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UTILITY PATENT APPLICATION TRANSMITTAL <i>(Only for new nonprovisional applications under 37 CFR 1.53(b))</i>	Attorney Docket No.	175090.0011C1
	First Named Inventor	Kyoung Seok LEE
	Title	METHOD FOR CARRIER MANAGEMENT...
	Express Mail Label No.	

APPLICATION ELEMENTS <i>See MPEP chapter 600 concerning utility patent application contents.</i>	Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450
1. ☒ Fee Transmittal Form (PTO/SB/17 or equivalent) 2. ☒ Applicant asserts small entity status. See 37 CFR 1.27 3. ☐ Applicant certifies micro entity status. See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent. 4. ☒ Specification [Total Pages <u>33</u>] Both the claims and abstract must start on a new page. (See MPEP § 608.01(a) for information on the preferred arrangement) 5. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets <u>5</u>] 6. Inventor's Oath or Declaration [Total Pages <u>3</u>] (including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e)) a. ☒ Newly executed (original or copy) b. ☐ A copy from a prior application (37 CFR 1.63(d)) 7. ☒ Application Data Sheet * See note below. See 37 CFR 1.76 (PTO/AIA/14 or equivalent) 8. CD-ROM or CD-R in duplicate, large table, or Computer Program (Appendix) ☐ Landscape Table on CD 9. 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 PAPERS 10. ☐ Assignment Papers (cover sheet & document(s)) Name of Assignee _____ 11. ☐ 37 CFR 3.73(c) Statement ☒ Power of Attorney (when there is an assignee) 12. ☐ English Translation Document (if applicable) 13. ☒ Information Disclosure Statement (PTO/SB/08 or PTO-1449) ☐ Copies of citations attached 14. ☐ Preliminary Amendment 15. ☐ Return Receipt Postcard (MPEP § 503) (Should be specifically itemized) 16. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed) 17. ☐ Nonpublication Request Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent. 18. ☐ Other: _____ _____ _____ _____ _____

***Note:** (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS					
☒ The address associated with Customer Number: <u>89980</u> OR ☐ Correspondence address below					
Name					
Address					
City		State		Zip Code	
Country		Telephone		Email	
Signature	/Franklin R. Bryan/			Date	August 20, 2015
Name (Print/Type)	Franklin R. Bryan			Registration No. (Attorney/Agent)	68313

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

IPR2024-00608
Petitioners' Ex. 1003
Ex.1003.00001

Privacy Act Statement

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM		
First Named Inventor/Applicant Name:		Kyoung Seok LEE		
Filer:		Franklin Robert Bryan/Brianna Byrd		
Attorney Docket Number:		175090.0011C1		
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	70	70
Utility Search Fee	2111	1	300	300
Utility Examination Fee	2311	1	360	360
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:			IPR2024-00608 Petitioners' Ex. 1003 Ex.1003.00003	

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				730

Electronic Acknowledgement Receipt

EFS ID:	23262816
Application Number:	14831023
International Application Number:	
Confirmation Number:	8602
Title of Invention:	METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Kyoung Seok LEE
Customer Number:	89980
Filer:	Franklin Robert Bryan/Brianna Byrd
Filer Authorized By:	Franklin Robert Bryan
Attorney Docket Number:	175090.0011C1
Receipt Date:	20-AUG-2015
Filing Date:	
Time Stamp:	13:16:53
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$730
RAM confirmation Number	12790
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

IPR2024-00608
Petitioners' Ex. 1003
Ex.1003.00005

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	NewContApp_1750900011C1_ ADS.pdf	1819705	no	8
			614b267beac91727c0ef81c3a7d70f5c306d6ed6		
Warnings:					
Information:					
2		NewContApp_1750900011C1_ Specification.pdf	159329	yes	33
			b3201bb7874ed2bc9f19f109483244498dc25b30		
	Multipart Description/PDF files in .zip description				
	Document Description		Start		End
	Specification		1		30
	Claims		31		32
	Abstract		33		33
Warnings:					
Information:					
3	Drawings-only black and white line drawings	NewContApp_1750900011C1_ Drawings.pdf	1303016	no	5
			906b85835b4b948c8bc208eb7a26373c885e2dd5		
Warnings:					
Information:					
4	Oath or Declaration filed	NewContApp_1750900011C1_ ExecutedDec.pdf	192915	no	1
			e0cabed452ecd1f693adcad816d7b29016f3ab30		
Warnings:					
Information:					
5	Power of Attorney	NewContApp_1750900011C1_ POA.pdf	47981	no	1
			d9cb1d00cc2fe940f392107e8f385ee49bbf66a		
Warnings:					
Information:					
6	Transmittal Letter	NewContApp_1750900011C1_ Stmt.pdf	19033	no	2
			7ec4dd43f5ecc4b69629d8749fb5baf7d38842bd		

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Petitioners' Ex. 1003
F-1003-00006

IPR2024-00608
Petitioners' Ex. 1003
Ex.1003.00006

Warnings:					
Information:					
7	Information Disclosure Statement (IDS) Form (SB08)	NewContApp_1750900011C1_1 DS.pdf	74078 f243cc0f3f4c81d647a84628b74fad1508d36353	no	2
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
8	Transmittal of New Application	NewContApp_1750900011C1_1 UtilityTransmittal.pdf	310806 a6263e509b43d5dab0fa0512b4d4a029204a3ec8	no	2
Warnings:					
Information:					
9	Fee Worksheet (SB06)	fee-info.pdf	35302 53726c9281a24efa25dd436f289aa888418244ee	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			3962165		
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.					

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	175090.0011C1
		Application Number	
Title of Invention	METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2

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

Inventor Information:

Inventor 1					Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Kyoung Seok		LEE		
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service					
City	Daejeon	Country of Residenceⁱ	KR		
Mailing Address of Inventor:					
Address 1	214-1704 Sammeori Apt.				
Address 2	Dunsan-dong, Seo-gu				
City	Daejeon	State/Province			
Postal Code	302-120	Countryⁱ	KR		
Inventor 2					Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Jae Heung		KIM		
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service					
City	Daejeon	Country of Residenceⁱ	KR		
Mailing Address of Inventor:					
Address 1	108-302 Sejong Apt.				
Address 2	Jeonmin-dong, Yuseong-gu				
City	Daejeon	State/Province			
Postal Code	305-728	Countryⁱ	KR		
Inventor 3					Remove
Legal Name					

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 Petitioners' Ex. 1003
 Ex.1003.00008

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	175090.0011C1
		Application Number	
Title of Invention	METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM		

Prefix	Given Name	Middle Name	Family Name	Suffix
	Kook Jin		LEE	
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service				
City	Daejeon	Country of Residence ⁱ	KR	

Mailing Address of Inventor:				
Address 1	B-1517 Nexusvalley			
Address 2	Dunsan-dong, Seo-gu			
City	Daejeon	State/Province		
Postal Code	302-120	Country ⁱ	KR	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. Add				

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence information of this application.			
Customer Number	89980		
Email Address	pto@nsiplaw.com	Add Email	Remove Email

Application Information:

Title of the Invention	METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM		
Attorney Docket Number	175090.0011C1	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	5	Suggested Figure for Publication (if any)	

Filing By Reference :

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country ⁱ

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Petitioners' Ex. 1003

Ex.1003.00009

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	175090.0011C1
		Application Number	
Title of Invention	METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM		

Publication Information:

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

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.			
Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	89980		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the application number blank.

Prior Application Status	Pending	Remove			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
	Continuation of	13884216	2013-05-08		
Prior Application Status	Pending	Remove			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)		
13884216	a 371 of international	PCTKR2011008404	2011-11-07		
Prior Application Status	Patented	Remove			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
PCTKR2011008404	Continuation of	13208471	2011-08-12	8743720	2014-05-14
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.					Add

Foreign Priority Information:

IPR2024-00608
Petitioners' Ex. 1003
Ex.1003.00010

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	175090.0011C1
		Application Number	
Title of Invention	METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM		

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

		Remove	
Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ⁱ (if applicable)
10-2010-0077880	KR	2010-08-12	
		Remove	
Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ⁱ (if applicable)
10-2010-0110649	KR	2010-11-08	
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013. NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	175090.0011C1
		Application Number	
Title of Invention	METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM		

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.				
Applicant 1		Remove		
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.				
Clear				
☒ Assignee	☐ Legal Representative under 35 U.S.C. 117	☐ Joint Inventor		
☐ Person to whom the inventor is obligated to assign.	☐ Person who shows sufficient proprietary interest			
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:				
Name of the Deceased or Legally Incapacitated Inventor :				
If the Applicant is an Organization check here. ☒				
Organization Name	Electronics and Telecommunications Research Institute			
Mailing Address Information For Applicant:				
Address 1	218 Gajeong-ro, Yuseong-gu			
Address 2				
City	Daejeon	State/Province		
Country ⁱ	KR	Postal Code		
Phone Number		Fax Number		
IPR2024-00608 Petitioners' Ex. 1003 Ex.1003.00012				

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	175090.0011C1
		Application Number	
Title of Invention	METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM		
Email Address			
Additional Applicant Data may be generated within this form by selecting the Add button.			Add

Assignee Information including Non-Applicant Assignee Information:

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

Assignee 1			
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.			
			Remove
If the Assignee or Non-Applicant Assignee is an Organization check here.			☒
Organization Name	Electronics and Telecommunications Research Institute		
Mailing Address Information For Assignee including Non-Applicant Assignee:			
Address 1	218 Gajeong-ro, Yuseong-gu		
Address 2			
City	Daejeon	State/Province	
Country i	KR	Postal Code	34129
Phone Number		Fax Number	
Email Address			
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.			Add

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.					
Signature	/Franklin R. Bryan/			Date (YYYY-MM-DD)	2015-08-20
First Name	Franklin	Last Name	Bryan	Registration Number	68313
Additional Signature may be generated within this form by selecting the Add button.					Add

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	175090.0011C1
		Application Number	
Title of Invention	METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM		

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

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【DESCRIPTION】**【Invention Title】**

METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION
ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM

5

【Cross-Reference to Related Applications】

This application is a continuation of U.S. Application No. 13/884,216, filed on May 8,
2013, which is a 35 U.S.C. § 371 National Stage filing of International Application No.
PCT/KR2011/008404 which was filed November 7, 2011, and which claims the benefit
10 of Korean Application No. 10-2010-0110649 filed on November 8, 2010, Korean
Application No. 10-2010-0077880, filed on August 12, 2010, and US Patent No.
8,743,720, issued on May 14, 2014, the entire disclosures of which are incorporated
herein by reference for all purposes.

15 **【Technical Field】**

The present invention relates to a Long Term Evolution (LTE)-Advanced system,
which is next-generation mobile communication being standardized by the 3rd
Generation Partnership Project (3GPP), and more particularly to a carrier management
method of performing a carrier deactivation procedure between a base station and a
20 terminal in a carrier aggregation environment in which communication between the base
station and the terminal is performed using a plurality of carriers.

【Background Art】

3GPP, which is a mobile communication standardization organization, has
developed an LTE system standard as a next-generation mobile communication standard.

25 Also, the development of the LTE-Advanced system standard as an extension of the LTE

standard is under way to satisfy International Mobile Telecommunication (IMT)-Advanced system requirements proposed by the International Telecommunication Union-Radio communication Sector (ITU-R).

While the LTE standard supports a maximum radio bandwidth of 20 MHz, the
5 LTE-Advanced standard uses bandwidth aggregation (carrier aggregation) to support a maximum bandwidth of 100 MHz. Thus, in the LTE-Advanced standard, the bandwidth of 100 MHz is divided into component carriers (CCs), each of which has a maximum bandwidth of 20 MHz, and a base station may communicate with a terminal by simultaneously using a plurality of carriers.

10 The terminal, which supports multicarrier communication, uses a plurality of radio channels in a broad band. The wider a frequency bandwidth for use in communication, the higher the power consumption. Therefore, the terminal of the LTE-Advanced system is configured to activate and use multiple carriers only when traffic is high and to perform communication using only a single carrier when traffic is low.

15 On the other hand, when a secondary carrier is configured and operated in the multicarrier environment, a secondary carrier deactivation procedure and a discontinuous reception (DRX) procedure should be stably controlled, and thus a management state is not consistent between the base station and the terminal. In addition, when the deactivation procedure is performed, a hybrid automatic repeat request (HARQ)
20 retransmission procedure to be performed in the terminal should be managed according to a deactivation state.

【Disclosure】

【Technical Problem】

An object of the present invention is to provide a carrier management method of a

base station capable of preventing inconsistency of carrier states that are managed by the base station and a terminal when a secondary carrier, which is configured and operated in a carrier aggregation environment, is deactivated, as a carrier state management method of the base station.

5 Another object of the present invention is to provide a carrier management method of a terminal capable of preventing inconsistency of carrier states that are managed by a base station and the terminal when a secondary carrier, which is configured and operated in a carrier aggregation environment, is deactivated, as a carrier state management method of the terminal.

10 **【Technical Solution】**

 According to an example for achieving the object of the present invention described above, there is provided a carrier state management method of a base station for use in a carrier aggregation environment, including: transmitting a deactivation message for a secondary carrier to a terminal; and changing the secondary carrier to a
15 deactivation state after a predetermined time from the transmission of the deactivation message.

 Here, the predetermined time may be a value predefined to make state information that is managed by the base station consistent with state information that is managed by the terminal for the secondary carrier.

20 Here, the example of the carrier state management method of the base station may further include: receiving a reception success message for the deactivation message from the terminal after transmitting the deactivation message, wherein the changing of the secondary carrier to the deactivation state includes: changing, by the base station, the secondary carrier to the deactivation state after a predetermined time from an arrival time
25 of the reception success message.

Here, the example of the carrier state management method of the base station may further include immediately stopping, by the base station, data transmission and retransmission using the secondary carrier immediately after transmitting the deactivation message.

- 5 Here, the example of the carrier state management method of the base station may further include: stopping downlink (DL) transmission of the secondary carrier and initializing uplink (UL) and DL retransmission buffers after transmitting the deactivation message.

- According to another example for achieving the object of the present invention
10 described above, there is provided a carrier state management method of a base station for use in a carrier aggregation environment, including: determining whether or not to change a secondary-carrier state to a deactivation state by determining whether or not transmission/reception through a secondary carrier has been performed for a given time; and changing the secondary carrier to the deactivation state after a predetermined time
15 from when the change of the secondary carrier to the deactivation state is determined.

 Here, the determining of whether or not to change the secondary-carrier state to the deactivation state may be performed using a predetermined timer.

- Here, the predetermined time may be a value predefined to make state information that is managed by the base station consistent with state information that is
20 managed by the terminal for the secondary carrier.

- According to another example for achieving the object of the present invention described above, there is provided a carrier state management method of a terminal for use in a carrier aggregation environment, including: receiving a deactivation message for a secondary carrier from a base station; and changing the secondary carrier to a
25 deactivation state after a predetermined time from the reception of the deactivation

message.

Here, the predetermined time may be a value predefined to make state information that is managed by the base station consistent with state information that is managed by the terminal for the secondary carrier.

5 Here, the example of the carrier state management method may further include: transmitting a reception success message for the deactivation message to the base station after receiving the deactivation message, wherein the changing of the secondary carrier to the deactivation state includes: changing, by the terminal, the secondary carrier to the deactivation state after a predetermined time from a transmission time of the reception
10 success message.

Here, the example of the carrier state management method of the terminal may further include: immediately stopping, by the terminal, data transmission and retransmission using the secondary carrier immediately after receiving the deactivation message.

15 Here, the example of the carrier state management method of the terminal may further include: stopping UL transmission of the secondary carrier and initializing UL and DL retransmission buffers after receiving the deactivation message.

According to another example for achieving the object of the present invention described above, there is provided a carrier management method of a terminal for use in
20 a carrier aggregation environment, including: determining whether or not to change a secondary-carrier state to a deactivation state by determining whether or not transmission/reception through a secondary carrier has been performed for a given time; and changing the secondary carrier to the deactivation state after a predetermined time from when the change of the secondary carrier to the deactivation state is determined.

25 Here, the determining of whether or not to change the secondary-carrier state to

the deactivation state may be performed using a predetermined timer.

Here, the predetermined time may be a value predefined to make state information that is managed by the terminal consistent with state information that is managed by the base station for the secondary carrier.

5 **【Advantageous Effects】**

If a carrier management method according to the present invention as described above is used, it is possible to prevent an increase in the number of unnecessary retransmissions in a mobile communication system using carrier aggregation. That is, according to the present invention, when a secondary carrier is deactivated in a carrier
10 aggregation environment, a DL retransmission buffer of a terminal is immediately initialized. Accordingly, the terminal stops a reception operation of a carrier, so that an unnecessary retransmission procedure of the terminal may be omitted and operations of the terminal and a base station may be consistent.

Thus, it is possible to reduce an unnecessary retransmission operation and power
15 consumption of the terminal and prevent the waste of radio resources and the performance degradation of the base station due to unnecessary retransmission.

In addition, it is possible to prevent inconsistency of secondary carrier states that are managed by the base station and the terminal when a secondary carrier is deactivated according to the present invention. It is possible to solve a problem of an unnecessary
20 wakeup operation of a terminal by a DRX procedure related to a deactivated carrier by initializing a DRX-related timer that operates in a secondary carrier. Accordingly, power consumption of the terminal is reduced. In particular, the effect of power consumption reduction is increased because the above-described procedure affects operations of all carriers rather than a secondary carrier.

25 **【Description of Drawings】**

FIG. 1 is a conceptual diagram illustrating a general procedure in which a base station configures and activates carriers for a terminal in a carrier aggregation environment.

FIG. 2 is a conceptual diagram illustrating a power consumption reduction (DRX) operation of the terminal in a mobile communication system.

FIG. 3 is a flowchart illustrating a DL carrier management method according to the present invention.

FIG. 4 is a conceptual diagram illustrating a DL data retransmission stop procedure in a carrier aggregation environment according to the present invention.

FIG. 5 is a flowchart illustrating a UL carrier management method on the side of a base station according to the present invention.

FIG. 6 is a conceptual diagram illustrating a UL data retransmission stop procedure in a carrier aggregation environment according to the present invention.

FIG. 7 is a flowchart illustrating a UL carrier management method on the side of a terminal according to the present invention.

FIG. 8 is a flowchart illustrating an example of a carrier state management method of the base station according to the present invention.

FIG. 9 is a flowchart illustrating an example of a carrier state management method of the terminal according to the present invention.

FIG. 10 is a conceptual diagram illustrating a carrier state management method according to the present invention.

FIG. 11 is a diagram illustrating a secondary-carrier deactivation procedure according to the present invention.

