transmission of the data stored in the Msg3 buffer, but for the transmission of other data. Accordingly, the CR timer may be erroneously started.

[00109] In addition, if the eNode B does not know that the CR timer is erroneously started in the UE and transmits the UL Grant signal for the transmission of other data as described with reference to FIG. 8, information (e.g., BSR) to be transmitted through the message 3 may be lost.

[00110] In addition, the UE may not receive a message 4 for completing a proper contention resolution procedure even with respect to the ongoing random access procedure.

[00111] In a preferred embodiment of the invention for solving the above-described problem, the data stored in the Msg3 buffer is restrictively transmitted only in the case where the UL Grant signal received from the eNode B is

received on the random access response message, but not in all cases where the UL Grant signal is received from the eNode B. If the UL Grant signal is received on the masked PDCCH not by the random access response message but by the UE identifier (C-RNTI or a Semi Persistent Scheduling Radio Network Temporary Identifier (SPS-RNTI)) in a state in which the data is stored in the Msg3 buffer, a method of acquiring and transmitting new data (MAC PDU) to the eNode B instead of the data stored in the Msg3 buffer is suggested.

[00112] FIG. 9 is a flowchart illustrating a method of transmitting UL data by a UE according to a preferred embodiment of the present invention. In more detail, FIG. 9 shows the operation of a HARQ entity of the UE according to an embodiment of the present invention at every TTI.

[00113] First, the HARQ entity of the UE may identify a HARQ process associated with a TTI (S901). If the HARQ process associated with the TTI is identified, the HARQ entity of the UE may determine whether or not a UL Grant signal received from the eNode B indicated at the TTI (S902). The UE may determine whether or not a HARQ buffer corresponding to the HARQ process is empty if there is no information about the received UL Grant signal at the TTI, and perform non-adaptive retransmission as described with reference to FIG. 6 if there is data in the HARQ buffer (S903).

[00114] Meanwhile, if there is a UL Grant signal received from the eNode B at the TTI, it may be determined (1) whether the UL Grant signal is not received on the PDCCH indicated by the temporary C-RNTI and the NDI is toggled from the value during transmission prior to the HARQ process, (2) whether there is previous NDI and this transmission is initial transmission of the HARQ process, (3) whether the UL Grant signal is received on the PDCCH indicated by the C-RNTI and the HARQ buffer of the HARQ process is empty, or (4) whether the UL Grant signal is received on the random access response message (S904). If any one of the conditions (1) to (4) is satisfied in step S904 (A), the method progresses to step S906. In contrast, if any one of the conditions (1) to (4) is not satisfied in step S904 (B), the method progresses to step S905 of performing adaptive retransmission using the UL Grant signal (S905).

[00115] Meanwhile, the UE determines whether there is data in the Msg3 buffer in step S906 (S906). In addition, even when there is data in the Msg3 buffer, the UE determines whether the received UL Grant signal is received on the random access response message (S907). That is, the UE according to the present embodiment transmits the data stored in the Msg3 buffer only when there is data in the Msg3 buffer when receiving the UL Grant signal and the UL Grant signal is received on the random access response message (S908). If

there is no data in the Msg3 buffer when receiving the UL Grant signal or the UL Grant is not received on the random access response message, the UE determines that the eNode B makes a request not for the transmission of the data stored in the Msg3 buffer but for transmission of new data, and performs new data transmission (S909). In more detail, the HARQ entity of the UE may be controlled such that a MAC PDU including new data from a multiplexing and assembly entity is acquired and is transmitted through the HARQ process.

[00116] Hereinafter, an example applied to a process of transmitting a BSR by the UE which operates by the embodiment described with reference to FIG. 9 as shown in FIG. 8 will be described.

[00117] FIG. 10 is a view illustrating a method of transmitting UL data when a BSR is triggered in a UE, according to an embodiment of the present invention.

[00118] As described above, new data may be generated in the RLC and PDCP buffers of the UE. It is assumed that the generated new data has higher priority than that of the data already stored in the RLC and PDCP buffers. The UE may trigger the BSR transmission in order to inform an eNode B of information about the generation of the data (step 1).

[00119] The UE should transmit the BSR according to BSR transmission trigger, but, in a special case, there may be no radio resource for transmitting the BSR. In this case, the

UE may trigger a random access procedure for transmitting the BSR. It is assumed that the random access procedure triggered in the present embodiment is the contention based random access procedure described with reference to FIG. 5.

[00120] The UE may transmit a random access preamble to the eNode B according to the triggering of the random access procedure (step 2).

[00121] The eNode B may receive the random access preamble transmitted by the UE and transmit a random access response message to the UE (step 3). The UE may receive the random access response message.

[00122] The UE may generate a message 3 including the BSR and a UE identifier according to a UL Grant signal included in the random access response message received in step 3 and store the message 3 in a Msg3 buffer (step 4).

[00123] The UE may select a HARQ process according to the UL Grant information included in the random access response message received in step 3 and copy and store the message 3 stored in the Msg3 buffer in the buffer corresponding to the selected HARQ process. Thereafter, the data stored in the HARQ buffer may be transmitted to the eNode B according to the UL HARQ procedure described with reference to FIG. 6 (step 5). The UE starts (or restarts) the CR timer by the transmission of the message 3.

[00124] When the CR timer expires, the UE may perform retrial of the random access procedure. That is, a random access preamble and a PRACH resource may be prepared to be selected and transmitted to the eNode B. However, in a state in which the CR timer is not operated, the UE may receive the UL Grant signal from the eNode B on a PDCCH masked by a UE identifier (step 6).

[00125] When the UL Grant signal has been received on the PDCCH in step 6, the UE generates new data different from the data stored in the Msg3 buffer according to the UL Grant information received in step 6 as a new MAC PDU, unlike the procedure of the embodiment of FIG. 8 for transmitting the message 3 stored in the Msg3 buffer according to the UL Grant information received in step 6 (step 7). In more detail, if the UE receives the UL Grant signal in step 6 but does not receive the UL Grant signal on the random access response message, a MAC PDU for transmitting not the data stored in the Msg3 buffer but new data from a multiplexing and assembly entity may be acquired and transmitted using a HARQ process corresponding thereto.

[00126] After the new MAC PDU is generated, the UE according to the present embodiment may select a HARQ process according to the UL Grant signal received in step 6, store the MAC PDU newly generated in step 7 in the buffer

corresponding to the HARQ process, and transmit the MAC PDU to the eNode B according to the UL HARQ procedure (step 8).

[00127] Thereafter, the UE may perform a random access procedure including the transmission of the random access preamble and the reception of the random access response and transmit the BSR stored in the Msg3 buffer to the eNode B.

[00128] According to the above-described embodiment, it is possible to prevent the eNode B from erroneously operating the CR timer due to the UL Grant signal transmitted not for transmission of the data stored in the Msg3 buffer but for transmission of new data. Accordingly, the problem that the message 3 is lost may be solved. In addition, the random access procedure of the UE with the eNode B may be normally performed.

[00129] Unlike the above-described embodiment, as another embodiment of the present invention, a method of performing a process while ignoring the UL Grant signal if the UL Grant signal is received from the eNode B on the PDCCH masked by the UE identifier during the random access procedure of the UE may be implemented. In this case, the UE may transfer the message 3 to the eNode B by the normal random access procedure, and the eNode B may retransmit the UL Grant signal for the transmission of new data after the random access procedure of the UE is completed.

[00130] Hereinafter, the configuration of the UE for implementing the above-described embodiment of the present invention will be described.

[00131] FIG. 11 is a schematic view showing the configuration of a UE according to an embodiment of the present invention.

[00132] As shown in FIG. 11, the UE according to the present embodiment may include a reception (Rx) module 1101 for receiving a UL Grant signal from an eNode B on a specific message, a transmission (TX) module 1102 for transmitting data to the eNode B using the received UL Grant signal, a Msg3 buffer 1103 for storing UL data transmitted in a random access procedure, and a HARQ entity 1104 for controlling the transmission of UL data of the UE.

[00133] In particular, the HARQ entity 1104 of the UE according to the present embodiment performs a function of determining whether there is data stored in the Msg3 buffer 1103 when the Rx module 1101 receives the UL Grant signal and a function of determining whether the Rx module 1101 receives the UL Grant signal on a random access response message. If there is data stored in the Msg3 buffer 1103 when the Rx module 1101 receives the UL Grant signal and the RX module 1101 receives the UL Grant signal on the random access response message, the data stored in the Msg3 buffer 1103 is controlled to be acquired and transmitted to the eNode B. If

there is no data stored in the Msg3 buffer 1103 when the Rx module 1101 receives the UL Grant signal and the RX module 1101 receives the UL Grant signal not on the random access response message but on the PDCCH, the data stored in the Msg3 buffer 1103 is not transmitted but new data is acquired from the multiplexing and assembly entity in the form of a MAC PDU and is transmitted to the eNode B.

[00134] In addition, in order to perform the UL HARQ procedure, the UE according to the present embodiment may include one or more HARQ processes 1106 and HARQ buffers 1107 corresponding to the HARQ processes 1106. In the current LTE system, eight independent HARQ processes are defined for use, but the present invention is not limited thereto.

[00135] Meanwhile, the HARQ entity 1104 according to the present embodiment may transfer the data acquired from the multiplexing and assembly entity 1105 or the msg3 buffer 1103 to a specific HARQ process 1106 using the above-described configuration, and control the specific HARQ process 1106 to transmit the data acquired from the multiplexing and assembly entity 1105 or the Msg3 buffer 1103 through the Tx module 1102. As described above, if the specific HARQ process 1106 transmits the data stored in the Msg3 buffer 1103 through the Tx module 1102 as described above, the data stored in the Msg3 buffer 1103 may be copied into the specific HARQ buffer 1107 corresponding to the specific HARQ process 1106 and the

data copied into the specific HARQ buffer 1107 may be transmitted through the Tx module 1102.

[00136] At this time, the data stored in the Msg3 buffer 1103 is a MAC PDU including a UE identifier and may further include information such as a BSR according to the purpose of the random access procedure.

[00137] In the configuration of the UE shown in FIG. 11, the Tx module 1102 and the Rx module 1101 may be configured as a physical layer processing module 1108, and the HARQ entity 1104, the multiplexing and assembly entity 1105 and one or more HARQ processes 1106 may be configured as a MAC layer module 1109. However, the invention is not limited thereto. In addition, the Msg3 buffer 1103 and the HARQ buffers 1107 corresponding to the HARQ processes 1106 may be implemented using any storage medium.

[00138] Although the signal transmission or reception technology and the UE for the same are applied to a 3GPP LTE system, they are applicable to various mobile communication systems having a similar procedure, in addition to the 3GPP LTE system.

[00139] 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 invention. Thus, 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.

WHAT IS CLAIMED IS:

1. A method of transmitting data by a user equipment through an uplink, the method comprising:

receiving an uplink grant (UL Grant) signal from a base station on a specific message;

determining whether there is data stored in a message 3 (Msg3) buffer when receiving the UL Grant signal on the specific message;

determining whether the specific message is a random access response message; and

transmitting the data stored in the Msg3 buffer to the base station using the UL Grant signal received on the specific message, if there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message.

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

transmitting new data to the base station in correspondence with the UL Grant signal received on the specific message, if there is no data stored in the Msg3 buffer when receiving the UL Grant signal on the specific

message or the specific message is not the random access response message.

3. The method according to claim 2, wherein the transmitting the new data to the base station includes:

acquiring a Medium Access Control Protocol Data Unit (MAC PDU) from a multiplexing and assembly entity; and

transmitting the MAC PDU to the base station.

4. The method according to claim 2, wherein the UL Grant signal received on the specific message is a UL Grant signal received on a Physical Downlink Control Channel (PDCCH), and

wherein the user equipment transmits new data in correspondence with the UL Grant signal received on the PDCCH.

5. The method according to claim 1, wherein the data stored in the Msg3 buffer is a Medium Access Control Protocol Data Unit (MAC PDU) including a user equipment identifier.

6. The method according to claim 5, wherein the data stored in the Msg3 buffer further includes information about a buffer status report (BSR) if the user equipment starts a random access procedure for the BSR.

7. A user equipment comprising:

a reception module receiving an uplink grant (UL Grant) signal from a base station on a specific message;

a transmission module transmitting data to the base station using the UL Grant signal received on the specific message;

a message 3 (Msg3) buffer storing UL data to be transmitted in a random access procedure; and

a Hybrid Automatic Repeat Request (HARQ) entity determining whether there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is a random access response message, acquiring the data stored in the Msg3 buffer if there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal and the specific message is the random access response message, and controlling the transmission module to transmit the data stored in the Msg3 buffer to the base station using the UL Grant signal received by the reception module on the specific message.

8. The user equipment according to claim 7, further comprising a multiplexing and assembly entity used for transmission of new data,

wherein the HARQ entity acquires the new data to be transmitted from the multiplexing and assembly entity if

there is no data stored in the Msg3 buffer when the reception module receives the UL Grant signal on the specific message or the received message is not the random access response message, and controls the transmission module to transmit the new data acquired from the multiplexing and assembly entity using the UL Grant signal received by the reception module on the specific message.

9. The user equipment according to claim 8, further comprising:

one or more HARQ processes; and

HARQ buffers respectively corresponding to the one or more HARQ processes,

wherein the HARQ entity transfers the data acquired from the multiplexing and assembly entity or the Msg3 buffer to a specific HARQ process of the one or more HARQ processes and controls the specific HARQ process to transmit the data acquired from the multiplexing and assembly entity or the Msg3 buffer through the transmission module.