【Modes of the Invention】

While the invention is susceptible to various modifications and alternative forms,

specific embodiments thereof are shown by way of example in the drawings and will herein be described in detail.

It should be understood, however, that there is no intent to limit the invention to the particular forms disclosed, but on the contrary, the invention is to cover all
5 modifications, equivalents, and alternatives falling within the spirit and scope of the invention.

The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used herein, the singular forms “a,” “an,” and “the” are intended to include the plural forms as well,
10 unless the context clearly indicates otherwise. It will be further understood that the terms “comprises,” “comprising,” “includes,” and/or “including,” when used herein, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

15 Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and will not be interpreted
20 in an idealized or overly formal sense unless expressly so defined herein.

The term “terminal” may refer to a mobile station (MS), user equipment (UE), a user terminal (UT), a wireless terminal, an access terminal (AT), a subscriber unit, a subscriber station (SS), a wireless device, a wireless communication device, a wireless transmit/receive unit (WTRU), a mobile node, a mobile, or other terms. Various
25 example embodiments of a terminal may include a cellular phone, a smart phone having

a wireless communication function, a personal digital assistant (PDA) having a wireless communication function, a wireless modem, a portable computer having a wireless communication function, a photographing device such as a digital camera having a wireless communication function, a gaming device having a wireless communication function, a music storing and playing appliance having a wireless communication function, an Internet home appliance capable of wireless Internet access and browsing, and also portable units or terminals having a combination of such functions, but the present invention is not limited thereto.

The term “base station” used herein generally denotes a fixed or moving point communicating with a terminal, and may be referred to as a Node-B, evolved Node-B (eNB), base transceiver system (BTS), access point, relay, femtocell, and other terms. In the present invention, the term “base station” is used to mean a control device that controls one cell. In an actual communication system, a “physical base station” may control a plurality of cells. In this case, the physical base station may include a plurality of base stations in the present invention. That is, when a different parameter is allocated to each cell, each base station may allocate a different value.

The term “carrier” used in the present invention refers to a medium for transmitting a radio channel in a specific frequency band for wireless communication by the base station, and hence has the same meaning as a mobile communication cell. In other words, the terminal of the present invention may receive and communicate radio channels transmitted in a plurality of cells. In addition, the term “carrier” may be used as the term indicating one CC among a plurality of CCs constituting a carrier aggregation environment.

With reference to the appended drawings, preferred embodiments of the present invention will be described in detail below. To aid in understanding the present

invention, like numbers refer to like elements throughout the description of the figures, and the description of the same component will not be reiterated.

FIG. 1 is a conceptual diagram illustrating a general procedure in which a base station configures and activates carriers for a terminal in a carrier aggregation
5 environment.

Referring to FIG. 1, the LTE-Advanced system controls a configuration procedure 110, an activation procedure 120, and a deactivation procedure 130 into which a multicarrier management step is divided. Although a maximum of five CCs may currently exist in the LTE-Advanced standard, an example in which three CCs, or
10 downlink (DL) CC #1 (141), DL CC #2 (142), and DL CC #3 (143), are used as DL CCs is shown in FIG. 1.

When the terminal is connected to the base station that provides multicarrier communication, a multicarrier communication environment is constructed using the configuration procedure. The base station transmits a configuration message to cause
15 the terminal to store configuration information regarding multicarrier communication and prepare carrier communication.

When traffic is low, the terminal communicates with the base station by use of only single carriers (DL CC #1 of FIG. 1 and UL CC #1 (not shown)). In a state in which the single carrier is used, the used carrier is referred to as a primary carrier or a
20 primary cell. A radio channel state of the primary carrier is measured in a short cycle and managed as a state in which stable communication is possible.

When traffic of the terminal increases, the base station uses the activation procedure to cause the terminal to actually use a plurality of CCs. A carrier to be additionally activated for the multicarrier environment is referred to as a secondary
25 carrier or a secondary cell of which a radio channel state is managed at a lower level than

that of the primary carrier.

The term “carrier” used in the LTE-Advanced system refers to a medium for transmitting a radio channel in a specific frequency band for wireless communication by the base station, and hence has the same meaning as a mobile communication cell. In other words, the terminal of the present invention may simultaneously receive and communicate radio channels transmitted in a plurality of cells.

In order to activate the secondary carrier, the base station transmits an activation message to the terminal. Upon receipt of the message, the terminal activates the secondary carrier and uses the activated secondary carrier in communication.

Accordingly, a large volume of data is transmitted and received by multiple carriers, and a data transmission rate is increased. If traffic with the terminal is decreased, the base station transmits a deactivation message to cause the terminal to make a change for use of only a single carrier. DL and UL CCs may be independently configured/released and activated/deactivated. Through one message, the DL and UL CCs may be simultaneously activated/deactivated.

When multicarrier communication is performed, data is mapped and transmitted according to each CC. A scheduler of the base station divides data to be transmitted in units of CCs, and the divided data is allocated and transmitted according to each CC. Transmitted data is retransmitted using the same CC.

Based on FIG. 1, one data block is assigned to DL CC #1. If a data reception error occurs after initial transmission, retransmission (or HARQ) should be performed using DL CC #1. When DL data is transmitted, the data is allocated to a data channel (that is, a physical downlink shared channel (PDSCH)), and demodulation information of the data channel is indicated and transmitted on a control channel (that is, a physical downlink control channel (PDCCH)).

The control channel may be transmitted by the same CC as the data channel or a different CC. If CC positions are different from each other, a position of the data channel is indicated using a carrier indicator (or a carrier indicator field (CIF)) within the control channel.

5 If traffic between the base station and the terminal increases and a radio channel state of some CCs becomes bad in a state in which multiple carriers are used, the number of data reception errors of a receiver increases and the number of retransmissions increases. In particular, if a radio channel state of a CC becomes bad in a structure in which retransmission is performed by only a CC used during initial transmission as in the
10 LTE-Advanced system, there is a problem in that the number of reception errors rapidly increases.

Also, there is a problem in that data transmitted once is retransmitted until reception succeeds during a maximum number of retransmissions, regardless of a radio channel state. This procedure leads to unnecessary retransmission operations and power
15 consumption of the terminal. There is a problem in that the waste of radio resources and the degradation of base station performance occur because other terminals may not use resources due to unnecessary retransmission.

FIG. 2 is a conceptual diagram illustrating a power consumption reduction (DRX) operation of the terminal in a mobile communication system.

20 Referring to FIG. 2, the terminal is controlled by dividing a period into an on-duration period 201 in which an operation of receiving a DL control channel transmitted from the base station is performed and a sleep period 202 in which an operation of reducing power consumption is performed by stopping a reception operation.

If the base station does not transmit a control channel to the terminal in an on-
25 duration mode, the terminal determines that it is not necessary to receive data and is

switched to a sleep mode. If the control channel is received in the on-duration mode, a wakeup state is maintained for a given time by use of an inactivity timer. A cycle in which the terminal performs an on-duration operation is indicated as a DRX cycle 203. The DRX cycle is divided into long DRX and short DRX. In the long DRX, it is possible to minimize power consumption because a data reception cycle of the terminal is long.

In the mobile communication system of the multicarrier structure, all carriers use the same DRX operation procedure. All activated carriers perform the on-duration operation when one carrier is in the on-duration mode, and also the sleep state is equally applied to all carriers.

In order to maintain the DRX operation of each carrier, a DRX-related timer is managed according to each carrier. If one carrier performs a DL control channel reception operation by the timer, all carriers are in a wakeup mode, thereby performing the same wakeup operation.

DL Carrier Management Method according to Present Invention

In a mobile communication system based on frequency division duplexing (FDD), a terminal measures a DL radio channel state, and transmits measured channel state information (CSI) to a base station. At this time, the base station manages the radio channel state of a carrier by analyzing the received DL CSI and uses the CSI as information for scheduling.

In a mobile communication system based on time division duplexing (TDD), the base station may recognize a DL radio channel state to manage the radio channel state by analyzing a UL radio channel state because the same frequency band is used in UL and DL.

FIG. 3 is a flowchart illustrating a DL carrier management method according to the present invention.

According to the present invention, the DL carrier management method may be configured as a DL carrier management method in a carrier aggregation environment so that the base station determines a DL CC of an unstable radio channel state among multiple carriers of carrier aggregation and stops data transmission by the CC.

Referring to FIG. 3, the DL carrier management method according to the present invention may be configured to include the step (S210) of determining, by the base station, a DL CC of an unstable radio channel state and the step (S220) of stopping data transmission by the DL CC of the unstable radio channel state determined in step S210.

First, in step S210, the determination of the radio channel state may be made on the basis of radio CSI received from the terminal, or the base station may directly measure and determine the radio channel state. For example, the determination may be made on the basis of whether a channel state value recognized from the received CSI is equal to or less than a given threshold reference value for a given time.

If data reception success information is not received from the terminal a given number of times or more in step S210, the base station may be configured to determine that a radio channel state of a carrier is unstable. Cases where the base station does not receive the data reception success information include when the base station receives reception failure information (NACK) or does not receive reception success information (ACK) or reception failure information (NACK) during a designated reception period (when reception fails).

Next, if it is determined that a DL CC is in an unstable radio channel state in step S210, the step (S220) of stopping data transmission by the DL CC of the unstable radio channel state is performed.

In step S220, the base station stops data allocation to the DL CC. In step S220, the base station may be configured to perform the step of transmitting a notification message for stopping retransmission by the DL CC to the terminal through another DL CC.

5 A carrier for use in the message transmission may be a primary carrier or a secondary carrier of a good radio channel state, and a position of the carrier for use in the message transmission may be indicated using a CIF.

FIG. 4 is a conceptual diagram illustrating a DL data retransmission stop procedure in a carrier aggregation environment according to the present invention.

10 In general, a data transmission procedure between the base station and the terminal is accomplished by iterating initial data transmission 310, the terminal's reception error notification 320, radio channel state notification 330, and the base station's data retransmission 340.

In the above-described DL carrier management method according to the present invention, the base station determines whether a radio channel state of some DL CCs is bad on the basis of radio channel state notification 330 or reception error notification 320 of a multicarrier received from the terminal and non-reception of reception error notification, notifies the terminal of stop of data transmission by a CC of a bad radio channel state (350), and stops the data transmission by the CC (360). Of course, the data transmission stop notification 350 and the data transmission stop 360 may be performed in reverse order.

Thus, if a transmission stop instruction is received, the terminal stops the reception error notification or retransmission procedure.

Here, methods in which the base station transmits retransmission stop information to the terminal may include a method using a control channel, a method using a data

channel, and the like. Hereinafter, four methods will be described in detail.

1) Method using Control Channel (PDCCH)

- A carrier retransmission stop indication is included in the control channel and transmitted to the terminal, and an indication method may use some fields of the control
5 channel (for example, a transport block (TB) field).

- At this time, information regarding a carrier of which retransmission is stopped may be indicated using a carrier identifier (or CIF) in the control channel.

- Information regarding data of which retransmission is stopped may be indicated by a retransmission-related field (for example, a new data indicator (NDI) field or a
10 redundancy version (RV) field) or a distinguishable value, so that the stop of all data transmissions by a CC may be indicated.

2) Method using Data Channel (PD SCH)

- A carrier retransmission stop indication is included in the data channel and transmitted to the terminal. An information indication method may be configured to
15 provide retransmission stop notification by defining a predetermined field as in the method using the control channel.

- The above-described control information may be configured by a new control message (or medium access control (MAC) control element).

3) Method using Existing Method

- An indication of new data transmission, not previous data retransmission, is
20 included in the control channel (for example, new data transmission is indicated by changing (or toggling) the NDI field of PDCCH), and resource consumption may be avoided by minimizing and allocating a size of the data channel to be allocated (or the TB field).

25 - At this time, meaningless data (or padding) may be transmitted on the data

channel so as to avoid data transmission delay using an unstable channel. It is possible to transmit retransmission stop control information described above.

4) Method using CC Deactivation Message

Using an existing carrier deactivation message, the base station transmits a
5 deactivation message for a DL CC to the terminal. If the deactivation message is received, the terminal performs a procedure of deactivating the DL CC and the base station may simultaneously stop all transmission (initial transmission and retransmission) by the DL CC.

On the other hand, the terminal receiving the data transmission stop notification
10 using the above-described method may be configured to notify the base station of the fact that a stop message has been successfully received.

In the present invention, if the terminal is notified of retransmission stop information, the terminal may be configured to stop a data retransmission procedure by terminating a control channel reception operation for retransmission data reception by a
15 designated carrier. A demodulation operation error of retransmission is prevented by initializing a reception buffer of the carrier or a retransmission block.

If a retransmission procedure of a carrier is stopped, an operation (DRX) for reducing power consumption or a carrier deactivation procedure may be performed. In further detail, the terminal does not perform the DRX operation by demodulating a
20 control channel for a given time so as to receive data in which a reception error has occurred. If the procedure of the present invention is used, the terminal may immediately stop the control channel demodulation operation and perform the DRX operation.

In the method of the related art, data initially transmitted by a specific DL CC is
25 iteratively retransmitted by a CC up to a preset maximum number of times (for example,

8 times) even when a radio channel state is unstable. However, in the DL channel management method according to the present invention, it is possible to reduce power consumption of the terminal, the waste of radio resources due to unnecessary retransmissions, and the degradation of base station performance by preventing an
5 unnecessary retransmission operation for the terminal in an unstable radio channel state.

UL Carrier Management Method according to Present Invention

The base station measures a UL radio channel state, manages a radio channel state of a received carrier, and uses it as UL scheduling information. UL scheduling is
10 performed by the base station. The base station transmits UL carrier information, information regarding a transmission data size, and the like to be used by the terminal determined by scheduling to the terminal through a control channel (PDCCH).

As a UL carrier management method in a carrier aggregation environment, the UL carrier management method according to the present invention may be configured so
15 that the base station determines a UL CC of an unstable radio channel state among multiple carriers and instructs the terminal to stop data transmission by the UL CC. At this time, if the instruction to stop data transmission by the UL CC of the unstable radio channel state is received from the base station, the terminal may be configured to stop data retransmission by the UL CC and initialize a retransmission buffer of the designated
20 UL CC.

Hereinafter, UL carrier management methods according to the present invention will be described separately on the side of the base station and the side of the terminal. FIG. 5 illustrates the UL carrier management method on the side of the base station according to the present invention, and FIG. 7 illustrates the UL carrier management
25 method on the side of the terminal according to the present invention. FIG. 6 is a

conceptual diagram illustrating a UL data retransmission stop procedure in the carrier aggregation environment according to the present invention, and is referred to in FIGS. 5 and 7.

FIG. 5 is a flowchart illustrating the UL carrier management method on the side of the base station according to the present invention.

Referring to FIG. 5, the UL carrier management method on the side of the base station according to the present invention may be configured to include the step (S410) of determining, by the base station, a UL CC of an unstable radio channel state among multiple carriers and the step (S420) of instructing the terminal to stop data transmission by the UL CC of the unstable radio channel state determined in step S410.

First, in step S410, the determination of the radio channel state may be made by determining whether a channel state value of the UL CC is equal to or less than a reference value for a given time by use of radio CSI collected by the base station or determining whether the number of reception errors of UL data received by the UL CC from the terminal is equal to or greater than a reference value for a given time.

Next, in step S420, methods of instructing the terminal to stop data transmission may include a method using a control channel, a method using a data channel, and the like. Hereinafter, four methods will be described in detail.

1) Method using Control Channel (PDCCH)

- A data transmission stop indication is included in the control channel and transmitted to the terminal, and an indication method may use some fields of the control channel (for example, a TB field).

- At this time, a UL CC of which retransmission is stopped may be indicated using a carrier identifier (or CIF) in the control channel.

- Information regarding data of which retransmission is stopped may be indicated

by a retransmission-related field (for example, an NDI field or an RV field) or a distinguishable value, so that the stop of all data transmissions by the UL CC may be indicated.

2) Method using Data Channel (PDSCH)

5 - A UL CC retransmission stop indication is included in the data channel and transmitted to the terminal. An information indication method may be configured to provide retransmission stop notification by defining a predetermined field as in the method using the control channel.

 - The above-described control information may be configured by a new control
10 message (or MAC control element).

3) Method using Existing Method

 - An indication of new data transmission, not previous data retransmission, is included in the control channel (for example, new data transmission is indicated by changing (or toggling) the NDI field of PDCCH), and resource consumption may be
15 avoided when the terminal transmits UL data by minimizing and allocating a size of the data channel to be allocated (or the TB field).

 - At this time, the terminal may transmit meaningless data (or padding) on the data channel so as to avoid data transmission delay using an unstable channel.

4) Method using CC Deactivation Message

20 If the base station instructs the terminal to stop data retransmission using a carrier deactivation message, and the terminal receives the carrier deactivation message from the base station, the terminal may perform a deactivation procedure of a corresponding carrier and, simultaneously (or before/after the deactivation procedure), stop all transmission (initial transmission and retransmission) by the carrier.

25 FIG. 6 is a conceptual diagram illustrating a UL data retransmission stop

procedure in a carrier aggregation environment according to the present invention.

In general, a data transmission procedure between the base station and the terminal is accomplished by iterating the base station's initial transmission approval, the terminal's initial data transmission, the base station's data retransmission approval, and
5 the terminal's retransmission operation.

However, in the UL carrier management method according to the present invention, the base station determines a radio channel state (550), and makes a transmission stop instruction 560 to stop transmission by a carrier if the radio channel state of a UL CC received from the terminal is bad. Thus, the base station stops an
10 approval of retransmission by the carrier (570), and the terminal stops a retransmission procedure when receiving the transmission stop instruction (580).

FIG. 7 is a flowchart illustrating the UL carrier management method on the side of the terminal according to the present invention.

Referring to FIG. 7, the UL carrier management method on the side of the terminal according to the present invention may be configured to include the step (S610)
15 of receiving, by the terminal, an instruction to stop data transmission by a UL CC of an unstable radio channel state from the base station and the step (S620) of stopping data retransmission by the designated UL CC when the data transmission stop instruction is received, and initializing a retransmission buffer of the designated UL CC.

20 First, because the step (S610) of receiving, by the terminal, the data transmission stop instruction to stop the data transmission by the UL CC of the unstable radio channel state from the base station may be configured in correspondence with the method for the data transmission stop instruction transmitted from the base station in step S410 of FIG. 4, redundant description thereof is omitted.

25 Next, in step S620, the terminal may be configured to stop the data retransmission

by the UL CC when receiving the instruction to stop the data transmission by the designated UL CC of the unstable radio channel state, and initialize the retransmission buffer of the designated UL CC.

That is, in step S620, the terminal prevents a modulation operation error related to retransmission by stopping the data retransmission by the designated UL CC and initializing the UL CC or the retransmission buffer. If retransmission by a carrier is stopped, an operation (DRX) for reducing power consumption or a carrier deactivation procedure may be performed.

In the method of the related art, data initially transmitted by a specific UL CC is iteratively retransmitted by a carrier up to a preset maximum number of times (for example, 8 times) even when a radio channel state is unstable. In particular, there is a problem in that the terminal continuously performs retransmission even when the base station does not approve the retransmission in UL differently from DL as described above. In further detail, there is a problem in that the terminal retransmits data by a carrier by determining that a reception error has occurred if a given time has elapsed even when a data retransmission instruction is not received from the base station through a control channel after data transmission. However, in the UL carrier management method according to the present invention, it is possible to reduce power consumption of the terminal, the waste of radio resources due to unnecessary retransmissions, and the degradation of base station performance by preventing an unnecessary retransmission operation when a radio channel state is unstable.

Carrier State Management Method of Base Station and Terminal

On the other hand, in the above-described DL and UL carrier management methods, a deactivation message may be used to signal a data transmission stop

instruction and a secondary carrier to be used in communication may be deactivated according to the deactivation message. It should be understood that a secondary-carrier deactivation operation may be applied to a general secondary-carrier deactivation procedure using the deactivation message as well as the case where the deactivation
 5 message is used to signal the data transmission stop instruction.

At this time, if the secondary carrier to be used in communication is deactivated, the terminal initializes a buffer to be used for data retransmission of the secondary carrier. Hereinafter, a detailed deactivation procedure will be described.

When use of the secondary carrier is stopped, the base station transmits a
 10 secondary-carrier deactivation message to the terminal. Upon receipt of the deactivation message, the terminal changes the secondary carrier to a deactivation state. Here, secondary carriers to be deactivated through a procedure according to the deactivation message include a UL CC and a DL CC.

According to the present invention, a deactivation state change of the terminal
 15 includes the following.

- A demodulation procedure of a DL secondary carrier is stopped.
- Data transmission using a UL secondary carrier is stopped.
- A DL retransmission buffer of the secondary carrier is initialized and a retransmission procedure is stopped.
- 20 - A UL retransmission buffer of the secondary carrier is initialized and a retransmission procedure is stopped.

When the deactivation message has been transmitted, the base station should operate to maintain the same state information for the secondary carrier as the terminal so as to support the deactivation state of the terminal.

25 FIG. 8 is a flowchart illustrating an example of a carrier state management

method of the base station according to the present invention, and FIG. 9 is a flowchart illustrating an example of a carrier state management method of the terminal according to the present invention.

In addition, FIG. 10 is a conceptual diagram illustrating a carrier state management method according to the present invention, and illustrates messages exchanged between the base station and the terminal, transmission and reception times of the messages, and operations to be performed on the two sides. In FIG. 10, the vertical axis is the time axis and the vertical downward direction represents the passage of time.

The carrier state management methods of the base station and the terminal will be described with reference to FIGS. 8 and 9 along with FIG. 10.

Referring to FIG. 8, the carrier state management method of the base station according to the present invention may be configured to include the step (S810) of transmitting a deactivation message for a secondary carrier to the terminal and the step (S820) of changing the secondary carrier to the deactivation state after a predetermined time from the transmission of the deactivation message.

The carrier state management method of the base station according to the present invention is used to solve inconsistency of state information and state change times for secondary carriers that are managed by the base station and the terminal in consideration of the occurrence of time delay for deactivation message reception and demodulation until the terminal performs a carrier state change procedure by receiving and demodulating a deactivation message when the base station has transmitted the deactivation message.

Referring to FIG. 10, the base station performs the step (S810 of FIG. 8) of transmitting the deactivation message to the terminal at a time t_1 . At this time, the base station may stop data transmission and retransmission by a secondary carrier immediately

after the transmission of the deactivation message. In addition, the base station may additionally perform the step of stopping DL transmission of the secondary carrier and initializing UL and DL retransmission buffers after the step (S810) of transmitting the deactivation message.

- 5 The base station may perform the step (S820) of changing state information for a secondary carrier that is managed by the base station to the deactivation state at a time t_5 after the lapse of a predetermined time (t_5-t_1) .

On the other hand, the base station may be configured to perform the step of receiving a reception success (acknowledgement) message for the deactivation message from the terminal after the step (S810) of transmitting the deactivation message. In this case, the step (S820) of changing the secondary carrier to the deactivation state may be embodied by changing the secondary carrier to the deactivation state after a predetermined time (t_5-t_4) from a time t_4 when the reception success message is received. In general, a difference (t_4-t_1) between the transmission time t_1 of the deactivation message of the base station and the reception time t_4 of the reception success message transmitted by the terminal is configured to have a fixed value, except for the influence of propagation delay of the reception success message, so that (t_5-t_1) may also be defined if (t_5-t_4) is defined.

10
15

On the other hand, the predetermined time may be a value predefined to make state information that is managed by the terminal consistent with state information that is managed by the base station for the secondary carrier.

20

Next, referring to FIG. 9, the carrier state management method of the terminal according to the present invention may be configured to include the step (S910) of receiving a deactivation message for a secondary carrier from the base station and the step (S920) of changing the secondary carrier to the deactivation state after a

25

predetermined time from the reception of the deactivation message.

The terminal may be configured to stop data transmission and retransmission using the above-described secondary carrier immediately when the deactivation message is successfully received (demodulated) in step S910. In addition, after the step of
5 receiving the deactivation message, the terminal may be configured to additionally perform the step of stopping the UL transmission of the secondary carrier and initializing the UL and DL retransmission buffers.

Thereafter, the base station may perform the step (S920) of changing the secondary carrier that is managed by the base station to the deactivation state at the time
10 t_5 after a predetermined time (t_5-t_2) has elapsed from the deactivation message reception (t_2).

On the other hand, the terminal may be configured to transmit the reception success (acknowledgement) message for the deactivation message received from the base station to the base station. In this case, the step (S920) of changing the secondary
15 carrier to the deactivation state may be embodied by changing the secondary carrier to the deactivation state after a predetermined time (t_5-t_3) from a time t_3 when the reception success message is transmitted. In general, a difference (t_3-t_2) between the reception time t_2 of the deactivation message of the terminal and the transmission time t_3 of the reception success message transmitted by the terminal is configured to have a fixed value,
20 so that (t_5-t_2) may also be defined if (t_5-t_3) is defined.

At this time, the predetermined time may be a value predefined to make state information that is managed by the terminal consistent with state information that is managed by the base station for the secondary carrier.

As described above, a predetermined time that is the elapsed time until the base
25 station changes the state information for the secondary carrier to the deactivation state, is

configured to be different from a predetermined time that is the elapsed time until the terminal changes the state information for the secondary carrier to the deactivation state. That is, the above-described predetermined times should be set by considering the transmission delays of the deactivation message and the reception success message, processing times required for demodulations thereof, and the like.

On the other hand, the “consistency” of the carrier state information may not mean that state information that is managed by the base station and the terminal should be accurately synchronized and maintained and state change times should be accurately consistent. Although an example in which the base station and the terminal make a carrier state change at the same time t_5 is illustrated in FIG. 10, it should be understood that the “consistency” of the carrier state information in the present invention is consistency of a degree in which problems due to differences of state information and change times that are managed by the base station and the terminal may be prevented. For example, the “consistency” may be consistency of a level at which the object of the present invention is satisfied so that a problem does not occur when the terminal manages a secondary carrier in the activation state, even when the base station manages a specific secondary carrier in the deactivation state.

On the other hand, a procedure of changing a secondary carrier to the deactivation state when the deactivation message is not used and the base station and the terminal do not perform communication using the secondary carrier for a given time is also the same as described above.

That is, in another example of the carrier state management method of the base station according to the present invention, the base station may be configured to determine whether or not to change a secondary-carrier state to the deactivation state by determining whether or not transmission/reception through a secondary carrier has been

performed for a given time, and change the secondary carrier to the deactivation state after a predetermined time from when the change of the secondary-carrier state to the deactivation state is determined.

In addition, in another example of the carrier state management method of the terminal according to the present invention, the terminal may be configured to determine whether or not to change a secondary-carrier state to the deactivation state by determining whether or not transmission/reception through a secondary carrier has been performed for a given time, and change the secondary carrier to the deactivation state after a predetermined time from when the change of the secondary-carrier state to the deactivation state is determined.

In other examples of the carrier state management methods of the base station and the terminal according to the present invention, it is possible to determine whether or not to change the secondary-carrier state to the deactivation state using a timer. For example, it is possible to determine to change the secondary carrier to the deactivation state by determining that the communication through the secondary carrier has not been performed for the given time upon expiration of the timer of which a value continuously decreases (or increases) while communication through the secondary carrier is not performed. At this time, the timer may be reset every time communication through the secondary carrier is performed.

In the other examples of the carrier state management methods of the base station and the terminal according to the present invention, the predetermined time may be a value predefined to make state information that is managed by the terminal consistent with state information that is managed by the base station for the secondary carrier as described in the example of the carrier state management method. The base station and the terminal may be configured to have different values for the predetermined time.

However, when the base station and the terminal manage separate timers, the timers should be designed so that a procedure of changing a secondary carrier to the deactivation state may be performed at the same time. In addition, the predetermined time should be designed so that carrier state change times of the two sides are consistent.

5 Because the concept of “consistency” of the carrier state information and the carrier state change time is the same as in the example of the carrier state management method according to the present invention described above, description thereof is omitted.

Details of Secondary-Carrier Deactivation Procedure according to Present

10 Invention

In the present invention, the terminal stops a power consumption reduction operation (DRX) for a secondary carrier when the secondary carrier used by the terminal is deactivated. Hereinafter, a detailed procedure will be described.

15 In the mobile communication system of the multicarrier structure, the power consumption operation of the terminal is performed to control a plurality of carriers in parallel. Thus, the terminal controls a DRX operation according to each multicarrier, and particularly, a timer related to HARQ retransmission control is managed in each HARQ process unit.

20 More specifically, an HARQ retransmission procedure is performed in units of secondary carriers, and retransmission is performed through the same secondary carrier if initial transmission fails. If data transmission fails, the terminal manages a DRX-retransmission timer and an HARQ round trip time (RTT) timer according to each HARQ process. Accordingly, if the data transmission fails, the HARQ timer is set to 8 for a data block of which transmission fails, and the DRX-retransmission timer is set to a
25 given value. After the terminal is in a sleep mode during 8 subframes according to the

set value, the HARQ RTT timer is terminated, the DRX-retransmission timer starts to wake up, and retransmission data is received.

However, when the secondary carrier is deactivated and it is not necessary to perform retransmission, the HARQ RTT timer and the DRX-retransmission timer are
5 initialized so that a wakeup operation for a retransmission procedure is not performed.

FIG. 11 is a diagram illustrating a secondary-carrier deactivation procedure according to the present invention.

As illustrated in FIG. 11, secondary-carrier retransmission is iterated and the DRX-retransmission timer and the HARQ RTT timer are in operation. At this time, if
10 the deactivation message is received, the terminal terminates the operation of the DRX-retransmission timer and stops an unnecessary wakeup state.

In the present invention, when the secondary carrier is in operation in an on-duration state or is maintained in the wakeup state by an inactivity timer, the terminal immediately stops the on-duration state or the inactivity timer and stops the wakeup
15 operation if a deactivation message of a secondary carrier is received from the base station.

While the present invention have been described above with reference to the above-described embodiments, it will be understood by those skilled in the art that that various changes, substitutions and alterations may be made herein without departing
20 from the spirit and scope of the invention as defined in the following claims.

【CLAIMS】

1. A carrier management method of a base station for use in a carrier aggregation environment, comprising:

transmitting a deactivation message for a secondary carrier to a terminal;

5 changing the secondary carrier to a deactivation state based on a predetermined time from the transmission of the deactivation message; and

stopping downlink (DL) data transmission of the secondary carrier and initializing uplink (UL) and DL retransmission buffers after transmitting the deactivation message.

10

2. The carrier management method of claim 1, wherein the predetermined time is a value predefined to make state information that is managed by the base station consistent with state information that is managed by the terminal for the secondary carrier.

15

3. The carrier management method of claim 1, further comprising:

receiving a reception success message for the deactivation message from the terminal after transmitting the deactivation message,

wherein the changing of the secondary carrier to the deactivation state includes

20 changing, by the base station, the secondary carrier to the deactivation state after a predetermined time from an arrival time of the reception success message.

4. The carrier management method of claim 1, further comprising:

immediately stopping, by the base station, data transmission and retransmission

25 using the secondary carrier immediately after transmitting the deactivation message.

5. A carrier management method of a terminal for use in a carrier aggregation environment, comprising:

receiving a deactivation message for a secondary carrier from a base station;

30 changing the secondary carrier to a deactivation state based on a predetermined time from the reception of the deactivation message; and

stopping UL data transmission of the secondary carrier and initializing UL and DL retransmission buffers after receiving the deactivation message.

5 6. The carrier management method of claim 5, wherein the predetermined time is a value predefined to make state information that is managed by the base station consistent with state information that is managed by the terminal for the secondary carrier.

10 7. The carrier management method of claim 5, further comprising:
transmitting a reception success message for the deactivation message to the base station after receiving the deactivation message,
wherein the changing of the secondary carrier to the deactivation state includes changing, by the terminal, the secondary carrier to the deactivation state after a predetermined time from a transmission time of the reception success message.

15 8. The carrier management method of claim 5, further comprising:
immediately stopping, by the terminal, data transmission and retransmission using the secondary carrier immediately after receiving the deactivation message.

20

【ABSTRACT】

Disclosed is a carrier management method for use in a carrier aggregation environment of a mobile communication system. In the method, a base station is configured to transmit a deactivation message for a secondary carrier to a terminal and
5 change the secondary carrier to a deactivation state after a predetermined time from the transmission of the deactivation message. The terminal receives the deactivation message transmitted by the base station, and changes the secondary carrier to the deactivation state after a predetermined time from the transmission of the deactivation message. As the predetermined time, a predefined value may be used to prevent
10 inconsistency of secondary-carrier state information that is managed by the base station and the terminal. If the carrier state management information is used, it is possible to prevent inconsistency of secondary-carrier states that are managed by the base station and the terminal and solve problems due to the inconsistency.