10. The user equipment according to claim 9, wherein, when the specific HARQ process transmits the data stored in the Msg3 buffer through the transmission module, the data stored in the Msg3 buffer is controlled to be copied into a specific HARQ buffer corresponding to the specific HARQ

process, and the data copied into the specific HARQ buffer is controlled to be transmitted through the transmission module.

11. The user equipment according to claim 8, wherein the UL Grant signal received by the reception module on the specific message is a UL Grant signal received on a Physical Downlink Control Channel (PDCCH), and

wherein the HARQ entity controls new data to be transmitted in correspondence with the received UL Grant signal received on the PDCCH.

12. The user equipment according to claim 7, wherein the UL Grant signal received by the reception module on the specific message is a UL Grant signal received on a random access response message received on Physical Downlink Shared Channel (PDSCH), and

wherein the HARQ entity controls the data stored in the Msg3 buffer to be transmitted using the UL Grant signal received on the random access response message if there is data stored in the Msg3 buffer when the reception module receives the UL Grant signal on the random access response message.

13. The user equipment according to claim 7, wherein the data stored in the Msg3 buffer is a Medium Access Control

Protocol Data Unit (MAC PDU) including a user equipment identifier.

ABSTRACT OF THE DISCLOSURE

A mobile communication technology, and, more particularly, a method for efficiently transmitting data stored in a message 3 (Msg3) buffer and a user equipment for the same is disclosed. The method of transmitting data by a user equipment in uplink includes receiving an uplink (UP) Grant signal from a base station on a specific message, determining whether there is data stored in a message 3 (Msg3) buffer when receiving the UL Grant signal on the specific message, determining whether the specific message is a random access response message, and transmitting the data stored in the Msg3 buffer to the base station using the UL Grant signal received on the specific message, if there is data stored in the Msg3 buffer when receiving the UL Grant signal on the specific message and the specific message is the random access response message.

0465-2287PUS1
Attorney Docket No.

BIRCH, STEWART, KOLASCH & BIRCH, LLP

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PLEASE NOTE: YOU MUST COMPLETE THE FOLLOWING

COMBINED DECLARATION AND POWER OF ATTORNEY FOR PATENT AND DESIGN APPLICATIONS

As a below named inventor, I hereby declare that: my residence, post office address and citizenship are as stated next to my name; that I verily believe that I am the original, first and sole inventor (if only one inventor is named below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Insert Title: **DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME**

the specification of which is attached hereto. If not attached hereto, the application is identified by the attorney docket number as set forth above and/or the following:

Fill in Appropriate Information – The specification was filed on _____ as United States Application Number _____;
and amended on _____ (if applicable) and/or

For Use Without Specification Attached: the specification was filed on _____ as PCT International Application Number _____;
and was amended on _____ (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 referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Insert Priority Information (if appropriate)

Prior Foreign Application(s)			Priority Claimed	
10-2009-0057128 (Number)	Republic of Korea (Country)	June 25, 2009 (Month/Day/Year Filed)	[x] Yes	[ ] No
(Number)	(Country)	(Month/Day/Year Filed)	[x] Yes	[ ] No
(Number)	(Country)	(Month/Day/Year Filed)	[x] Yes	[ ] No
(Number)	(Country)	(Month/Day/Year Filed)	[ ] Yes	[ ] No

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional applications(s) listed below.

Insert Provisional Application(s): (if any)

61/087,988 (Application Number)	August 11, 2008 (Filing Date)
(Application Number)	(Filing Date)

All Foreign Applications, if any, for any Patent or Inventor's Certificate Filed More than 12 Months (6 Months for Designs) Prior to the Filing Date of This Application:

Insert Requested Information (if appropriate)

Country	Application Number	Date of Filing (Month/Day/Year)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States and/or PCT application(s), including for continuation-in-part application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States and/or PCT application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is material to the patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

Insert Prior U.S. Application(s): (if any)

(Application Number)	(Filing Date)	(Status - patented, pending, abandoned)
(Application Number)	(Filing Date)	(Status - patented, pending, abandoned)

0465-2287PUS1

Attorney Docket No.

I hereby appoint the practitioners at **CUSTOMER NO.** 02292 as my attorneys or agents to prosecute this application and/or an international application based on this application and to transact all business in the United States Patent and Trademark Office connected therewith and in connection with the resulting patent based on instructions received from the entity who first sent the application papers to the practitioners, unless the inventor(s) or assignee provides said practitioners with a written notice to the contrary:

Send Correspondence to:

CUSTOMER NO. 02292; (BIRCH, STEWART, KOLASCH & BIRCH, LLP)
Telephone: (703) 205-8000 • Facsimile: (703) 205-8050

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of First or Sole Inventor: Insert Name of Inventor →
Insert Date This Document is Signed
Insert Residence Insert Citizenship →
Insert Post Office Address →

GIVEN NAME/FAMILY NAME	INVENTOR'S SIGNATURE	DATE*
Sung Jun PARK		29-09-2009
Residence (City, State & Country) Anyang-Si, Republic of Korea		CITIZENSHIP Republic of Korea
MAILING ADDRESS (Complete Street Address including City, State & Country) LG Institute, Hogye 1(il)-dong, Dongan-gu; Anyang-Si, Gyeonggi-Do; Republic of Korea 431-749		

Full Name of Second Inventor, if any: see above

GIVEN NAME/FAMILY NAME	INVENTOR'S SIGNATURE	DATE*
Seung June YI		29-09-2009
Residence (City, State & Country) Anyang-Si, Republic of Korea		CITIZENSHIP Republic of Korea
MAILING ADDRESS (Complete Street Address including City, State & Country) LG Institute, Hogye 1(il)-dong, Dongan-gu; Anyang-Si, Gyeonggi-Do; Republic of Korea 431-749		

Full Name of Third Inventor, if any: see above

GIVEN NAME/FAMILY NAME	INVENTOR'S SIGNATURE	DATE*
Young Dae LEE		
Residence (City, State & Country) Anyang-Si, Republic of Korea		CITIZENSHIP Republic of Korea
MAILING ADDRESS (Complete Street Address including City, State & Country) LG Institute, Hogye 1(il)-dong, Dongan-gu; Anyang-Si, Gyeonggi-Do; Republic of Korea 431-749		

Full Name of Fourth Inventor, if any: see above

GIVEN NAME/FAMILY NAME	INVENTOR'S SIGNATURE	DATE*
Sung Duck CHUN		29-09-2009
Residence (City, State & Country) Anyang-Si, Republic of Korea		CITIZENSHIP Republic of Korea
MAILING ADDRESS (Complete Street Address including City, State & Country) LG Institute, Hogye 1(il)-dong, Dongan-gu; Anyang-Si, Gyeonggi-Do; Republic of Korea 431-749		

Full Name of Fifth Inventor, if any: see above

GIVEN NAME/FAMILY NAME	INVENTOR'S SIGNATURE	DATE*
Residence (City, State & Country)		CITIZENSHIP
MAILING ADDRESS (Complete Street Address including City, State & Country)		

Full Name of Sixth Inventor, if any: see above

GIVEN NAME/FAMILY NAME	INVENTOR'S SIGNATURE	DATE*
Residence (City, State & Country)		CITIZENSHIP
MAILING ADDRESS (Complete Street Address including City, State & Country)		

*DATE OF SIGNATURE

Attorney Docket No.