FIG. 1

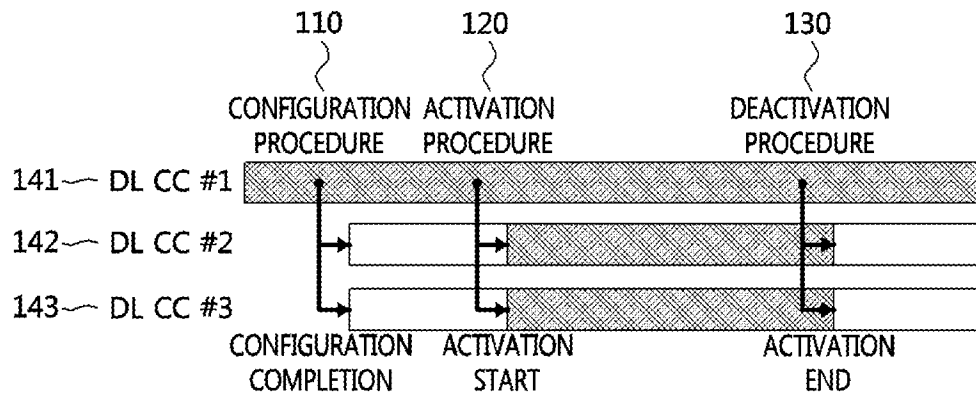


FIG. 2

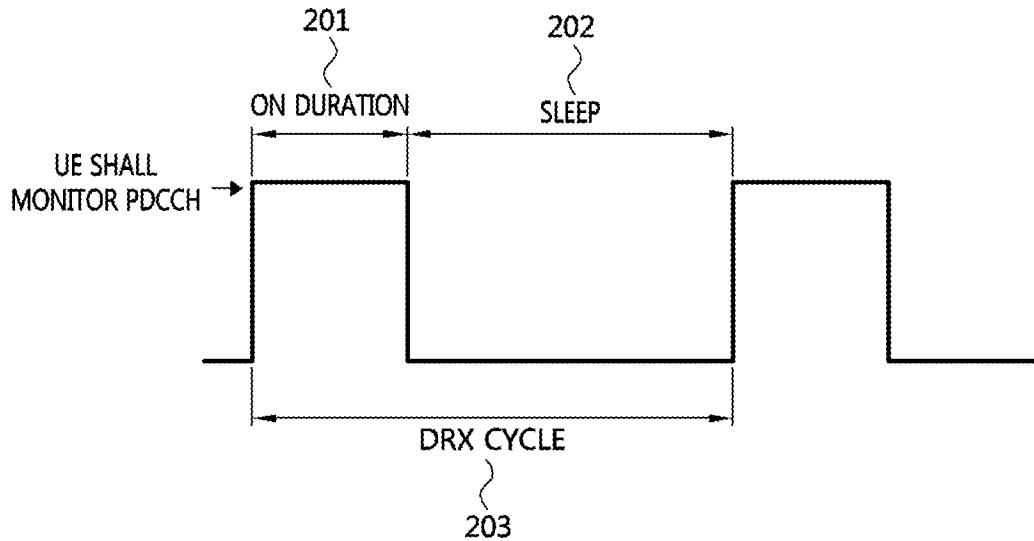


FIG. 3

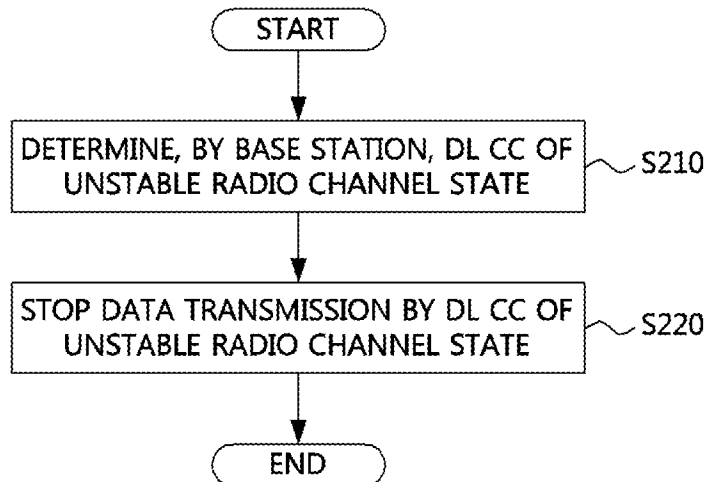


FIG. 4

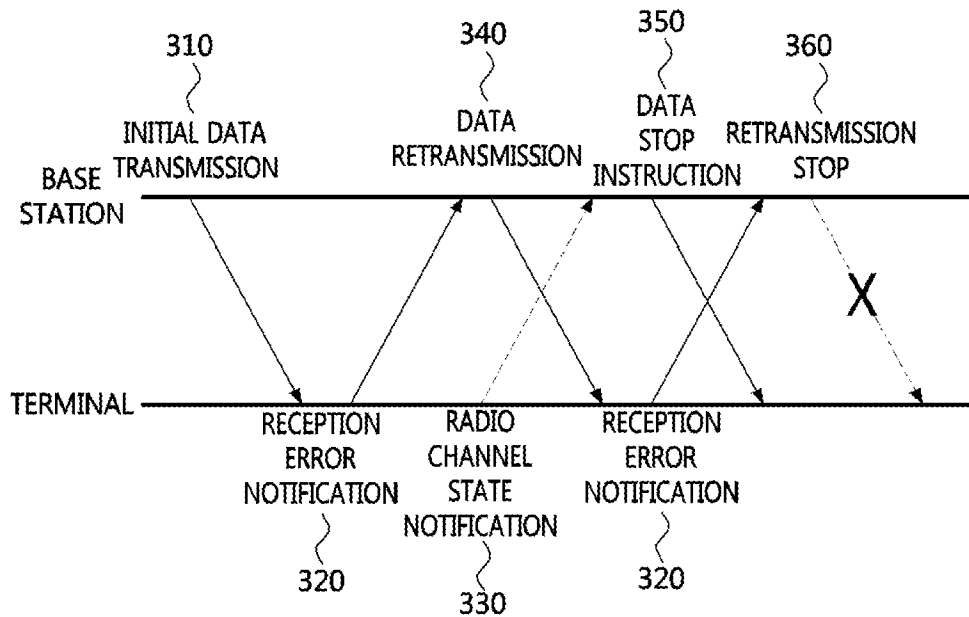


FIG. 5

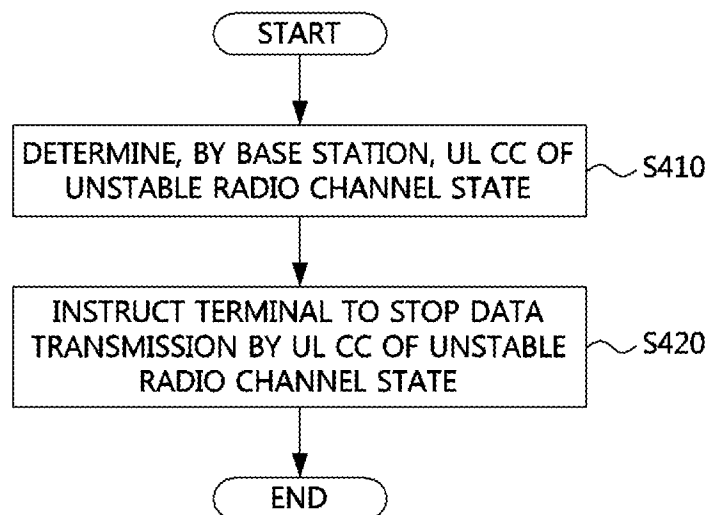


FIG. 6

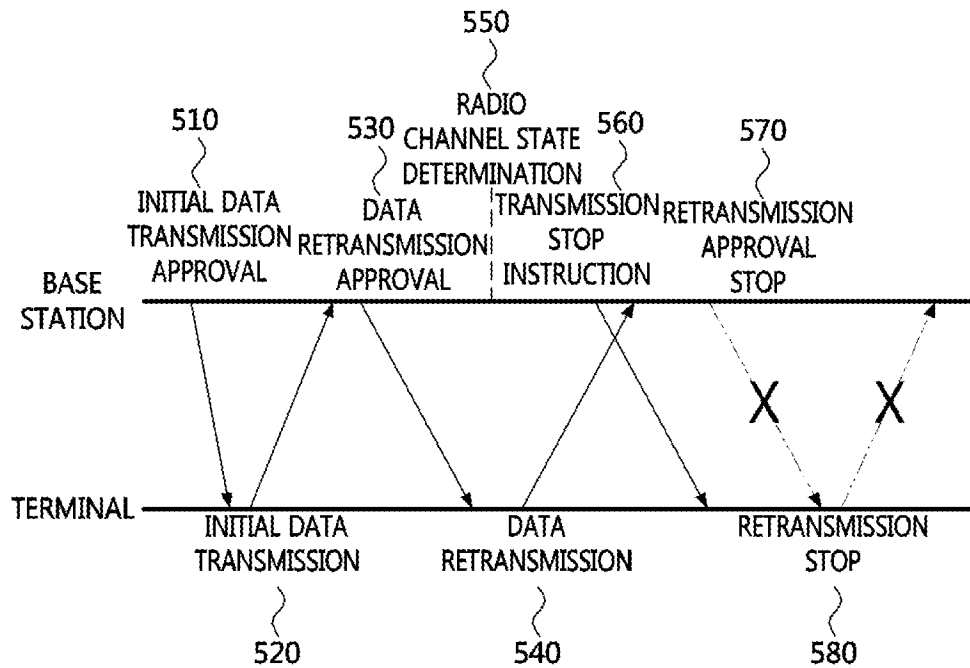


FIG. 7

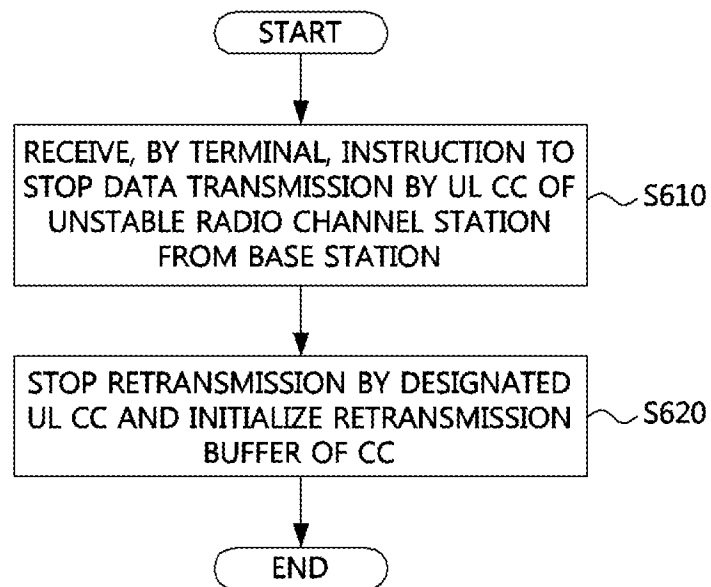


FIG. 8

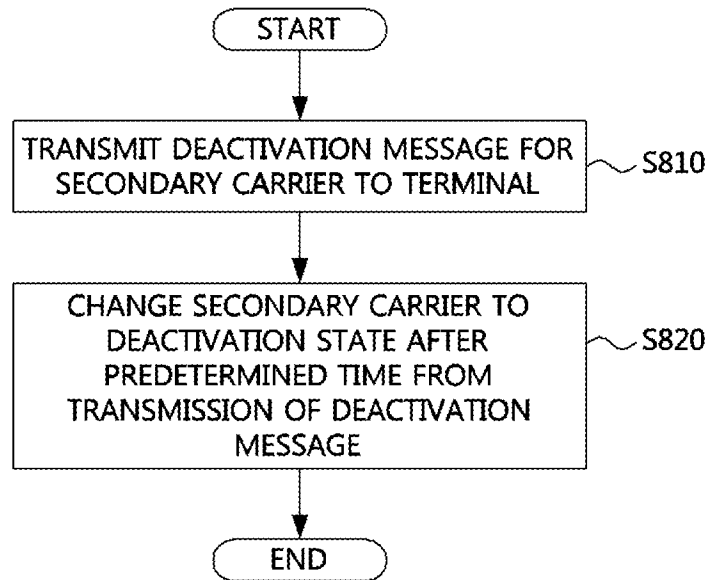


FIG. 9

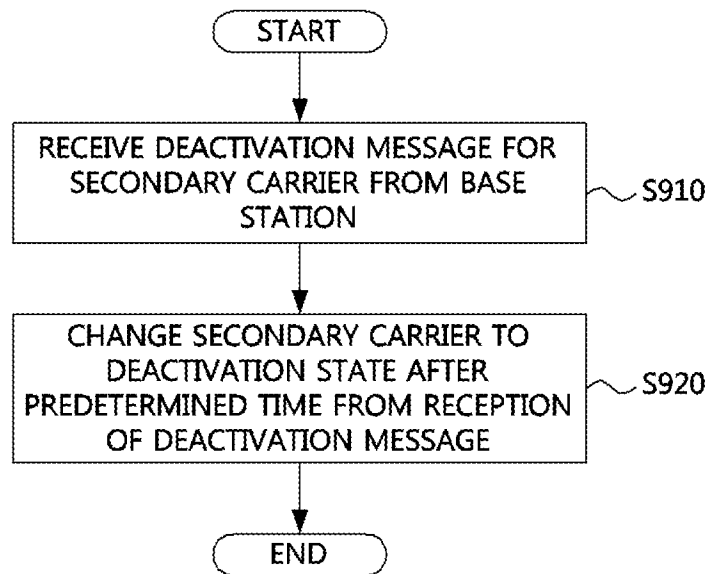


FIG. 10

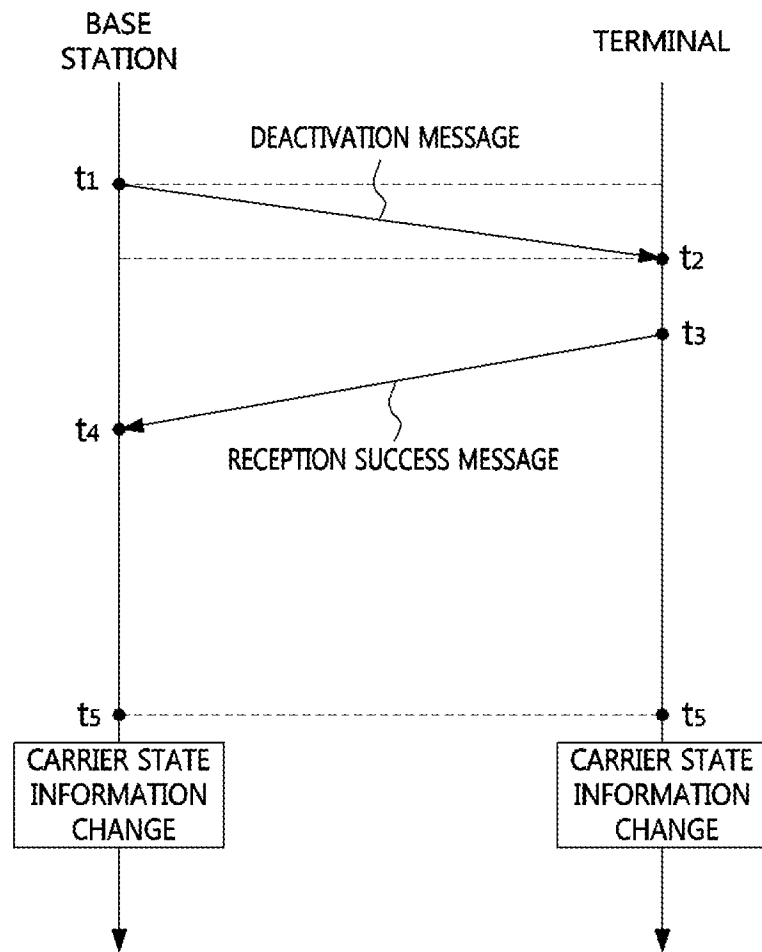
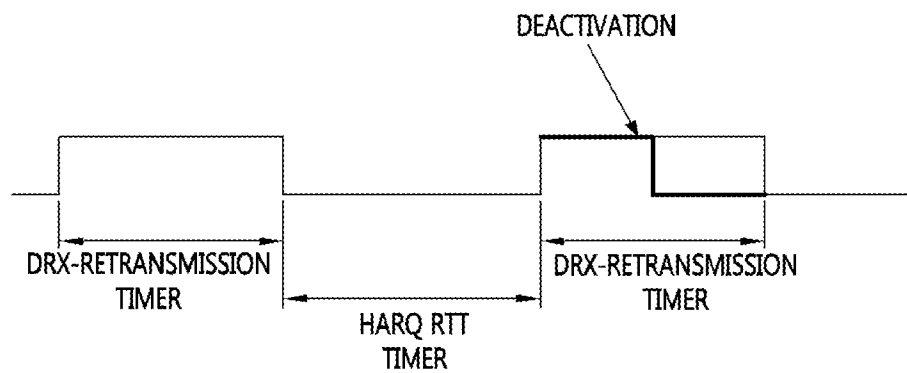


FIG. 11



DECLARATION UNDER 37 CFR 1.63

As a below-named inventor, I hereby declare that this declaration is directed to the application attached hereto, or to United States Application Number or PCT International Application Number _____ filed on _____ (if applicable), entitled:

**METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A
MOBILE COMMUNICATION SYSTEM**

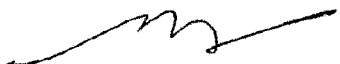
The above-identified application was made or authorized to be made by me.

I believe I am the original inventor or an original joint inventor of a claimed invention in the above-identified application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 USC 1001 by fine or imprisonment of not more than five (5) years, or both.

I have reviewed and understand the contents of the above-identified application, including the claims.

I am aware of the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information that became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

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POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in the accompanying transmittal letter (form PTO/AIA/15, PTO/SB/16, PTO/AIA/18, PTO/AIA/19, PTO/SB/29, PTO/AIA/50, PTO/AIA/82A, or equivalent).

I hereby appoint the practitioners of NSIP Law associated with the following Customer Number as my attorneys or agents to transact all business in the United States Patent and Trademark Office connected with the application identified in the accompanying transmittal letter:

89980

Please recognize or change the correspondence address for the application identified in the accompanying transmittal letter to the address of NSIP Law associated with the following Customer Number:

89980

I, the below-named Assignee, am the original Applicant (if there is only one Applicant) or an original Applicant (if there is more than one Applicant) of the application identified in the accompanying transmittal letter. The undersigned, whose title is supplied below, is authorized to act on behalf of the Assignee.

Name of Assignee	Electronics and Telecommunications Research Institute		
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Signature		Date	28-07-2015
Name	Ickchan Lee		
Title	Director Intellectual Property Management Team		

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

INVENTORS: Kyoung Seok LEE, et al.

CONFIRMATION NO.: Not Yet Assigned

APPLICATION NO.: New Application

GROUP ART UNIT: Not Yet Assigned

FILING DATE: Concurrently Herewith

EXAMINER: Not Yet Assigned

TITLE: METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION
ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir:

Applicant hereby submits the following information in accordance with the duty of disclosure set forth in 37 C.F.R. § 1.56.

MPEP 609.02(A)(2) states as follows (emphasis added):

The examiner will consider information which has been considered by the Office in a parent application when examining: (A) a continuation application filed under 37 CFR 1.53(b), (B) a divisional application filed under 37 CFR 1.53(b), or (C) a continuation-in-part application filed under 37 CFR 1.53(b). A listing of the information need not be resubmitted in the continuing application unless the applicant desires the information to be printed on the patent.

If resubmitting a listing of the information, applicant should submit a new listing that complies with the format requirements in 37 CFR 1.98(a)(1).

Accordingly, attached hereto is an Information Disclosure Statement complying with the format requirements in 37 CFR 1.98(a)(1) and listing the references cited in parent application number 13/884,216. This Information Disclosure Statement is being presented concurrently with the filing of the new application, and therefore no fee is due at this time.

It is respectfully requested that an Examiner-initialed copy of the attached PTO/SB08 form be returned to the undersigned.

Dated: August 20, 2015

By: /Franklin R. Bryan/
Reg. No. 68,313
NSIP Law
P.O. Box 65745
Washington, DC 20035
Tel: (202) 429-0020

Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>			Complete if Known		
			Application Number	Not Yet Assigned	
			Filing Date	Concurrently Herewith	
			First Named Inventor	Kyoung Seok Lee	
			Art Unit	Not Yet Assigned	
			Examiner Name	Not Yet Assigned	
Sheet	1	of	2	Attorney Docket Number	175090.0011C1

Substitute for PTO/SB/08a/b

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number Number - Kind Code ² (if known)	Patent or Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
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		US 2014/0328284 A1	11-06-2014	Jang et al.	
		US 8,976,694 B2	03-10-2015	Feuersanger et al.	

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

IPR2024-00608
Petitioners' Ex. 1003
Ex.1003.00058

Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>				Complete if Known	
				Application Number	Not Yet Assigned
				Filing Date	Concurrently Herewith
				First Named Inventor	Kyoung Seok Lee
				Art Unit	Not Yet Assigned
				Examiner Name	Not Yet Assigned
Sheet	2	of	2	Attorney Docket Number	175090.0011C1

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document	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
		Country Code ³ - Number ⁴ - Kind Code ⁵ (if known)				
		KR 10-2009-0074279 A1	07-06-2009	Interdigital Technology Corporation		X
		KR 10-2010-0118067 A1	11-04-2010	LG Electronics Inc.		X
		WO 12/064052 A3	05-18-2012	Electronics and Telecommunications Research Institute		X

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ⁶
		Ericsson, ST-Ericsson, "DXR with Carrier Aggregation in LTE-Advanced," 3GPP TSG-RAN WG2 #67bis, Tdoc R2-095809, 4 pages (2009)	
		International Search Report and Written Opinion for Application No. PCT/KR2011/008404, 14 pages, dated May 29, 2012.	

Examiner Signature		Date Considered	
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IPR2024-00608
Petitioners' Ex. 1003
Ex.1003.00059

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 14/831,023		
APPLICATION AS FILED - PART I								
(Column 1)		(Column 2)		SMALL ENTITY		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	70		N/A		
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	300		N/A		
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A		
TOTAL CLAIMS (37 CFR 1.16(j))	8	minus 20 = *	x 40 =	0.00	OR			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2	minus 3 = *	x 210 =	0.00				
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00				
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	730		TOTAL		
APPLICATION AS AMENDED - PART II								
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	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))					OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					OR		
			TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	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))					OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					OR		
			TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.								



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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
14/831,023	08/20/2015	2414	730	175090.0011C1	8	2

CONFIRMATION NO. 8602

FILING RECEIPT



0000000077229983

89980
NSIP LAW
P.O. Box 65745
Washington, DC 20035

Date Mailed: 09/03/2015

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Kyoung Seok LEE, Daejeon, KOREA, REPUBLIC OF;
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Kook Jin LEE, Daejeon, KOREA, REPUBLIC OF;

Applicant(s)

Electronics and Telecommunications Research Institute, Daejeon, KOREA, REPUBLIC OF;

Assignment For Published Patent Application

Electronics and Telecommunications Research Institute, Daejeon, KOREA, REPUBLIC OF

Power of Attorney: The patent practitioners associated with Customer Number 89980

Domestic Priority data as claimed by applicant

This application is a CON of 13/884,216 05/08/2013 PAT 9144106
which is a 371 of PCT/KR2011/008404 11/07/2011
which is a CON of 13/208,471 08/12/2011 PAT 8743720

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.)

REPUBLIC OF KOREA 10-2010-0077880 08/12/2010

REPUBLIC OF KOREA 10-2010-0110649 11/08/2010

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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 14/831,023**

Projected Publication Date: 12/10/2015

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A
MOBILE COMMUNICATION SYSTEM

Preliminary Class

370

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

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is a true copy from the records of the Korean Intellectual
Property Office

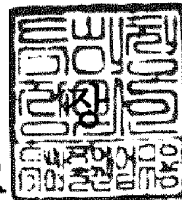
출 원 번 호 : 10-2010-0110649
Application Number

출 원 년 월 일 : 2010년 11월 08일
Filing Date NOV. 08, 2010

출 원 인 : 한국전자통신연구원
Applicant(s) Electronics and Telecommunications
Research Institute

2015년 09월 15일

특 허 청
COMMISSIONER



제출 일자 : 2010-11-08

【서지사항】

【서류명】	특허출원서
【참조번호】	1010
【출원구분】	특허출원
【출원인】	
【명칭】	한국전자통신연구원
【출원인코드】	3-1998-007763-8
【대리인】	
【명칭】	특허법인 이상
【대리인코드】	9-2008-100021-0
【포괄위임등록번호】	2009-067212-3
【발명의 국문명칭】	멀티 캐리어 구조의 이동통신 시스템에서 부 캐리어 제어 방법
【발명의 영문명칭】	A method for secondary carrier management on multiple component carrier systems
【발명자】	
【성명】	이경석
【성명의 영문표기】	Kyoung Seok Lee
【주민등록번호】	681001-1XXXXXX
【우편번호】	302-120
【주소】	대전광역시 서구 둔산동 샘머리아파트 214-1704
【국적】	KR
【발명자】	
【성명】	김재흥
【성명의 영문표기】	Jae Heung Kim
【주민등록번호】	660220-1XXXXXX

제출 일자 : 2010-11-08

【우편번호】 305-728

【주소】 대전광역시 유성구 전민동 세종아파트 108-302

【국적】 KR

【발명자】

【성명】 이국진

【성명의 영문표기】 Kook Jin Lee

【주민등록번호】 830404-1XXXXXX

【우편번호】 302-120

【주소】 대전광역시 서구 둔산동 벅스밸리 B동 1517호

【국적】 KR

【이 발명을 지원한 국가연구개발사업】

【과제고유번호】 KI001484

【부처명】 지식경제부/방통통신위원회

【연구사업명】 정보통신산업원천기술개발사업

【연구과제명】 차세대 이동통신 서비스 플랫폼 개발

【주관기관】 한국전자통신연구원

【연구기간】 2010.01.01 ~ 2010.12.31

【취지】 위와 같이 특허청장에게 제출합니다.

대리인 특허법인 이상 (서명 또는 인)

【수수료】

【출원료】 0 면 38,000 원

【가산출원료】 15 면 0 원

【우선권주장료】 0 건 0 원

【심사청구료】 0 항 0 원

제출 일자 : 2010-11-08

【합계】	38,000 원
【감면사유】	정부출연연구기관
【감면후 수수료】	19,000 원

【명세서】

【발명의 명칭】

멀티 캐리어 구조의 이동통신 시스템에서 부 캐리어 제어 방법{A method for secondary carrier management on multiple component carrier systems}

【기술분야】

<1> 본 발명은 3GPP에서 표준화 중인 LTE-Advanced 시스템이 복수 개의 캐리어를 사용하여 기지국과 단말기의 통신을 수행하는 구조에서 부캐리어 통신과 관련된 단말기의 재전송(HARQ) 및 DRX (Discontinuous Reception) 제어를 효율적으로 지원함으로써 단말기의 전력소모 최소화 및 기지국과 단말기의 동작 불일치를 방지하기 위한 방법에 관한 것이다.

【배경기술】

<2> 이동통신 표준화 기구인 3GPP는 차세대 이동통신 규격 개발을 위하여 LTE(Long Term Evolution) 시스템 규격을 개발하였다. 또한, ITU-R에서 제안한 IMT-Advanced 요구 사항을 충족하기 위하여 LTE 규격을 확장한 LTE-Advanced 시스템 규격을 개발하고 있다.

<3> LTE 규격은 이동통신을 위한 최대 무선 대역폭을 20MHz까지 지원하며, LTE-Advanced 규격은 최대 100MHz 대역폭을 지원하도록 대역폭 통합(carrier aggregation) 기술을 사용한다. 이에 따라, 100MHz 대역폭은 최대 20MHz 크기의 캐리어(CC: Component Carrier)로 구분하고, 기지국과 단말기는 복수 개의 캐리어를

동시에 사용하여 통신할 수 있다.

<4> 멀티 캐리어 통신을 지원하는 단말기는 복수 개의 무선 채널을 광대역으로 사용하며, 통신에 사용하는 주파수 대역폭이 넓을수록 전력소모가 증가한다. 그러므로, LTE-Advanced 시스템의 단말기는 통신량이 많은 경우에만 멀티 캐리어를 활성화하여 통신에 사용하고 통신량이 작으면 단일 캐리어만을 사용하여 통신한다.

<5> 도 1은 멀티 캐리어 제어 절차를 나타낸 도면이다.

<6> 도 1은 멀티캐리어 환경에서 기지국이 단말기의 부캐리어를 제어하기 위한 일반적인 절차를 나타낸 도이다.

<7> LTE-Advanced 시스템은 멀티 캐리어 관리 단계를 설정(configuration) 단계와 활성화(activation) 단계로 나누어 제어한다.

<8> 단말기가 멀티 캐리어 통신을 제공하는 기지국에 접속할 때 설정(configuration) 절차를 사용하여 멀티 캐리어 통신 환경을 구축한다. 기지국은 설정 메시지를 송신하여 단말기가 멀티 캐리어 통신에 대한 설정 정보를 저장하고 해당 캐리어의 통신을 준비하도록 한다.

<9> 단말기가 통신량이 작을 때에는 단일 캐리어만을 사용하여 기지국과 통신한다 (도 1의 DL CC #1과 UL CC #1 사용). 단일 캐리어를 사용하는 상태에서 사용하는 캐리어는 주 캐리어(Primary Carrier) 또는 주 셀(Primary Cell)로 지칭하며, 주 캐리어의 무선 채널 상태는 빠른 주기로 측정하여 안정적인 통신 가능 상태로 관리한다.

<10> 기지국은 단말기의 통신량이 증가하면 활성화(activation) 절차를 사용하여 단말기가 복수 개의 캐리어를 실제로 사용하도록 한다. 멀티 캐리어 환경을 위하여 활성화되는 캐리어는 부 캐리어(Secondary Carrier) 또는 부 셀(Secondary Cell)로 지칭하며, 주 캐리어보다 낮은 단계로 무선 채널 상태를 관리한다.

<11> 부 캐리어의 활성화를 위하여 기지국은 단말기로 활성화 메시지를 송신하며, 단말기는 해당 메시지를 수신하면 해당 부 캐리어를 활성화하고 통신에 사용하며, 따라서 멀티 캐리어로 대용량의 데이터를 송수신하게 되어 데이터 전송률이 증가한다. 기지국은 단말기와의 통신량이 감소하면 비활성화(deactivation) 메시지를 송신하여 단말기가 단일 캐리어만을 사용하도록 변경하며, 타이머를 사용하여 일정시간 동안 부캐리어로 데이터 통신이 이루어지지 않은 경우에도 해당 부캐리어를 비활성화한다.

<12> 도 2는 단말기의 전력소모 감소(DRX) 동작을 나타낸 도면이다.

<13> 도 2는 이동통신 시스템에서 단말기의 전력소모 감소(DRX) 동작을 나타낸 도면이다.

<14> 단말기는 기지국에서 송신하는 하향링크 제어 채널의 수신 동작을 수행하는 기간(On Duration)과 수신 동작을 중지하고 전력소모를 줄이는 동작(sleep)을 수행하는 기간으로 나뉘어 단말기를 제어한다. 단말기가 On Duration 수행 중에 기지국이 단말기로 제어 채널을 송신하지 않으면, 단말기는 데이터를 수신할 필요가 없는 것으로 판단하여 sleep 동작으로 전환한다. 또한, On Duration 수행 중에 제어 채널

널이 수신되면 inactivity timer를 사용하여 일정시간동안 wakeup 상태를 유지한다. 단말기가 On Duration 동작을 수행하는 주기는 DRX Cycle로 표시한다. DRX Cycle은 Long DRX와 Short DRX로 나뉘어 표시되며, Long DRX는 단말기의 데이터 수신 주기가 크기 때문에 전력소모를 최대한 줄일 수 있다.

<15> 멀티캐리어 구조의 이동통신 시스템에서 모든 캐리어는 동일한 DRX 동작 절차를 사용한다. 하나의 캐리어가 On Duration일 경우에는 활성화된 모든 캐리어가 On Duration 동작을 수행하며, sleep 상태도 모든 캐리어에 동일하게 적용된다. 각 캐리어의 DRX 동작을 유지하기 위해서는 각 캐리어별로 DRX 관련 타이머를 관리하며, 타이머에 의하여 하나의 캐리어가 하향링크 제어 채널 수신 동작을 수행하면 모든 캐리어가 wakeup하게 되므로 모든 캐리어가 동일한 wakeup 동작을 수행할 수 있다.

【발명의 내용】

【해결하려는 과제】

<16> 멀티 캐리어 환경에서 부캐리어가 설정되어 동작할 경우 기지국과 단말기가 관리하는 상태의 불일치가 발생하지 않도록 부캐리어 비활성화 절차와 DRX 절차가 안정적으로 제어되어야 한다. 또한, 비활성화 절차가 수행될 때 단말기에서 수행되는 HARQ 재전송 절차는 비활성화 상태에 따라 관리되어야 한다.

【과제의 해결 수단】

<17> 멀티 캐리어 환경에서 부캐리어가 설정되어 동작할 경우 기지국과 단말기가

관리하는 상태의 불일치가 발생하지 않도록 부캐리어 비활성화 절차와 DRX 절차가 안정적으로 제어하고, 비활성화 절차가 수행될 때 단말기에서 수행되는 HARQ 재전송 절차가 비활성화 상태에 따라 관리되는 방법을 제공한다.

【발명의 효과】

<18> 본 발명에 따르면 멀티캐리어 환경에서 부캐리어가 비활성화 되었을 때 단말기의 하향링크 재전송 버퍼가 즉시 초기화되며, 이에 따라 단말기는 해당 캐리어의 수신 동작을 중지하기 때문에 불필요한 단말기의 재전송 절차를 생략하고 기지국과 단말기의 동작을 일치시킬 수 있다.

<19> 또한, 부캐리어 비활성화 시에 해당 부캐리어에서 동작하는 DRX 관련 타이머를 초기화함으로써 단말기가 비활성화된 캐리어와 연관된 DRX 절차에 의해 불필요하게 wakeup하는 문제를 해결할 수 있으며 단말기의 전력소모도 감소된다. 특히, 이와 같은 절차는 해당 부캐리어가 아닌 모든 캐리어의 동작에 영향을 미치므로 전력소모 감소 효과가 증가한다.

【도면의 간단한 설명】

<20> 도 1은 멀티 캐리어 제어 절차를 나타낸 도면이다.

도 2는 단말기의 전력소모 감소(DRX) 동작을 나타낸 도면이다.

도 3은 본 발명에 따른 부캐리어 비활성화 절차도이다.

【발명을 실시하기 위한 구체적인 내용】

<21> 본 발명은 다양한 변경을 가할 수 있고 여러 가지 실시예를 가질 수 있는

바, 특정 실시예들을 도면에 예시하고 상세하게 설명하고자 한다.

<22> 그러나, 이는 본 발명을 특정한 실시 형태에 대해 한정하려는 것이 아니며, 본 발명의 사상 및 기술 범위에 포함되는 모든 변경, 균등물 내지 대체물을 포함하는 것으로 이해되어야 한다.

<23> 본 출원에서 사용한 용어는 단지 특정한 실시예를 설명하기 위해 사용된 것으로, 본 발명을 한정하려는 의도가 아니다. 단수의 표현은 문맥상 명백하게 다르게 뜻하지 않는 한, 복수의 표현을 포함한다. 본 출원에서, "포함하다" 또는 "가지다" 등의 용어는 명세서상에 기재된 특징, 숫자, 단계, 동작, 구성요소, 부품 또는 이들을 조합한 것이 존재함을 지정하려는 것이지, 하나 또는 그 이상의 다른 특징들이나 숫자, 단계, 동작, 구성요소, 부품 또는 이들을 조합한 것들의 존재 또는 부가 가능성을 미리 배제하지 않는 것으로 이해되어야 한다.

<24> 다르게 정의되지 않는 한, 기술적이거나 과학적인 용어를 포함해서 여기서 사용되는 모든 용어들은 본 발명이 속하는 기술 분야에서 통상의 지식을 가진 자에 의해 일반적으로 이해되는 것과 동일한 의미를 가지고 있다. 일반적으로 사용되는 사전에 정의되어 있는 것과 같은 용어들은 관련 기술의 문맥 상 가지는 의미와 일치하는 의미를 가진 것으로 해석되어야 하며, 본 출원에서 명백하게 정의하지 않는 한, 이상적이거나 과도하게 형식적인 의미로 해석되지 않는다.

<25> 이하, 첨부한 도면들을 참조하여, 본 발명의 바람직한 실시예를 보다 상세하게 설명하고자 한다. 본 발명을 설명함에 있어 전체적인 이해를 용이하게 하기 위하여 도면상의 동일한 구성요소에 대해서는 동일한 참조부호를 사용하고 동일한 구

성요소에 대해서 중복된 설명은 생략한다.

<26> 본 발명에서의 '기지국'은 '하나의 셀(cell)을 제어하는 제어장치'의 의미로 사용된다. 실제 통신 시스템에서의 '물리적인 기지국'은 복수의 셀을 제어할 수 있는데 이 경우에 '물리적인 기지국'은 본 발명에서의 '기지국'을 여러 개 포함하고 있는 것으로 생각할 수 있다. 즉, 각 셀마다 다르게 할당되는 파라미터는 각 '기지국'이 서로 다른 값을 할당한다고 생각할 수 있다.

<27> 또한 본 발명에서 단말은 UE(User Equipment), 또는 MS(Mobile Station), 또는 RN(Relay Node), 또는 MTC(Machine Type Communication) device 등이 될 수 있다.

<28> 본 발명에서, 단말기가 통신에 사용하는 부캐리어가 비활성화되면 단말기는 해당 부캐리어의 데이터 재전송에 사용하는 버퍼를 초기화하며, 이하에서 상세한 절차를 기술한다.

<29> 기지국은 부캐리어의 사용을 중단할 때 단말기로 부캐리어 비활성화 메시지를 송신하며, 부캐리어의 비활성화는 상향링크 및 하향링크의 비활성화를 포함한다. 단말기는 비활성화 메시지를 수신하면 해당 부캐리어를 비활성화 상태로 변경한다. 본 발명에 따른 단말기의 비활성화 상태 변경은 다음을 포함한다.

<30> - 해당 하향링크 부캐리어의 복조 절차를 중단한다.

간 이후에 해당 부캐리어를 비활성화 상태로 변경하며, 비활성화 상태로의 변경 시

송신을 중단한다. 그리고 데이터 수신성공 메시지를 기지국으로 송신한 후 일정시

<37> 단말기는 비활성화 메시지를 성공적으로 복조하면 해당 부캐리어로의 데이터

메시지가 도착하면 일정시간 이후에 해당 부캐리어를 비활성화 상태로 변경한다.

및 재전송을 중단한다. 그리고 해당 비활성화 메시지에 대한 단말기의 수신 성공

<36> 기지국은 비활성화 메시지를 송신한 후 즉시 해당 부캐리어로의 데이터 송신

국과 단말기의 시간 불일치를 해결하기 위하여 다음과 같은 절차를 사용한다.

하기 위해서는 메시지 수신 및 복조를 위한 시간 지연이 발생하며, 이에 따른 기지

<35> 기지국이 비활성화 메시지를 송신하였을 때 단말기가 상태 변경 절차를 수행

수행한다.

캐리어의 하향링크 채널 송신 중단, 상향링크 및 하향링크 재전송 버퍼 초기화를

하기 위하여 단말기와 동일한 상태가 유지되도록 동작한다. 이를 위하여, 해당 부

<34> 기지국은 비활성화 메시지를 송신하였을 때 단말기의 비활성화 상태를 지원

를 중단한다.

<33> - 해당 부캐리어의 상향링크 재전송 버퍼를 초기화하고, 재전송 절차

를 중단한다.

<32> - 해당 부캐리어의 하향링크 재전송 버퍼를 초기화하고, 재전송 절차

<31> - 해당 상향링크 부캐리어를 사용한 데이터 송신을 중단한다.

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간은 기지국과 단말기가 일치하도록 한다.

<38> 비활성화 메시지를 사용하지 않고, 일정시간 동안 기지국과 단말기가 사용하는 부캐리어로 통신이 수행되지 않은 경우에도 기지국과 단말기는 해당 부캐리어를 비활성화 상태로 변경하며, 비활성화 상태 변경 절차는 앞에서 언급한 바와 동일하다.

<39> 본 발명에서 단말기가 사용하는 부캐리어가 비활성화되면 단말기는 해당 부캐리어의 전력소모 감소 동작(DRX)을 중단하며, 이하에서 상세한 절차를 기술한다.

<40> 멀티캐리어 구조의 이동통신 시스템에서 단말기의 전력소모 감소 동작은 복수 개의 캐리어를 제어하기 위하여 병렬로 수행된다. 이에 따라 단말기는 각 멀티캐리어 별로 DRX 동작을 제어하며 특히 HARQ 재전송 제어와 관련된 타이머는 각 HARQ 프로세스 단위로 관리된다.