BIRCH, STEWART, KOLASCH & BIRCH, LLP 0465-2287PUS1

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COMBINED DECLARATION AND POWER OF ATTORNEY FOR PATENT AND DESIGN APPLICATIONS

As a below named inventor, I hereby declare that: my residence, post office address and citizenship are as stated next to my name; that I verily believe that I am the original, first and sole inventor (if only one inventor is named below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Insert Title: **DATA TRANSMISSION METHOD AND USER EQUIPMENT FOR THE SAME**

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and amended on _____ (if applicable) and/or
the specification was filed on _____ as PCT International Application Number _____;
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I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

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(Number)	(Country)	(Month/Day/Year Filed)	[x] Yes	[ ] No
(Number)	(Country)	(Month/Day/Year Filed)	[x] Yes	[ ] No
(Number)	(Country)	(Month/Day/Year Filed)	[ ] Yes	[ ] No

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61/087,988 (Application Number)	August 11, 2008 (Filing Date)
(Application Number)	(Filing Date)

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Insert Requested Information (if appropriate)

Country	Application Number	Date of Filing (Month/Day/Year)

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Insert Prior U.S. Application(s): (if any)

(Application Number)	(Filing Date)	(Status - patented, pending, abandoned)
(Application Number)	(Filing Date)	(Status - patented, pending, abandoned)

0465-2287PUS1

Attorney Docket No.

I hereby appoint the practitioners at **CUSTOMER NO. 02292** as my attorneys or agents to prosecute this application and/or an international application based on this application and to transact all business in the United States Patent and Trademark Office connected therewith and in connection with the resulting patent based on instructions received from the entity who first sent the application papers to the practitioners, unless the inventor(s) or assignee provides said practitioners with a written notice to the contrary:

Send Correspondence to:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of First or Sole Inventor Insert Name of Inventor → Insert Date This Document is Signed	GIVEN NAME/FAMILY NAME **Sung Jun PARK**	INVENTOR'S SIGNATURE DATE*
Insert Residence Insert Citizenship →	Residence (City, State & Country) Anyang-Si, Republic of Korea	CITIZENSHIP Republic of Korea
Insert Post Office Address →	MAILING ADDRESS (Complete Street Address including City, State & Country) LG Institute, Hogye 1(il)-dong, Dongan-gu; Anyang-Si, Gyeonggi-Do; Republic of Korea 431-749	
Full Name of Second Inventor, if any: see above	GIVEN NAME/FAMILY NAME **Seung June YI**	INVENTOR'S SIGNATURE DATE*
	Residence (City, State & Country) Anyang-Si, Republic of Korea	CITIZENSHIP Republic of Korea
	MAILING ADDRESS (Complete Street Address including City, State & Country) LG Institute, Hogye 1(il)-dong, Dongan-gu; Anyang-Si, Gyeonggi-Do; Republic of Korea 431-749	
Full Name of Third Inventor, if any: see above	GIVEN NAME/FAMILY NAME **Young Dae LEE**	INVENTOR'S SIGNATURE YOUNG DAE LEE DATE* 29/07/2009
	Residence (City, State & Country) Anyang-Si, Republic of Korea	CITIZENSHIP Republic of Korea
	MAILING ADDRESS (Complete Street Address including City, State & Country) LG Institute, Hogye 1(il)-dong, Dongan-gu; Anyang-Si, Gyeonggi-Do; Republic of Korea 431-749	
Full Name of Fourth Inventor, if any: see above	GIVEN NAME/FAMILY NAME **Sung Duck CHUN**	INVENTOR'S SIGNATURE DATE*
	Residence (City, State & Country) Anyang-Si, Republic of Korea	CITIZENSHIP Republic of Korea
	MAILING ADDRESS (Complete Street Address including City, State & Country) LG Institute, Hogye 1(il)-dong, Dongan-gu; Anyang-Si, Gyeonggi-Do; Republic of Korea 431-749	
Full Name of Fifth Inventor, if any: see above	GIVEN NAME/FAMILY NAME	INVENTOR'S SIGNATURE DATE*
	Residence (City, State & Country)	CITIZENSHIP
	MAILING ADDRESS (Complete Street Address including City, State & Country)	
Full Name of Sixth Inventor, if any: see above	GIVEN NAME/FAMILY NAME	INVENTOR'S SIGNATURE DATE*
	Residence (City, State & Country)	CITIZENSHIP
	MAILING ADDRESS (Complete Street Address including City, State & Country)	