<41> 보다 구체적으로, HARQ 재전송 절차는 부캐리어 단위로 수행되어 초기전송이 실패한 경우에 재전송은 동일한 부캐리어를 통하여 이루어진다. 데이터 전송이 실패한 경우에 단말기는 drx-RetransmissionTimer, HARQ RTT timer를 관리하며 각 HARQ 프로세스별로 관리한다. 이에 따라, 데이터 전송이 실패하면 전송이 실패한 데이터 블록에 대하여 HARQ RTT timer를 8로 지정하고 drx-RetransmissionTimer를

일정한 값으로 지정한다. 단말기는 지정된 값에 따라 8 서브프레임 시간동안 sleep한 후 HARQ RTT timer를 종료하고, drx-RetransmissionTimer를 시작하여 wakeup함으로써 재전송 데이터를 수신한다.

<42> 그러나, 부캐리어가 비활성화되어 재전송을 수행할 필요가 없는 경우에는 HARQ RTT timer, drx-RetransmissionTimer를 초기화하여 재전송 절차를 위한 wakeup 동작을 수행하지 않도록 한다.

<43> 도 3은 본 발명에 따른 부캐리어 비활성화 절차도이다.

<44> 도 3은 본 발명에 따른 부캐리어 비활성화 절차를 나타낸 도이며, 부캐리어의 재전송이 반복되어 drx-RetransmissionTimer, HARQ RTT timer가 동작 중인 것을 나타낸다. 이 때 비활성화 메시지가 수신되면 단말기는 drx-RetransmissionTimer의 동작을 종료하여 불필요한 wakeup 상태를 중단한다.

<45> 또한 본 발명에서, 부캐리어가 On Duration 상태로 동작 중이거나 inactivity timer에 의하여 wakeup 상태를 유지하고 있을 때 기지국으로부터 해당 부캐리어의 비활성화 메시지를 수신하면, 단말기는 즉시 On Duration 상태 또는 inactivity timer를 중지하여 wakeup 동작을 중지한다.

컴퓨터 제어의 구조의 이동통신 시스템에서 부 제어에 제어 방법.

【참고문헌】

【발명내용】

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【요약서】

【요약】

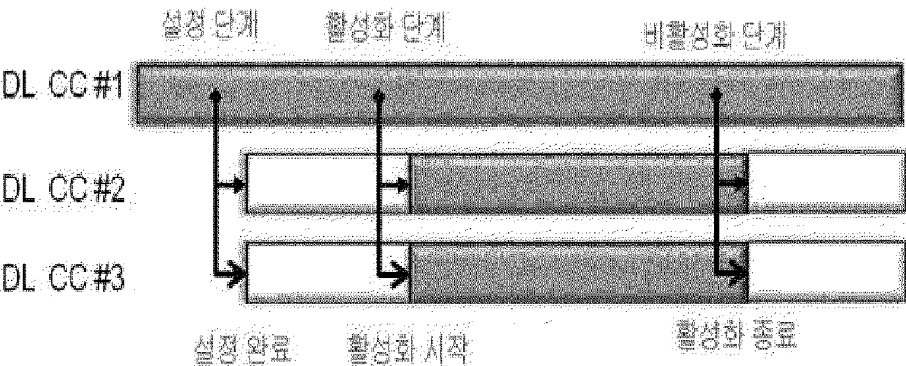
멀티 캐리어 구조의 이동통신 시스템에서 부 캐리어 제어 방법이 개시된다. 본 발명에 따르면 멀티캐리어 환경에서 부캐리어가 비활성화 되었을 때 단말기의 하향링크 재전송 버퍼가 즉시 초기화되며, 이에 따라 단말기는 해당 캐리어의 수신 동작을 중지하기 때문에 불필요한 단말기의 재전송 절차를 생략하고 기지국과 단말기의 동작을 일치시킬 수 있다. 또한, 부캐리어 비활성화 시에 해당 부캐리어에서 동작하는 DRX 관련 타이머를 초기화함으로써 단말기가 비활성화된 캐리어와 연관된 DRX 절차에 의해 불필요하게 wakeup하는 문제를 해결할 수 있으며 단말기의 전력소모도 감소된다. 특히, 이와 같은 절차는 해당 부캐리어가 아닌 모든 캐리어의 동작에 영향을 미치므로 전력소모 감소 효과가 증가한다.

【대표도】

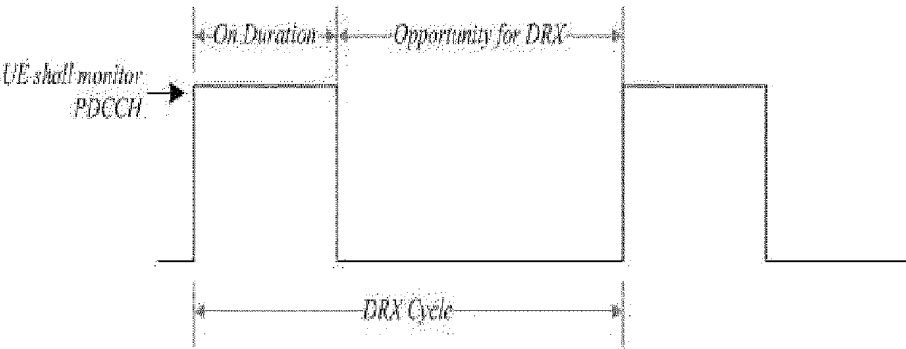
도 3

【도면】

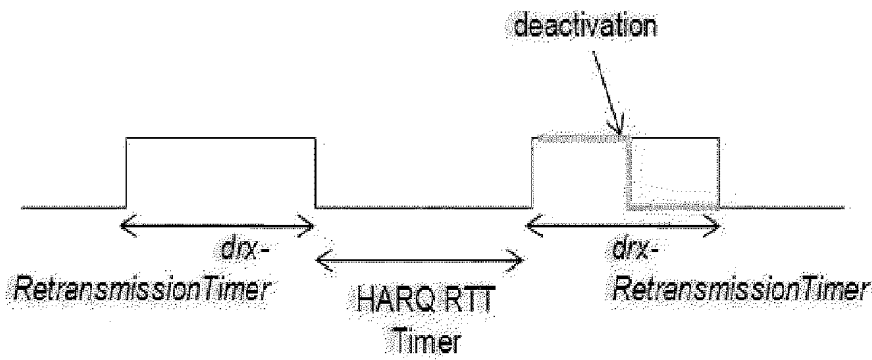
【도 1】



【도 2】



【도 3】





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
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출 원 년 월 일 : 2010년 08월 12일

Filing Date AUG. 12, 2010

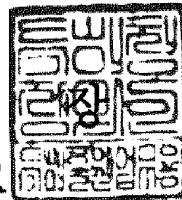
출 원 인 : 한국전자통신연구원

Applicant(s) Electronics and Telecommunications
Research Institute

2015년 09월 15일

특 허 청

COMMISSIONER



제출 일자 : 2010-08-12

【서지사항】

【서류명】	특허출원서
【출원구분】	특허출원
【출원인】	
【명칭】	한국전자통신연구원
【출원인코드】	3-1998-007763-8
【대리인】	
【명칭】	특허법인 신성
【대리인코드】	9-2000-100004-8
【지정된변리사】	문찬두,최종식,박정후,심정희,장형용
【포괄위임등록번호】	2000-051975-8
【발명의 국문명칭】	이동통신 시스템에서 멀티 캐리어 구조를 위한 채널 관리 방법
【발명의 영문명칭】	A method for channel management on multiple component carrier systems
【발명자】	
【성명】	이경석
【성명의 영문표기】	LEE,Kyoung Seok
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【성명】	김재흥
【성명의 영문표기】	KIM,Jae Heung
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제출 일자 : 2010-08-12

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【성명의 영문표기】 LEE,Kook Jin

【주민등록번호】 830404-1XXXXXX

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【기술이전희망】

【기술양도】 희망

【실시권허여】 희망

【기술지도】 희망

【취지】 위와 같이 특허청장에게 제출합니다.

대리인 특허법인 신성 (서명 또는 인)

【수수료】

【출원료】	0 면	38,000 원
【가산출원료】	18 면	0 원
【우선권주장료】	0 건	0 원
【심사청구료】	0 항	0 원
【합계】		38,000 원
【감면사유】		정부출연연구기관
【감면후 수수료】		19,000 원

【명세서】

【발명의 명칭】

이동통신 시스템에서 멀티 캐리어 구조를 위한 채널 관리 방법(A method for channel management on multiple component carrier systems)

【기술분야】

<1> 본 발명은 3GPP에서 표준화 중인 LTE-Advanced 시스템이 복수 개의 캐리어를 사용하여 기지국과 단말기의 통신을 수행하는 구조에서, 무선 채널 상태에 따른 단말기의 채널 관리 방법에 관한 것이다. 기지국과 단말기가 대용량의 데이터 통신에 사용하는 멀티 캐리어의 무선 채널 상태가 불안정하여 데이터 재전송 오류가 급격하게 증가하는 문제점을 방지하기 위하여 기지국이 제어 메시지를 양호한 캐리어로 송신하여 불량 캐리어에서 발생하는 재전송을 중단하는 방법을 제시한다.

【배경기술】

<2> 이동통신 표준화 기구인 3GPP는 차세대 이동통신 규격 개발을 위하여 LTE(Long Term Evolution) 시스템 규격을 개발하였다. 또한, ITU-R에서 제안한 IMT-Advanced 요구 사항을 충족하기 위하여 LTE 규격을 확장한 LTE-Advanced 시스템 규격을 개발하고 있다.

<3> LTE 규격은 이동통신을 위한 최대 무선 대역폭을 20MHz까지 지원하며, LTE-Advanced 규격은 최대 100MHz 대역폭을 지원하도록 대역폭 통합(carrier

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aggregation) 기술을 사용한다. 이에 따라, 100MHz 대역폭은 최대 20MHz 크기의 컴포넌트 캐리어(CC: Component Carrier)로 구분하고, 기지국과 단말기는 복수 개의 캐리어를 동시에 사용하여 통신할 수 있다.

<4> 멀티 캐리어 통신을 지원하는 단말기는 복수 개의 무선 채널을 광대역으로 사용하며, 통신에 사용하는 주파수 대역폭이 넓을수록 전력소모가 증가한다. 그러므로, LTE-Advanced 시스템의 단말기는 통신량이 많은 경우에만 멀티 캐리어를 활성화하여 통신에 사용하고 통신량이 작으면 단일 캐리어만을 사용하여 통신하는 동작을 한다.

<5> 도 1은 멀티캐리어 환경에서 기지국이 단말기의 캐리어를 활성화하기 위한 일반적인 절차를 나타낸 도면이다.

<6> LTE-Advanced 시스템은 멀티 캐리어 관리 단계를 설정(configuration) 단계와 활성화(activation) 단계로 나누어 제어한다.

<7> 단말기가 멀티 캐리어 통신을 제공하는 기지국에 접속할 때 설정(configuration) 절차를 사용하여 멀티 캐리어 통신 환경을 구축한다. 기지국은 설정 메시지를 송신하여 단말기가 멀티 캐리어 통신에 대한 설정 정보를 저장하고 해당 캐리어의 통신을 준비하도록 한다.

<8> 단말기가 통신량이 작을 때에는 단일 캐리어만을 사용하여 기지국과 통신한다 (도 1의 DL CC #1과 UL CC #1 사용). 단일 캐리어를 사용하는 상태에서 사용하

는 캐리어는 주 캐리어(Primary Carrier) 또는 주 셀(Primary Cell)로 지칭하며, 주 캐리어의 무선 채널 상태는 빠른 주기로 측정하여 안정적인 통신 가능 상태로 관리한다.

<9> 기지국은 단말기의 통신량이 증가하면 활성화(activation) 절차를 사용하여 단말기가 복수 개의 캐리어를 실제로 사용하도록 한다. 멀티 캐리어 환경을 위하여 활성화되는 캐리어는 부 캐리어(Secondary Carrier) 또는 부 셀(Secondary Cell)로 지칭하며, 주 캐리어보다 낮은 단계로 무선 채널 상태를 관리한다.

<10> 부 캐리어의 활성화를 위하여 기지국은 단말기로 활성화 메시지를 송신하며, 단말기는 해당 메시지를 수신하면 해당 부 캐리어를 활성화하고 통신에 사용한다. 따라서, 멀티 캐리어로 대용량의 데이터를 송수신하게 되어 데이터 전송률이 증가한다. 기지국은 단말기와 통신량이 감소하면 비활성화(deactivation) 메시지를 송신하여 단말기가 단일 캐리어만을 사용하도록 변경한다. 하향링크(DL)와 상향링크(UL)의 부 캐리어(CC)는 독립적으로 설정/해제 및 활성화/비활성화 될 수 있다.

<11> 멀티 캐리어 통신을 수행할 때 데이터는 캐리어 별로 매핑하여 송신한다. 기지국의 스케줄러는 송신할 데이터를 캐리어 단위로 나누고, 나뉘어진 데이터는 캐리어 별로 할당하여 송신한다. 또한, 송신한 데이터의 재전송은 동일한 캐리어를 사용하여 송신한다.

<12> 도 1을 가정하여 기술하면, 하나의 데이터 블록을 DL CC #1에 할당하여 초기

전송 한 후, 해당 데이터의 수신 오류가 발생하면 재전송(또는 HARQ)은 DL CC #1으로 수행하여야 한다. 하향링크 데이터를 송신할 때, 데이터는 데이터 채널(또는 PDSCH)에 할당하고, 데이터 채널의 복조 정보는 제어 채널(또는 PDCCH)에 표시하여 송신한다.

<13> 제어 채널은 데이터 채널과 동일한 캐리어로 송신하거나 다른 캐리어로 송신할 수 있으며, 캐리어 위치가 서로 다른 경우에는 제어 채널 내에 캐리어 식별자(또는 CIF: Carrier Indicator Field)를 사용하여 데이터 채널의 위치를 표시한다.

<14> 기지국과 단말기의 통신량이 증가하여 멀티 캐리어를 사용하는 상태에서 일부 캐리어의 무선 채널 상태가 나빠지면 수신부의 데이터 수신 오류가 증가하여 재전송 횟수가 증가한다. 특히, LTE-Advanced 시스템과 같이 재전송을 데이터 초기 전송 시에 사용한 캐리어로만 수행하는 구조에서, 해당 캐리어의 무선 채널 상태가 불량할 경우 수신 오류가 급격하게 증가하는 문제점이 있다. 또한, 한번 송신한 데이터는 무선 채널 상태와 관계없이 최대 재전송 횟수 동안 수신에 성공할 때까지 재전송하는 문제점이 있다. 이러한 절차는 단말기의 불필요한 재전송 동작과 전력 소모를 가져다 준다. 또한, 불필요한 재전송으로 인하여 다른 단말기가 해당 자원을 사용할 수 없는 무선 자원 낭비와 기지국 성능 저하가 발생하는 문제점이 있다.

【발명의 내용】

【해결하려는 과제】

<15> 본 발명은 전술한 종래 기술의 문제점을 해결하기 위한 발명으로, 기지국이 단말기와 통신하여 무선 채널 상태가 불량한 캐리어의 사용을 중지하기 위한 방법이 필요하다.

<16> 본 발명의 다른 목적 및 장점은 하기의 설명에 의해서 이해될 수 있으며, 본 발명의 실시예에 의해 보다 분명하게 알게 될 것이다. 또한, 본 발명의 목적 및 장점들은 특허청구범위에 나타난 수단 및 그 조합에 의해 실현될 수 있음을 쉽게 알 수 있을 것이다.

【과제의 해결 수단】

<17> 상기 목적을 달성하기 위한 본 발명은 멀티 캐리어 중에서 무선 채널 상태가 불안정한 하향링크 캐리어를 판단하는 단계; 및 판단 결과에 따라, 해당 캐리어로의 데이터 송신을 중단하는 단계를 포함하는 채널 관리 방법을 제공한다.

【발명의 효과】

<18> 본 발명에 따르면, 멀티 캐리어 구조를 사용하는 이동통신 시스템에서 재전송 횟수를 감소시킬 수 있다. 이러한 효과는 단말기의 불필요한 재전송 동작과 전력소모를 줄인다. 또한, 불필요한 재전송으로 인하여 무선 자원 낭비와 기지국 성능 저하를 막을 수 있다.

<22> FDD 방식의 이동통신 시스템에서 하향링크의 무선 채널 상태는 단말기에서

<21> <하향링크 방법 기술>

법을 생략하기로 한다.

면이 본 발명의 요지를 불필요하게 드러낼 수 있다고 판단되는 경우에 그 상세한 설명
이며, 본 발명을 설명함에 있어서 본 발명과 관련된 공지 기술에 대한 구체적인 설명
 및 장점은 첨부된 도면과 관련한 다음의 상세한 설명을 통하여 보다 분명해 질 것
 장 바람직한 실시예를 첨부 도면을 참조하여 설명하기로 한다. 상술한 목적, 특징
 기술적 사상을 용이하게 실시할 수 있도록 상세히 설명하기 위하여, 본 발명의 가
 <20> 이하 본 발명이 속하는 기술 분야에서 통상의 지식을 가진 자가 본 발명의

【발명을 실시하기 위한 구체적인 내용】

데이터 재전송 중단 절차를 나타낸 도면이다.

도 3은 본 발명의 실시예에 따른 멀티캐리어 환경에서 기지국의 상향링크

데이터 재전송 중단 절차를 나타낸 도면,

도 2는 본 발명의 실시예에 따른 멀티캐리어 환경에서 기지국의 하향링크

관련적인 절차를 나타낸 도면,

<19> 도 1은 멀티캐리어 환경에서 기지국이 단말기의 캐리어를 활성화하기 위한

【도면의 간단한 설명】

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측정하며, 측정된 채널 상태 정보는 기지국으로 송신한다. 기지국은 수신된 하향링크 채널 상태 정보를 분석하여 캐리어의 무선 채널 상태를 관리하고 스케줄링 정보로 사용한다. TDD 방식의 이동통신 시스템은 동일한 주파수 대역을 상향링크와 하향링크로 사용하므로, 하향링크 무선 채널 상태는 기지국에서 상향링크 채널 상태를 분석함으로써 무선 채널 상태를 관리한다.

<23> 본 발명에 의한 기지국은 멀티 캐리어 중에서 무선 채널 상태가 불안정한 하향링크 캐리어를 판단하여 해당 캐리어로의 데이터 송신을 중단한다. 무선 채널 상태의 판단은 단말기가 측정하여 송신한 무선 채널 상태 정보를 사용하거나 기지국이 직접 측정하여 판단하며, 일정시간 동안 기준값 이하로 낮아진 것을 기준으로 판단한다. 또한, 기지국은 송신한 데이터의 수신 오류가 증가하는 캐리어는 해당 캐리어로의 데이터 할당을 중단하며, 일정시간 동안 기준값 이상으로 오류 횟수가 증가한 것을 기준으로 판단한다. 종래의 방법에서는, 한 캐리어로 데이터의 초기 전송이 이루어진 데이터는 무선 채널 상태가 불안정한 정보를 획득하여도 이미 설정한 최대 재전송 횟수(예: 8회)까지 해당 캐리어로 재전송을 수행하여야 한다.

<24> 본 발명의 기지국은 단말기로부터 데이터의 수신 성공 정보(또는 ACK)를 일정 횟수 이상 수신하지 못한 경우에도 해당 캐리어의 무선 채널 상태가 불안정한 것으로 판단하면 해당 캐리어로의 재전송을 중단한다. 기지국이 데이터의 수신 성공 정보를 수신하지 않은 경우는 단말기가 수신 실패 정보(또는 NACK)를 송신하거나 송신한 정보를 기지국이 수신 실패한 경우이다.

<25> 본 발명에서 기지국은 해당 데이터의 재전송 중단을 지시하는 메시지를 다른

캐리어를 통하여 단말기로 통보한다. 상기 메시지 전송에 사용하는 캐리어는 주 캐리어이거나 무선 채널 상태가 양호한 부 캐리어이며, 상기 메시지 전송에 사용하는 캐리어의 위치는 캐리어 식별자(CIF)를 사용하여 표시할 수 있다.

<26> 도 2는 본 발명의 일실시예에 따른 멀티캐리어 환경에서 기지국의 하향링크 데이터 재전송 중단 절차를 나타낸 도면이다.

<27> 일반적인 절차에서 기지국과 단말기의 데이터 전송 절차는 데이터 초기 전송, 그리고 단말기의 수신 오류 보고와 기지국의 데이터 재전송 반복으로 이루어진다. 본 발명의 예에서 기지국이 단말기로부터 멀티 캐리어의 무선 채널 상태 보고를 수신하였을 때, 일부 하향링크 캐리어의 무선 채널 상태가 나쁜 경우에는 해당 캐리어의 전송 중단 지시를 한다. 이에 따라, 기지국은 해당 캐리어로의 재전송을 중단하며, 단말기는 전송 중단 지시를 수신하면 수신 오류 보고 또는 재전송 절차를 중단한다.

<28> 기지국이 재전송 중단 정보를 단말기로 송신하는 방법은 제어 채널로 표시하는 방법과 데이터 채널로 표시하는 방법이 있다.

<29> *제어 채널(또는 PDCCH)로 표시하는 방법

<30> - 제어 채널에 캐리어의 재전송 중단을 표시하여 단말기로 송신한다.

<31> - 표시 방법은 제어 채널의 일부 필드(예, TB: Transport Block field)에 포

시한다.

<32> - 제어 채널에 캐리어 식별자(또는 CIF)를 사용하여 재전송을 중단할 캐리어 정보를 표시한다.

<33> - 재전송 관련 필드(예: NDI: New Data Indicator, RV: Redundancy Version)로 재전송을 중단할 데이터 정보를 표시하거나 구별 가능한 값으로 표시하여 해당 캐리어로의 모든 데이터 송신을 중단함을 표시한다.

<34> - 제어 채널을 수신한 단말기는 중단 메시지를 성공적으로 수신하였음을 기지국으로 통보할 수 있다.

<35> *데이터 채널(또는 PDSCH)로 표시하는 방법

<36> - 데이터 채널에 캐리어의 재전송 중단을 표시하여 단말기로 송신한다.

<37> - 정보의 표시 방법은 제어 채널로 표시하는 방법과 동일하다.

<38> - 이와 같은 제어 정보는 새로운 제어 메시지(또는 MAC Control Element)로 구성할 수 있다.

<39> 또한 기존의 방법을 사용하여, 재전송을 중단하는 방법은 다음과 같다.

<40> - 제어 채널에 이전 데이터의 재전송이 아닌 새로운 데이터 전송을 표시하고(예, PDCCH의 NDI 필드를 변경(또는 toggle)하여 새로운 데이터 전송을 표시) 할당할 데이터 채널의 크기(또는 TB field)를 최소화하여 할당함으로써 자원 소모를 회

피한다.

<41> - 이 때, 불안정한 채널을 사용한 데이터 전송 지연을 회피하기 위하여 데이터 채널에 무의미한 데이터(또는 padding)를 송신할 수 있다. 또는 앞에서 기술한 재전송 중단 제어 정보를 전송할 수 있다.

<42> 또한 기존의 캐리어 비활성화 메시지를 사용하여, 단말기가 기지국으로부터 캐리어 비활성화 메시지를 수신하면 해당 캐리어의 비활성화 절차를 수행하고 동시에 해당 캐리어로의 모든 전송(초기 전송, 재전송)을 중단할 수 있다.

<43> 본 발명에서 단말기는 제어 채널 또는 데이터 채널로 재전송 중단 정보를 수신하면 지정한 캐리어로의 재전송 데이터 수신을 위한 제어 채널 수신 동작을 종료함으로써 데이터 재전송 절차를 중단한다. 또한, 해당 캐리어 또는 해당 재전송 블록의 수신 버퍼를 초기화하여 재전송의 복조 동작 오류를 방지한다.

<44> 또한, 해당 캐리어의 재전송 절차를 중단하면 전력 소모를 감소하기 위한 동작(또는 DRX: Discontinuous Reception) 또는 캐리어 비활성화(또는 deactivation) 절차가 진행될 수 있다. 보다 상세히 기술하면, 단말기는 수신 오류가 발생한 데이터를 수신하기 위하여 일정시간 동안 제어 채널을 복조함으로써 DRX 동작을 수행하지 못하게 되는데, 본 발명의 절차를 사용하면, 단말기가 즉시 제어 채널 복조 동작을 중지하고 DRX 동작을 진행할 수 있다.

<45> <상향링크 방법 기술>

<46> 상향링크의 무선 채널 상태는 기지국이 측정하며, 기지국은 수신된 캐리어의 무선 채널 상태를 관리하고 상향링크 스케줄링 정보로 사용한다. 상향링크 스케줄링은 기지국에서 수행하며, 스케줄링에 의하여 결정된 단말기가 사용할 상향링크 캐리어 정보 및 송신 데이터 크기 등의 정보는 기지국이 단말기로 제어 채널(또는 PDCCH)을 통하여 송신한다.

<47> 본 발명에 의한 기지국은 멀티 캐리어 중에서 무선 채널 상태가 불안정한 상향링크 캐리어를 판단하여 단말기에게 해당 캐리어로의 데이터 송신을 중단하도록 지시한다. 무선 채널 상태의 판단은 기지국이 수집한 무선 채널 상태 정보를 사용하며, 일정시간 동안 기준값 이하로 낮아진 것을 기준으로 판단한다. 또한, 기지국은 수신한 상향링크 데이터의 수신 오류가 증가하는 캐리어는 해당 캐리어로의 데이터 할당을 중단하도록 지시하며, 일정시간 동안 기준값 이상으로 오류 횟수가 증가한 것을 기준으로 판단한다. 종래의 방법에서는, 한 캐리어로 데이터의 초기 전송이 이루어진 데이터는 무선 채널 상태가 불안정한 정보를 획득하여도 이미 설정된 최대 재전송 횟수(예: 8회)까지 해당 캐리어로 재전송을 계속 수행하여야 한다.

<48> 특히, 종래의 방법에서 상향링크는 기지국이 재전송을 허가하지 않아도 단말기는 계속적으로 재전송하는 문제점이 있다. 보다 상세히 기술하면, 단말기는 데이터 송신 후 기지국으로부터 제어 채널을 통한 데이터 재전송 지시를 수신하지 않은

경우에도 일정 시간이 경과하면 수신 오류가 발생한 것으로 판단하여 해당 캐리어로 데이터를 재전송한다.

<49> 도 3은 본 발명의 일실시예에 따른 멀티캐리어 환경에서 기지국의 상향링크 데이터 재전송 중단 절차를 나타낸 도면이다.

<50> 일반적인 절차에서 기지국과 단말기의 데이터 전송 절차는 기지국의 데이터 초기 전송 허가 및 단말기의 데이터 초기 전송, 그리고 기지국의 데이터 재전송 허가 및 단말기의 재전송 동작의 반복으로 이루어진다. 본 발명의 예에서 기지국이 단말기로부터 수신한 상향링크 캐리어의 무선 채널 상태가 나쁜 경우에는 해당 캐리어의 전송 중단 지시를 한다. 이에 따라, 기지국은 해당 캐리어로의 재전송 허가를 중단하며, 단말기는 전송 중단 지시를 수신하면 재전송 절차를 중단한다.

<51> 기지국이 재전송 중단 정보를 단말기로 송신하는 방법은 제어 채널로 표시하는 방법과 데이터 채널로 표시하는 방법이 있다.

<52> *제어 채널(또는 PDCCH)로 표시하는 방법

<53> - 제어 채널에 재전송이 중단되었음을 표시하여 단말기로 송신한다.

<54> - 표시 방법은 제어 채널의 일부 필드(예, TB: Transport Block field)에 표시한다.

<55> - 제어 채널에 캐리어 식별자(CIF)를 사용하여 재전송이 중단된 캐리어를 표

시한다.

<56> - 재전송 관련 필드(예: NDI: New Data Indicator, RV: Redundancy Version)로 재전송이 중단된 데이터 정보를 표시하거나 구별 가능한 값으로 표시하여 해당 캐리어로의 모든 데이터 송신이 중단됨을 표시한다.

<57> - 제어 채널을 수신한 단말기는 중단 메시지를 성공적으로 수신하였음을 기지국으로 통보할 수 있으며, 통보할 때 사용하는 캐리어는 무선 채널 상태가 양호한 상향링크 캐리어이다.

<58> *데이터 채널(또는 PDSCH)로 표시하는 방법

<59> - 데이터 채널에 캐리어의 재전송 중단을 표시하여 단말기로 송신한다.

<60> - 정보의 표시 방법은 제어 채널로 표시하는 방법과 동일하다.

<61> - 이와 같은 제어 정보는 새로운 제어 메시지(또는 MAC Control Element)로 구성할 수 있다.

<62> 또한 기존의 방법을 사용하여, 재전송을 중단하는 방법은 다음과 같다.

<63> - 제어 채널에 이전 데이터의 재전송이 아닌 새로운 데이터 전송을 표시하고(예, PDCCH의 NDI 필드를 변경(또는 toggle)하여 새로운 데이터 전송을 표시) 할당할 데이터 채널의 크기(또는 TB field)를 최소화하여 지정함으로써 단말기가 상향링크 데이터를 송신할 때 자원 소모를 회피한다.

<64> - 이 때, 불안정한 채널을 사용한 데이터 전송 지연을 회피하기 위하여 단말기는 할당된 데이터 채널에 무의미한 데이터(또는 padding)를 송신할 수 있다.

<65> 또한 기지국은 캐리어 비활성화 메시지를 사용하여 단말기로 송신하고, 단말기가 기지국으로부터 캐리어 비활성화 메시지를 수신하면 해당 캐리어의 비활성화 절차를 수행하고 동시에 해당 캐리어로의 모든 전송(초기 전송, 재전송)을 중단할 수 있다.

<66> 본 발명에서 단말기는 제어 채널 또는 데이터 채널로 재전송 중단 정보를 수신하면 지정한 캐리어로의 데이터 재전송을 중단하고 해당 캐리어의 수신 절차를 종료한다. 또한, 해당 캐리어 또는 해당 재전송 송신 버퍼를 초기화하여 재전송의 변조 동작 오류를 방지한다. 또한, 해당 캐리어의 재전송을 중단하면 전력 소모를 감소하기 위한 동작(또는 DRX: Discontinuous Reception) 또는 캐리어 비활성화(또는 deactivation) 절차가 진행될 수 있다.

<67> 한편, 본 발명은 비록 한정된 실시예와 도면에 의해 설명되었으나, 본 발명은 이것에 의해 한정되지 않으며 본 발명이 속하는 기술분야에서 통상의 지식을 가진 자에 의해 본 발명의 기술사상과 특허청구범위의 균등범위 내에서 다양한 수정 및 변형이 가능함은 물론이다.

제출 일자 : 2010-08-12

【특허 청구범위】

【청구항 1】

멀티 캐리어 중에서 무선 채널 상태가 불안정한 하향링크 캐리어를 판단하는 단계; 및

판단 결과에 따라, 해당 캐리어로의 데이터 송신을 중단하는 단계를 포함하는 채널 관리 방법.

【요약서】

【요약】

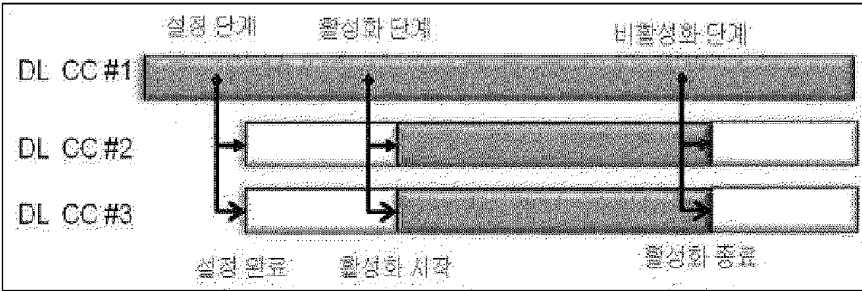
3GPP에서 표준화 중인 LTE-Advanced 시스템이 복수 개의 캐리어를 사용하여 기지국과 단말기의 통신을 수행하는 구조에서, 무선 채널 상태에 따른 단말기의 채널 관리 방법에 관한 기술이 개시된다. 이러한 기술에 따르면, 멀티 캐리어 중에서 무선 채널 상태가 불안정한 하향링크 캐리어를 판단하는 단계; 및 판단 결과에 따라, 해당 캐리어로의 데이터 송신을 중단하는 단계를 포함하는 채널 관리 방법이 제공된다.

【대표도】

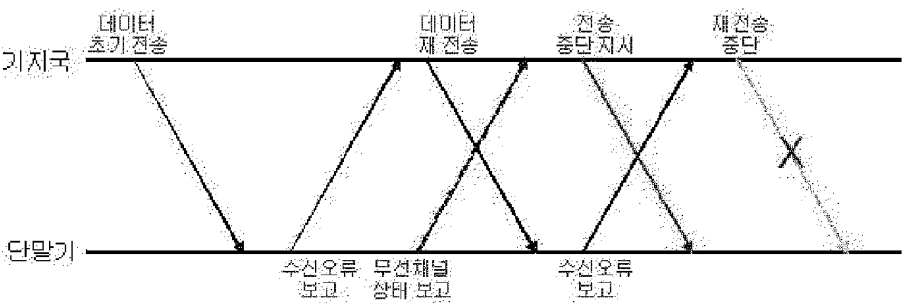
도 2

【도면】

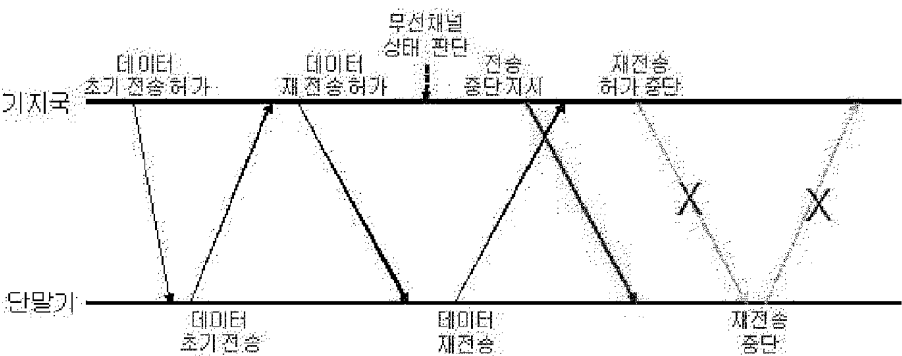
【도 1】



【도 2】



【도 3】



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:
Kyoung Seok LEE

Confirmation No.: 8602

Serial No.: 14/831,023

Group Art Unit: Not Yet Assigned

Filed: August 20, 2015

Examiner: Not Yet Assigned

For: METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION
ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM

PRELIMINARY AMENDMENT

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

Sir:

Prior to examination on merits, please amend the above-identified application as follows:

Amendments to the Claims on page 2.

The Remarks begin on page 4.

AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A carrier management method of a base station for use in a carrier aggregation environment, comprising:
transmitting a deactivation message for a secondary carrier to a terminal;
changing the secondary carrier to a deactivation state based on a predetermined time from the transmission of the deactivation message; and
stopping downlink (DL) data transmission of the secondary carrier and initializing uplink (UL) and DL ~~retransmission buffers~~ associated with the secondary carrier after transmitting the deactivation message.

2. (Original) The carrier management method of claim 1, wherein the predetermined time is a value predefined to make state information that is managed by the base station consistent with state information that is managed by the terminal for the secondary carrier.

3. (Original) The carrier management method of claim 1, further comprising:
receiving a reception success message for the deactivation message from the terminal after transmitting the deactivation message,
wherein the changing of the secondary carrier to the deactivation state includes changing, by the base station, the secondary carrier to the deactivation state after a predetermined time from an arrival time of the reception success message.

4. (Original) The carrier management method of claim 1, further comprising:
immediately stopping, by the base station, data transmission and retransmission using the secondary carrier immediately after transmitting the deactivation message.

5. (Currently Amended) A carrier management method of a terminal for use in a carrier aggregation environment, comprising:

receiving a deactivation message for a secondary carrier from a base station;
changing the secondary carrier to a deactivation state based on a predetermined time from the reception of the deactivation message; and
stopping UL data transmission of the secondary carrier and initializing UL and DL ~~retransmission buffers associated with the secondary carrier~~ after receiving the deactivation message.

6. (Original) The carrier management method of claim 5, wherein the predetermined time is a value predefined to make state information that is managed by the base station consistent with state information that is managed by the terminal for the secondary carrier.

7. (Original) The carrier management method of claim 5, further comprising:
transmitting a reception success message for the deactivation message to the base station after receiving the deactivation message,
wherein the changing of the secondary carrier to the deactivation state includes changing, by the terminal, the secondary carrier to the deactivation state after a predetermined time from a transmission time of the reception success message.