*DATE OF SIGNATURE

FIG. 1

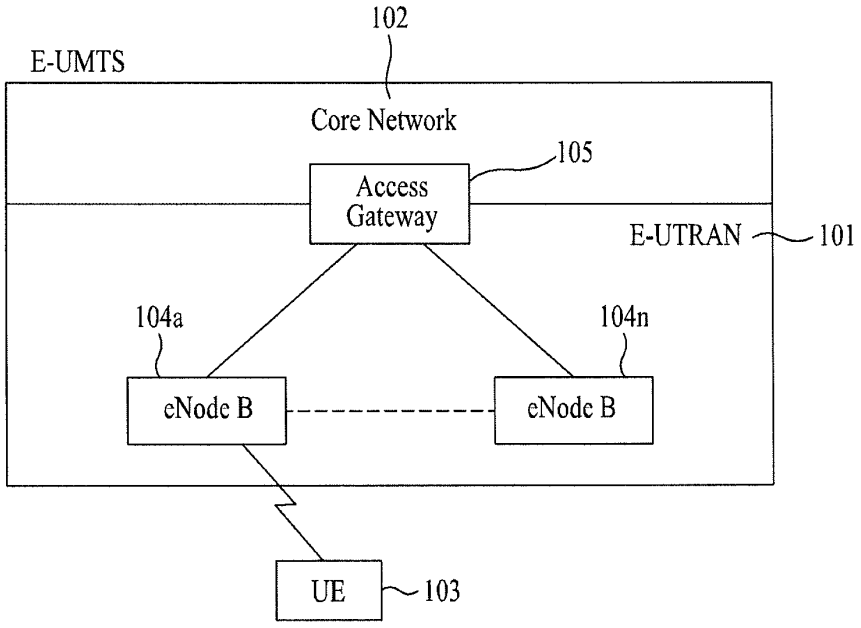

102
E-UMTS
Core Network
105
Access Gateway
E-UTRAN
101
104a
104n
eNode B
eNode B
UE
103

FIG. 2

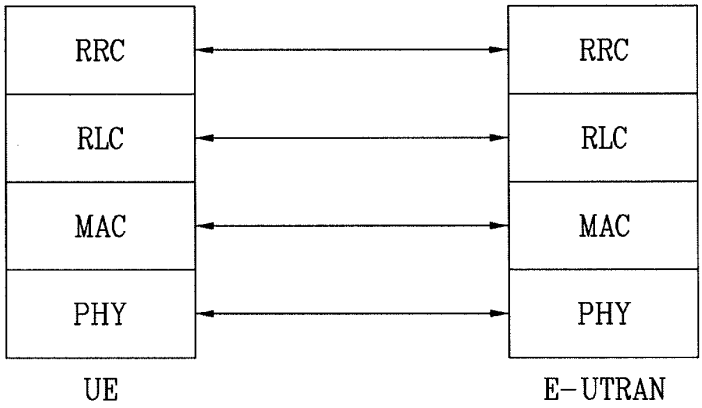

RRC
RLC
MAC
PHY
RRC
RLC
MAC
PHY
UE
E-UTRAN

FIG. 3

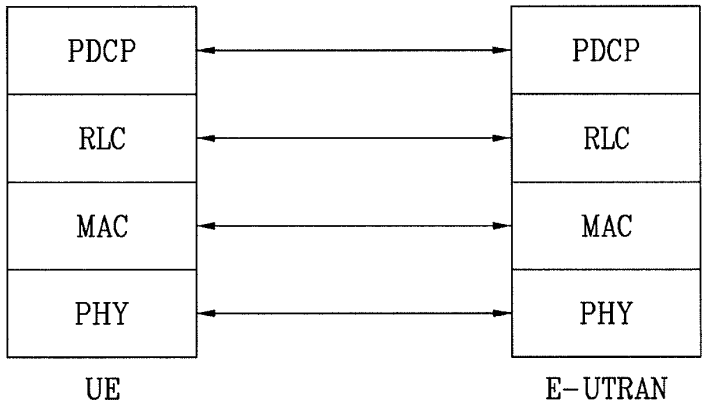

PDCP
RLC
MAC
PHY
PDCP
RLC
MAC
PHY
UE
E-UTRAN

FIG. 4

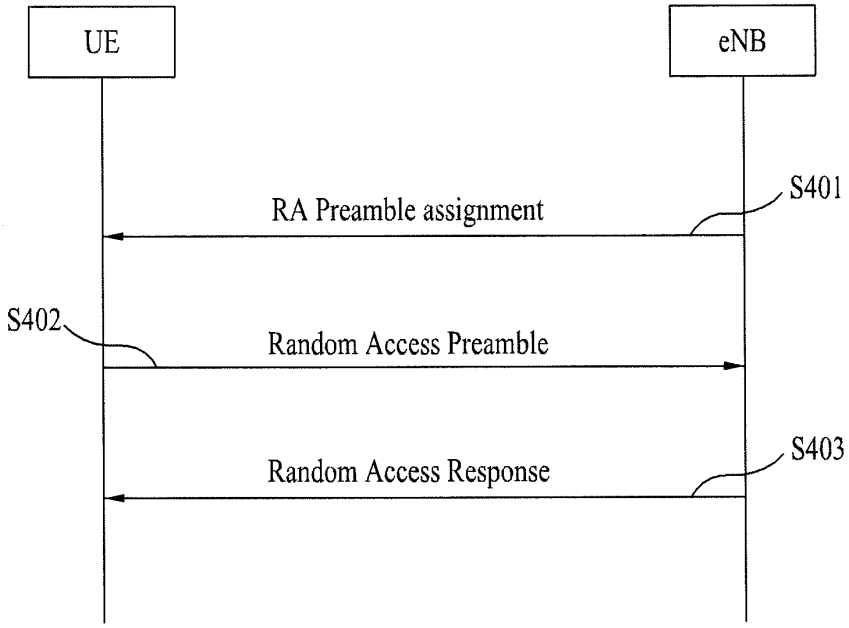

UE
eNB
S401
RA Preamble assignment
S402
Random Access Preamble
S403
Random Access Response

FIG. 5

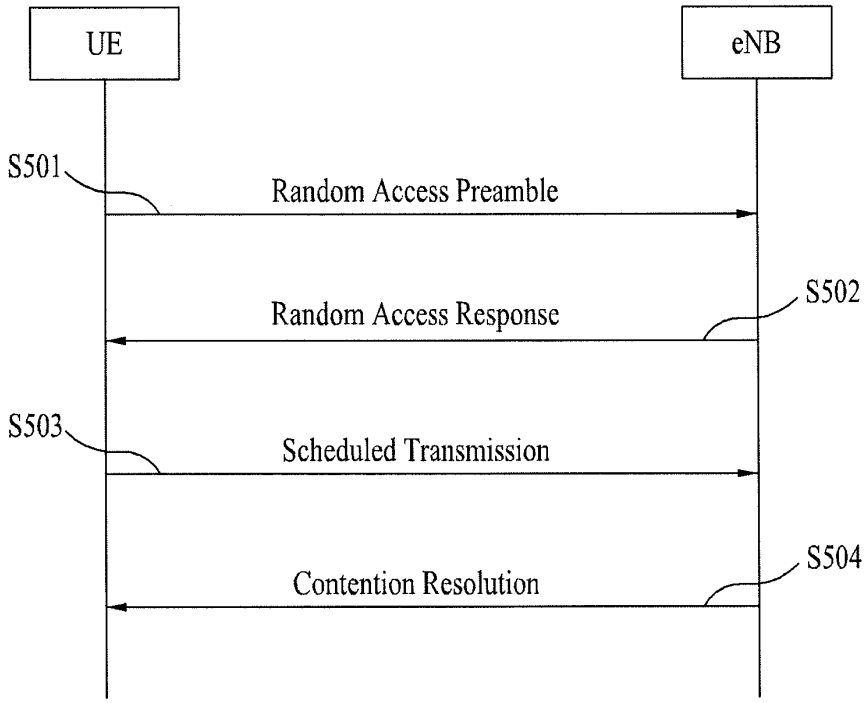

UE
eNB
S501
Random Access Preamble
S502
Random Access Response
S503
Scheduled Transmission
S504
Contention Resolution

FIG. 6

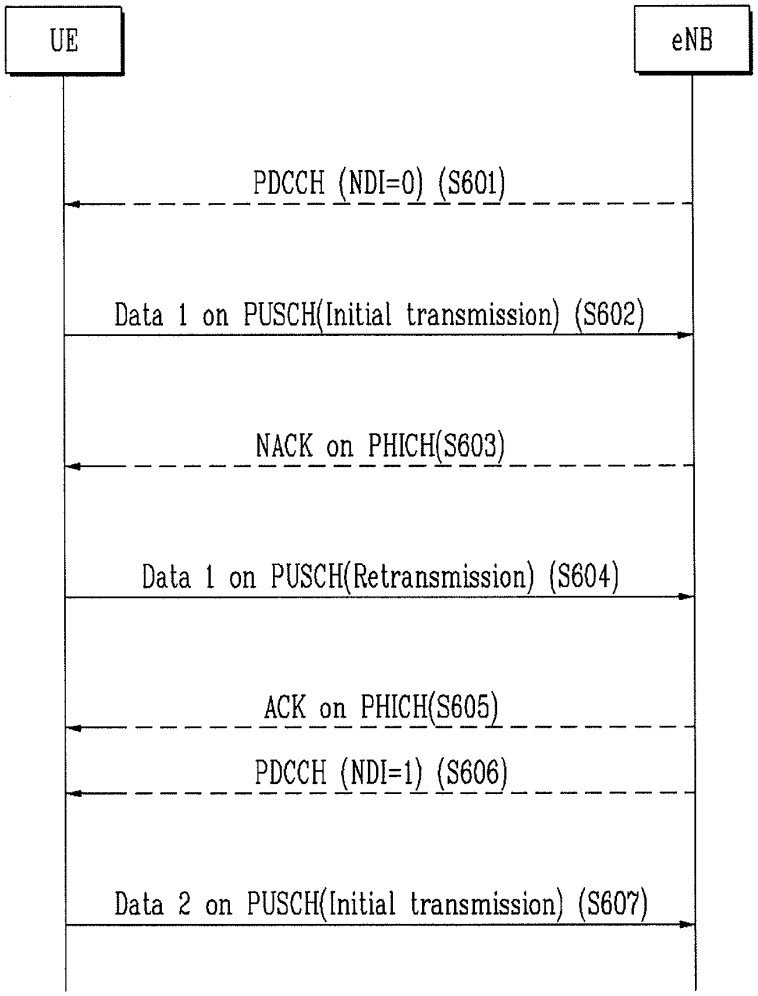

UE
eNB
PDCCH (NDI=0) (S601)
Data 1 on PUSCH(Initial transmission) (S602)
NACK on PHICH(S603)
Data 1 on PUSCH(Retransmission) (S604)
ACK on PHICH(S605)
PDCCH (NDI=1) (S606)
Data 2 on PUSCH(Initial transmission) (S607)

FIG. 7

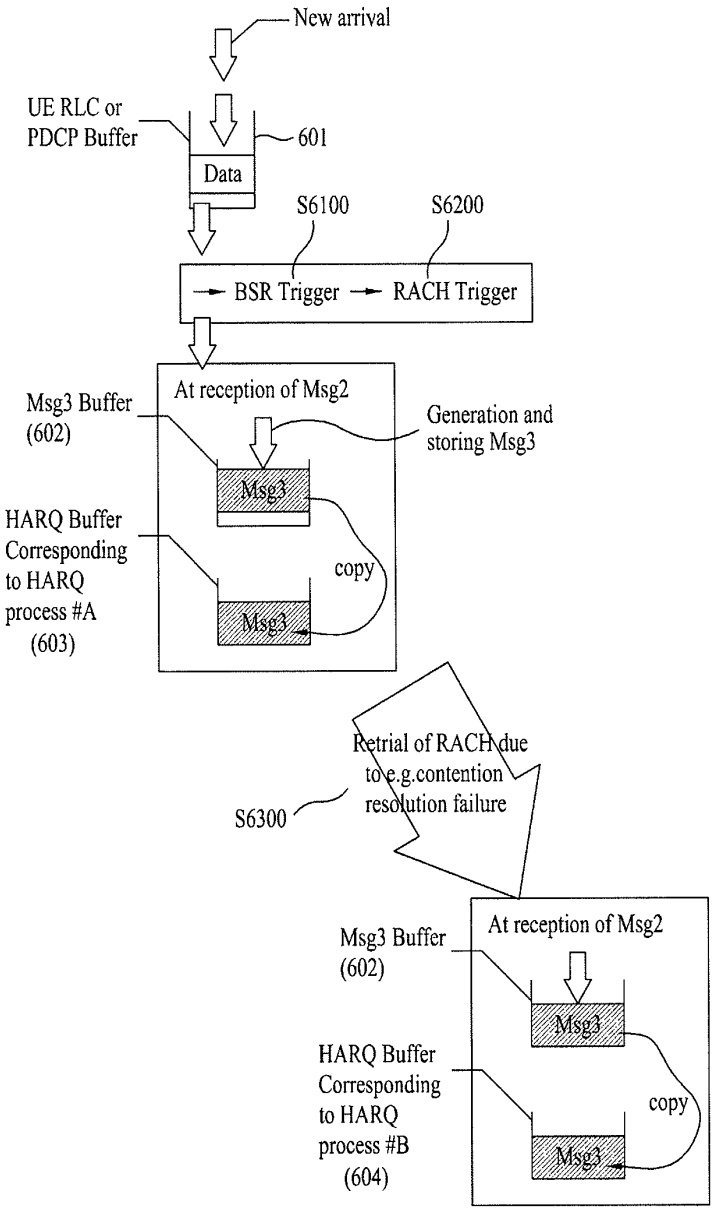

New arrival
UE RLC or
PDCP Buffer
601
Data
S6100
S6200
BSR Trigger
RACH Trigger
Msg3 Buffer
(602)
At reception of Msg2
Generation and
storing Msg3
Msg3
HARQ Buffer
Corresponding
to HARQ
process #A
(603)
copy
Msg3
Retrial of RACH due
to e.g.contention
resolution failure
S6300
Msg3 Buffer
(602)
At reception of Msg2
Msg3
HARQ Buffer
Corresponding
to HARQ
process #B
(604)
copy
Msg3

FIG. 8

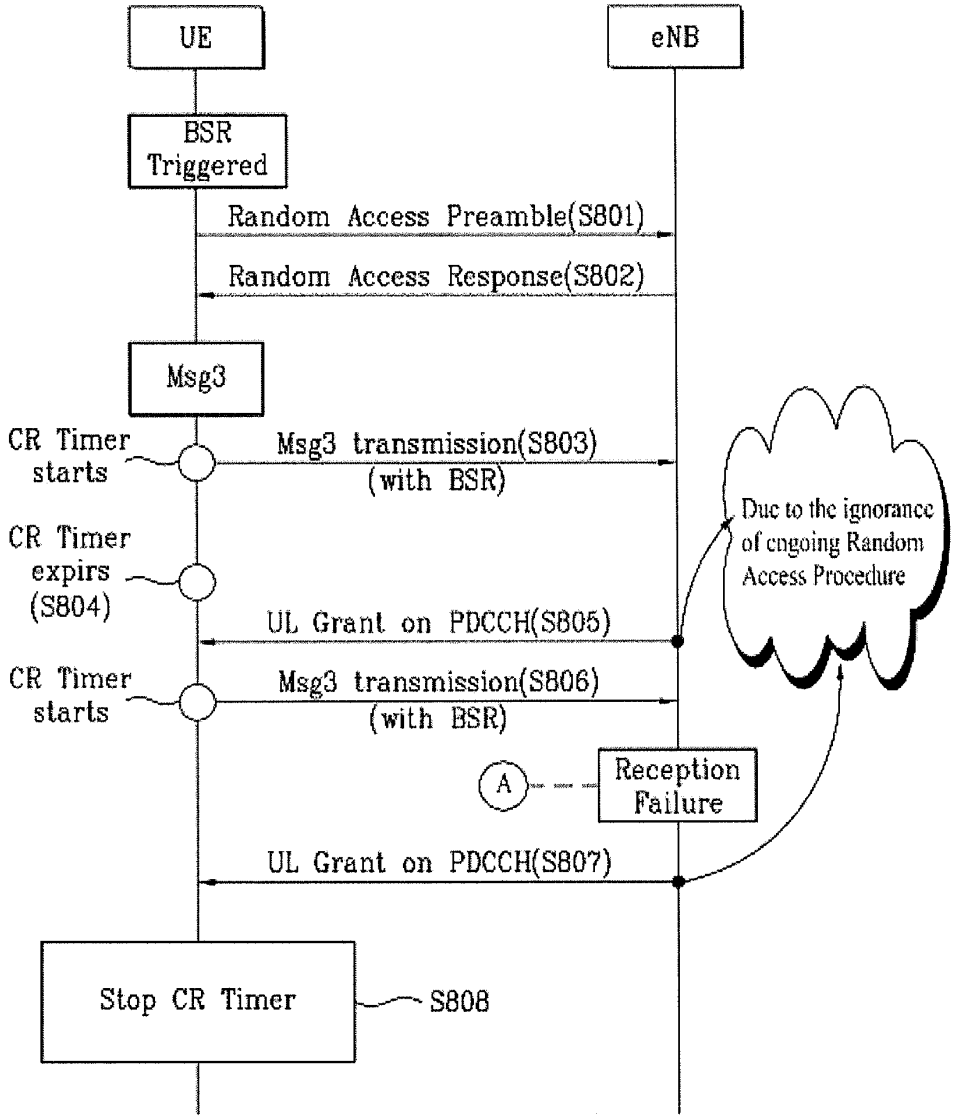

UE
eNB
BSR Triggered
Random Access Preamble(S801)
Random Access Response(S802)
Msg3
CR Timer starts
Msg3 transmission(S803) (with BSR)
CR Timer expirs (S804)
UL Grant on PDCCH(S805)
Due to the ignorance of ongoing Random Access Procedure
CR Timer starts
Msg3 transmission(S806) (with BSR)
A
Reception Failure
UL Grant on PDCCH(S807)
Stop CR Timer
S808

FIG. 9

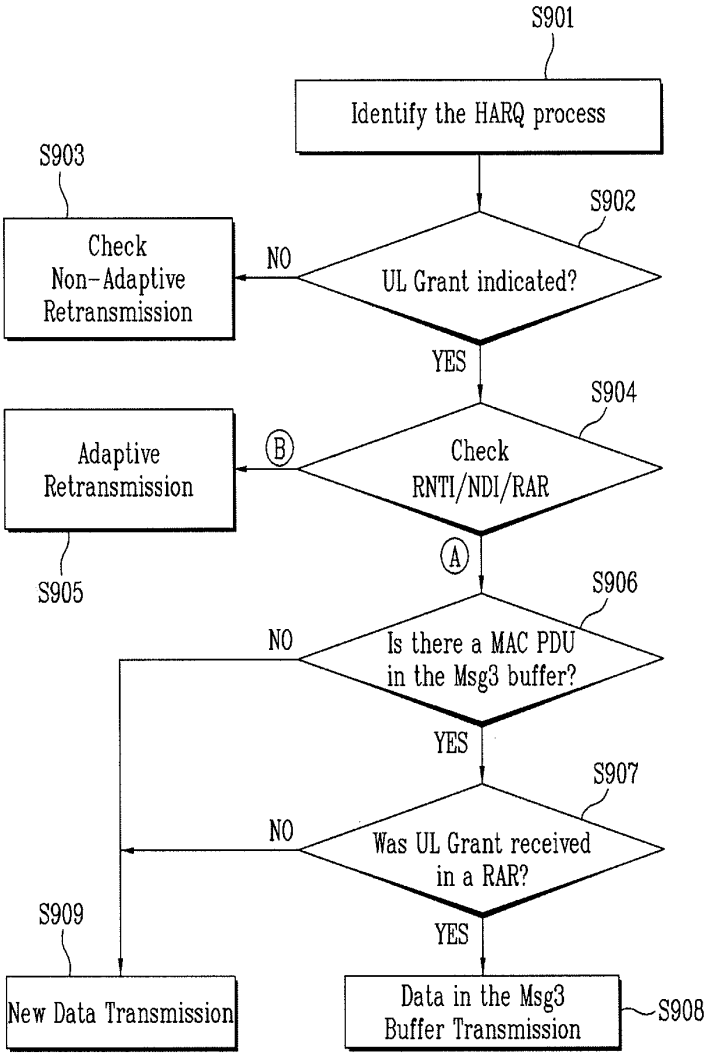

S901
Identify the HARQ process
S902
UL Grant indicated?
NO
S903
Check
Non-Adaptive
Retransmission
YES
S904
Check
RNTI/NDI/RAR
B
Adaptive
Retransmission
S905
A
S906
Is there a MAC PDU
in the Msg3 buffer?
NO
YES
S907
Was UL Grant received
in a RAR?
NO
YES
S909
New Data Transmission
Data in the Msg3
Buffer Transmission
S908

FIG. 10

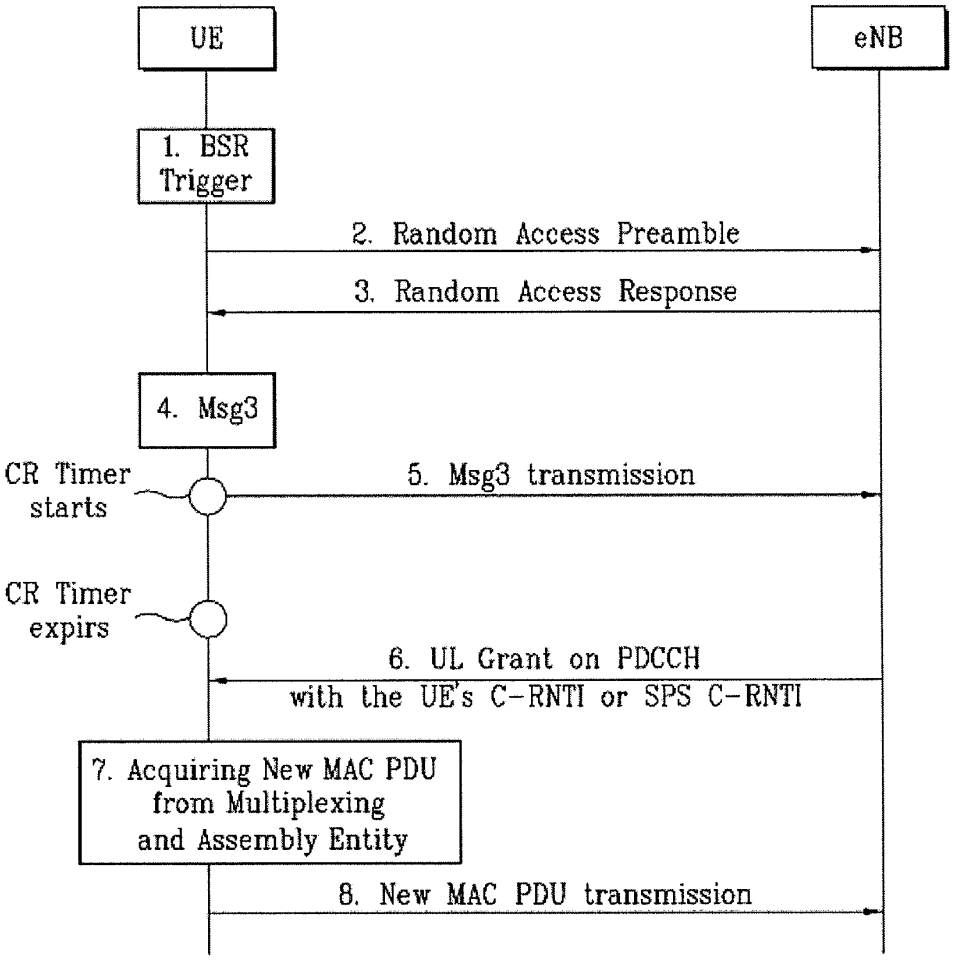
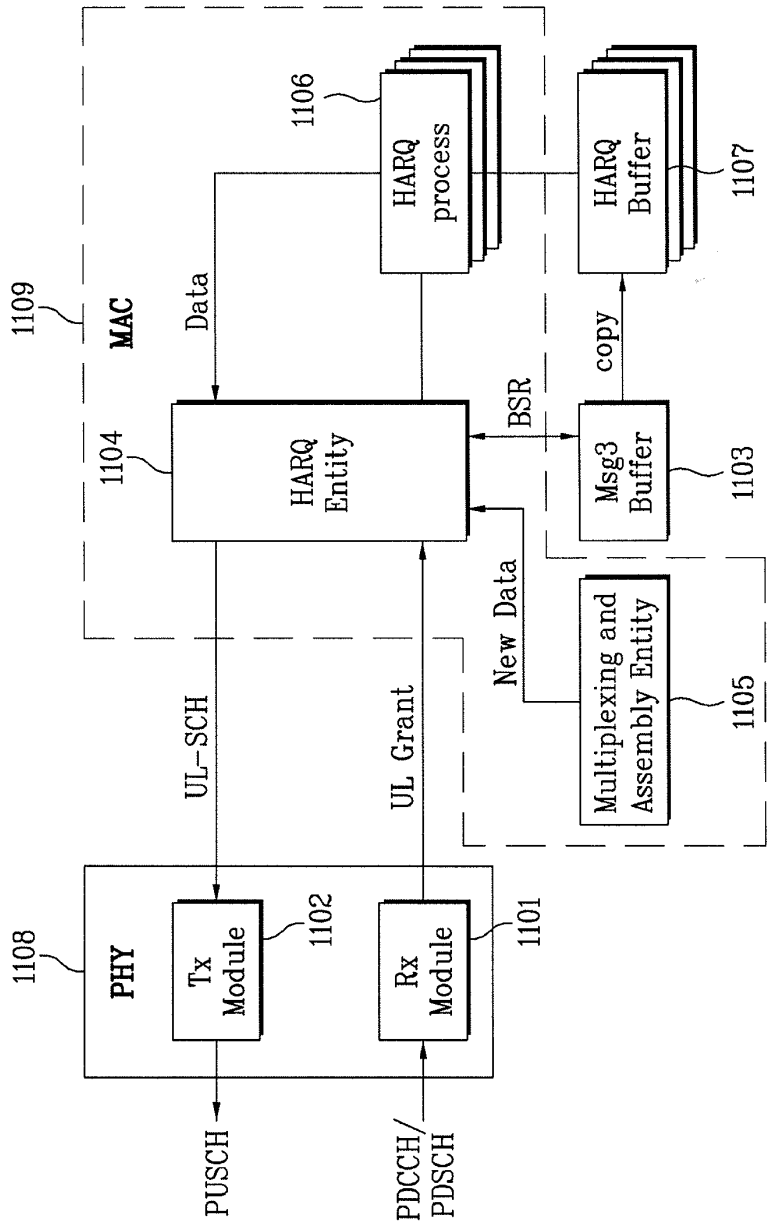

UE
eNB
1. BSR Trigger
2. Random Access Preamble
3. Random Access Response
4. Msg3
CR Timer starts
5. Msg3 transmission
CR Timer expirs
6. UL Grant on PDCCH with the UE's C-RNTI or SPS C-RNTI
7. Acquiring New MAC PDU from Multiplexing and Assembly Entity
8. New MAC PDU transmission

FIG. 11


1109
MAC
1104
HARQ Entity
1106
HARQ process
1107
HARQ Buffer
1103
Msg3 Buffer
1105
Multiplexing and Assembly Entity
Data
BSR
copy
New Data
UL-SCH
UL Grant
1108
PHY
Tx Module
1102
Rx Module
1101
PUSCH
PDCCH/ PDSCH

PTO/SB/06 (12-04)

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/538,514

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	**330**
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	**540**
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	**220**
TOTAL CLAIMS (37 CFR 1.16(i))	**13** minus 20 =		x$26		OR	x$52	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	**2** minus 3 =	*	x$110			x$220	
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $270 ($135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			195			390	
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	**1090**

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".
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