8. (Currently amended) The carrier management method of claim 5, further comprising:
~~immediately stopping, by the terminal, demodulation of a physical downlink control channel (PDCCH) of the secondary carrier data transmission and retransmission using the secondary carrier immediately after receiving the deactivation message.~~

REMARKS

The claims have been amended. No new matter has been introduced by the claim amendments. Entry of the amendments and favorable early consideration of the present application are respectfully requested.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 50-5113. Please also credit any overpayments to said Deposit Account.

Dated: November 9, 2015

Respectfully submitted,

By: /Franklin R. Bryan/
Franklin R. Bryan

Registration No.: 68,313
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P.O. Box 34688
Washington, DC 20043
(202) 429-0020
(202) 315-3758 (Fax)
Attorney/Agent For Applicant

Electronic Acknowledgement Receipt

EFS ID:	24023286
Application Number:	14831023
International Application Number:	
Confirmation Number:	8602
Title of Invention:	METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Kyoung Seok LEE
Customer Number:	89980
Filer:	Franklin Robert Bryan
Filer Authorized By:	
Attorney Docket Number:	175090.0011C1
Receipt Date:	09-NOV-2015
Filing Date:	20-AUG-2015
Time Stamp:	13:53:29
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		PrelimAmend_1750900011C1_PrelimAmendment.pdf	27092 5a647ba801f3e99c28a38ecc79667d21dc99ac4c	yes	4

IPR2024-00608
Petitioners' Ex. 1003
Ex.1003.00108

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Preliminary Amendment	1	1
	Claims	2	3
	Applicant Arguments/Remarks Made in an Amendment	4	4
Warnings:			
Information:			
Total Files Size (in bytes):		27092	
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.			

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 14/831,023		Filing Date 08/20/2015		☐ To be Mailed					
ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO														
APPLICATION AS FILED – PART I														
(Column 1)			(Column 2)											
FOR		NUMBER FILED		NUMBER EXTRA		RATE (\$)		FEE (\$)						
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A		N/A		N/A								
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))		N/A		N/A		N/A								
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A		N/A		N/A								
TOTAL CLAIMS (37 CFR 1.16(i))		minus 20 =		*		X \$ =								
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 =		*		X \$ =								
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).												
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))														
* If the difference in column 1 is less than zero, enter "0" in column 2.						TOTAL								
APPLICATION AS AMENDED – PART II														
(Column 1)			(Column 2)			(Column 3)								
AMENDMENT	11/09/2015		CLAIMS REMAINING AFTER AMENDMENT			HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))		* 8		Minus	** 20		=		X \$ =				
	Independent (37 CFR 1.16(h))		* 2		Minus	*** 3		=		X \$ =				
	☐ Application Size Fee (37 CFR 1.16(s))													
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))													
										TOTAL ADD'L FEE				
(Column 1)			(Column 2)			(Column 3)								
AMENDMENT			CLAIMS REMAINING AFTER AMENDMENT			HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))		*		Minus	**		=		X \$ =				
	Independent (37 CFR 1.16(h))		*		Minus	***		=		X \$ =				
	☐ Application Size Fee (37 CFR 1.16(s))													
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))													
										TOTAL ADD'L FEE				
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.											LIE /KATRINA . TURNER/			

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

IPR2024-00608

**Petitioners' Ex. 1003
Ex.1003.00110**



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/831,023	08/20/2015	Kyoung Seok LEE	175090.0011C1

CONFIRMATION NO. 8602

89980
NSIP LAW
P.O. Box 65745
Washington, DC 20035

PUBLICATION NOTICE



OC000000079264022

Title:METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM

Publication No.US-2015-0359037-A1

Publication Date:12/10/2015

NOTICE OF PUBLICATION OF APPLICATION

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

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

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

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

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



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/831,023	08/20/2015	Kyoung Seok LEE	175090.0011C1	8602
89980	7590	05/27/2016	EXAMINER	
NSIP LAW			WONG, WARNER	
P.O. Box 65745			ART UNIT	PAPER NUMBER
Washington, DC 20035			2469	
			NOTIFICATION DATE	DELIVERY MODE
			05/27/2016	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

pto@nsiplaw.com
pto.nsip@gmail.com

Office Action Summary	Application No. 14/831,023	Applicant(s) LEE ET AL.	
	Examiner WARNER WONG	Art Unit 2469	AIA (First Inventor to File) Status No

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

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

Status

- 1) ☒ Responsive to communication(s) filed on 9 November 2015.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

- 5) ☒ Claim(s) 1-8 is/are pending in the application.
5a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) _____ is/are allowed.
- 7) ☒ Claim(s) 1-8 is/are rejected.
- 8) ☐ Claim(s) _____ is/are objected to.
- 9) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☒ The drawing(s) filed on 20 August 2015 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

- a) ☐ All b) ☐ Some** c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date _____.
- 3) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 4) ☐ Other: _____.

IPR2024-00608

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the claims at issue are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO internet Web site contains terminal disclaimer forms which may be used. Please visit <http://www.uspto.gov/forms/>. The filing date of the application will determine what form should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to <http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp>.

2. **Claims 1-8** are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-8 of U.S. Patent No. 9,144,106 (hereinafter referred to as '106) in view of Nimbalker (US 2012/0087396).

Regarding claim 1, '106 describes a carrier management method of a base station (BS) for use in a carrier aggregation environment, comprising:

- transmitting a deactivation message for a secondary carrier to a terminal;
- changing the secondary carrier to a deactivation state based on a predetermined time from the transmission of the deactivation message;
- stopping downlink (DL) data transmission of the secondary carrier (claim 1).

Xu fails to further explicitly describe:

- initializing uplink (UL) and DL retransmission buffers after transmitting the deactivation message.

Nimbalker also describes wireless spectrum aggregation (para. 8), further describing:

initializing uplink (UL) and DL buffers associated with the secondary carrier after transmitting the deactivation message (para. 54, soft buffers for all transmission & reception (UL & DL) of the additional component carrier are reconfigured in response to a change such as deactivation of the additional component carrier, such as performing buffers reset, para. 55).

It would have been obvious to one with ordinary skill in the art at the time of invention by application to specify that after transmitting deactivation message in '104 to initialize UL & DL retransmission buffers.

The motivation for combining the teachings is that this yields an effective HARQ architecture for having full advantages of AMC & MIMO for higher data rates (Nimbalker, para. 6).

Regarding claim 5, '104 describes a carrier management method of a terminal for use in a carrier aggregation environment, comprising:

receiving a deactivation message for a secondary carrier from a base station;
changing the secondary carrier to a deactivation state based on a predetermined time from the reception of the deactivation message;
stopping UL data transmission of the secondary carrier and initializing UL and DL buffers associated with the secondary carrier after receiving the deactivation message (abstract & para. 117, UE will not transmit data to UE & deactivates the additional carrier).

Regarding claims 2 and 6, '104 describes:

wherein the predetermined time is a value predefined to make state information that is managed by the base station consistent with state information that is managed by the terminal for the secondary carrier (claims 2 & 6).

Regarding claims 3 and 7, '104 describes:

receiving a reception success message for the deactivation message from the terminal after transmitting the deactivation message (claims 3 & 7).

Regarding claims 4 and 8, '104 describes:

immediately stopping, by the base station, data transmission and retransmission using the secondary carrier immediately after transmitting the deactivation message (claims 4 & 8).

DETAILED ACTION

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102 of this title, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-8 are rejected under 35 U.S.C. 103 as being unpatentable over Xu (PCT/CN2010/07091), equivalent to (US 2013/0016639) herein used for ease of prosecution, in view of Nimbalkar.

Regarding claim 1, Xu describes a carrier management method of a base station (BS) for use in a carrier aggregation environment (title), comprising:

- transmitting a deactivation message for a secondary carrier to a terminal (abstract, fig. 4 & para. 46, BS transmitting deactivation indication to UE);
- changing the secondary carrier to a deactivation state based on a predetermined time from the transmission of the deactivation message (abstract & para. 117, when downlink traffic decreases, BS deactivates additional carrier after X DRX cycles & deletes such timer);
- stopping downlink (DL) data transmission of the secondary carrier (abstract & para. 117, BS will not transmit data to UE & deactivates the additional carrier);

Xu fails to further explicitly describe:

- initializing uplink (UL) and DL retransmission buffers after transmitting the deactivation message.

Nimbalker also describes wireless spectrum aggregation (para. 8), further describing:

- initializing uplink (UL) and DL buffers associated with the secondary carrier after transmitting the deactivation message (para. 54, soft buffers for all transmission & reception (UL & DL) of the additional component carrier are reconfigured in response to a change such as deactivation of the additional component carrier, such as performing buffers reset, para. 55).

It would have been obvious to one with ordinary skill in the art at the time of invention by application to specify that after transmitting deactivation message in Xu to initialize UL & DL retransmission buffers.

The motivation for combining the teachings is that this yields an effective HARQ architecture for having full advantages of AMC & MIMO for higher data rates (Nimbalkar, para. 6).

Regarding claim 5, Xu describes a carrier management method of a terminal for use in a carrier aggregation environment (title), comprising:

receiving a deactivation message for a secondary carrier from a base station (abstract, fig. 4 & para. 46, BS transmitting deactivation indication to UE);

changing the secondary carrier to a deactivation state based on a predetermined time from the reception of the deactivation message (abstract & para. 117, when downlink traffic decreases, BS deactivates additional carrier after X DRX cycles & deletes such timer);

stopping UL data transmission of the secondary carrier and initializing UL and DL buffers associated with the secondary carrier after receiving the deactivation message (abstract & para. 117, UE will not transmit data to UE & deactivates the additional carrier).

Xu fails to further explicitly describe:

initializing uplink (UL) and DL retransmission buffers after transmitting the deactivation message.

Nimbalker also describes wireless spectrum aggregation (para. 8), further describing:

initializing uplink (UL) and DL buffers associated with the secondary carrier after transmitting the deactivation message (para. 54, soft buffers for all transmission & reception (UL & DL) of the additional component carrier are reconfigured in response to a change such as deactivation of the additional component carrier, such as performing buffers reset, para. 55).

It would have been obvious to one with ordinary skill in the art at the time of invention by application to specify that after transmitting deactivation message in Xu to initialize UL & DL retransmission buffers.

The motivation for combining the teachings is that this yields an effective HARQ architecture for having full advantages of AMC & MIMO for higher data rates (Nimbalker, para. 6).

Regarding claims 2 and 6, Xu describes:

wherein the predetermined time is a value predefined to make state information that is managed by the base station consistent with state information that is managed by the terminal for the secondary carrier (para. 117, the predetermined time of X DRX cycles are being synchronous between the BS & UE).

Regarding claims 3 and 7, Xu describes:

receiving a reception success message for the deactivation message from the terminal after transmitting the deactivation message (fig. 4 & para. 91, returning a

Art Unit: 2469

deactivation complete response), wherein the changing of the secondary carrier to the deactivation state includes changing, by the base station, the secondary carrier to the deactivation state after a predetermined time from an arrival time of the reception success message (para. 117, BS deactivates additional carrier after X DRX cycles & deletes such timer).

Regarding claims 4 and 8, Xu describes:

immediately stopping, by the base station, data transmission and retransmission using the secondary carrier immediately after transmitting the deactivation message (fig. 4 & para. 90, BS can immediately deactivate (stop) all data (transmission & retransmission) after transmitting deactivation indication).

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Pelletier (US 2011/0134774) describing component carrier activation/deactivation for handling carrier aggregation, Pelletier (US 2012/0300733) HARQ process utilization of multiple carriers where buffer of HARQ process is flushed with supplementary carrier is deactivated, Wiemann (US 9,065,650) describing controlling the deactivation of transmission carriers, Hsu (US 2011/0243106) describing carrier aggregation with deactivation as the HARQ buffers are flushed, Seo (US 2012/0113946) describing method/apparatus for performing HARQ in multiple carrier system, Wang (US 2011/0243048) flush out HARQ buffer for the corresponding carrier, Heo (US 8,767,647) describing carrier aggregation + deactivation of specific carriers

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and retransmission, and Jang (US 2015/0139171) describing deactivating secondary carriers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WARNER WONG whose telephone number is (571)272-8197. The examiner can normally be reached on 6:30AM - 4:00PM, M-R.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ian Moore can be reached on (571) 272-3085. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Warner Wong
Primary Examiner
Art Unit 2469

/WARNER WONG/
Primary Examiner, Art Unit 2469

Notice of References Cited	Application/Control No. 14/831,023		Applicant(s)/Patent Under Reexamination LEE ET AL.	
	Examiner WARNER WONG		Art Unit 2469	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2011/0134774 A1	06-2011	Pelletier; Ghyslain	H04W52/365	370/252
*	B	US-2012/0300733 A1	11-2012	Pelletier; Benoit	H04L1/1812	370/329
*	C	US-9,065,650 B2	06-2015	Wiemann; Henning	H04L1/1867	1/1
*	D	US-2011/0243106 A1	10-2011	Hsu; Chia-Chun	H04L5/0096	370/336
*	E	US-2012/0113946 A1	05-2012	Seo; Dong Youn	H04L1/1812	370/329
*	F	US-2011/0243048 A1	10-2011	Wang; Chun-Yen	H04L5/0051	370/311
*	G	US-8,767,647 B2	07-2014	Heo; Youn Hyoung	H04L5/001	370/329
*	H	US-2015/0139171 A1	05-2015	JANG; Jae Hyuk	H04W24/02	370/329
*	I	US-2013/0016639 A1	01-2013	XU; Haibo	H04L5/001	370/311
*	J	US-2012/0087396 A1	04-2012	Nimbalker; Ajit	H04L1/1822	375/219
	K	US-				
	L	US-				
	M	US-				

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

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

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<i>Index of Claims</i> 	Application/Control No. 14831023	Applicant(s)/Patent Under Reexamination LEE ET AL.
	Examiner WARNER WONG	Art Unit 2469

✓	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	05/24/2016														
	1	✓														
	2	✓														
	3	✓														
	4	✓														
	5	✓														
	6	✓														
	7	✓														
	8	✓														

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	28	((("20100020733") or ("20100130219") or ("20100130137") or ("20100240406") or ("20100304786") or ("20110002281") or ("20110103331") or ("20110150743") or ("20110243048") or ("20110243106") or ("8270988") or ("8855132") or ("20140328284") or ("8976694"))).PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/05/24 13:48
S71	1	"14831023"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 11:15
S72	7	"13208471"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 11:18
S73	2	("9144106").PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/05/23 11:21
S75	4	lee-kyoung-seok.in. and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and retransmission).clm.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 13:13
S76	4	kim-jae-heung.in. and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and retransmission).clm.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/05/23 13:13
S77	4	lee-kook-jin.in. and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and retransmission).clm.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 13:15
S78	0	(electronics adj1 telecommunications adj1 research adj1 institute).as. and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and retransmission).clm.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 13:16
S79	8	(370/329).cls. and (((frequency band carrier) near1 aggregation\$) and	US-PGPUB; USPAT;	OR	ON	2016/05/23 13:17

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		de\$1activat\$3 and (retransmission or (buffer queue))).clm.	FPRS; EPO; JPO; DERWENT; IBM_TDB			
S80	812	(370/329).ccls. and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and (retransmission or (buffer queue)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 13:34
S81	15	(370/329).ccls. and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and (retransmission near1 (buffer queue)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 13:34
S82	567	(370/329).ccls. and ((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and retransmission	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 13:36
S83	221	(370/329).ccls. and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and ((HARQ ARQ) near1 (buffer queue)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 14:20
S84	19	("20080002688" "20080117891" "20080232307" "20100040001" "20100067468" "20100074204" "20100172290" "20100235705" "20100257419" "20100312994" "20110116457" "20110176502" "20120026936" "20120327891" "20130182679" "8009606" "8402336" "8411633" "8432859").PN. OR ("8630248").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2016/05/23 15:01
S89	0	H04W76/046.cpc and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and ((OC ((component secondary supplement\$3) adj1 carrier)) near1 (buffer queue)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 15:21
S90	8	H04W76/048.cpc. and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and ((OC ((component secondary) adj1 carrier)) near1 (buffer queue)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 15:21
S91	8	H04W52/0216.cpc. and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and ((OC ((component secondary supplement\$3) adj1 carrier)) near1 (buffer queue)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 15:22
S93	10	H04L5/0098.cpc. and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and ((OC ((component secondary supplement\$3) adj1 carrier)) near1 (buffer queue)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT;	OR	ON	2016/05/23 16:06

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Ex.1003.00126

			IBM_TDB			
S94	9	H04W72/00,04.cpc. and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and ((OC ((component secondary supplement\$3) adj1 carrier)) near1 (buffer queue)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 16:07
S95	0	H04W76/046.cpc. and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and ((OC ((component secondary supplement\$3) adj1 carrier)) near1 (buffer queue)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 16:09
S96	20	H04W\$.cpc. and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and ((OC ((component secondary supplement\$3) adj1 carrier)) near1 (buffer queue)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 16:10
S97	21	H04L\$.cpc. and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and ((OC ((component secondary supplement\$3) adj1 carrier)) near1 (buffer queue)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 16:57
S98	17	H04L\$.cpc. and ((frequency band carrier) near3 de\$1activat\$3) and ((OC ((component secondary supplement\$3) adj1 carrier)) near1 (buffer queue stack memory storage))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 17:17
S99	137	(H04L5/003).cpc. and ((frequency band carrier) near1 aggregation\$) and de\$1activat\$3	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 18:00
S100	27	(H04L27/2657).cpc. and ((frequency band carrier) near1 aggregation\$) and de\$1activat\$3	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 18:03
S101	168	(H04W).cpcl. and ((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 same (timing offset defer\$4) same state	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/05/23 18:04
S102	2	("20140328284").PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/05/24 10:40
S103	4	((("20150085808") or ("20150139171")).PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/05/24 10:41
S104	4	"13544464"	US-PGPUB;	OR	ON	2016/05/24

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Ex.1003.00127

			USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB			10:59
S106	3	("8937895").PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/05/24 11:36

EAST Search History (Interference)

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BIB DATA SHEET

CONFIRMATION NO. 8602

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
14/831,023	08/20/2015	370	2469	175090.0011C1		
RULE						
APPLICANTS Electronics and Telecommunications Research Institute, Daejeon, KOREA, REPUBLIC OF; INVENTORS Kyoung Seok LEE, Daejeon, KOREA, REPUBLIC OF; Jae Heung KIM, Daejeon, KOREA, REPUBLIC OF; Kook Jin LEE, Daejeon, KOREA, REPUBLIC OF; ** CONTINUING DATA ***** This application is a CON of 13/884,216 05/08/2013 PAT 9144106 which is a 371 of PCT/KR2011/008404 11/07/2011 which is a CON of 13/208,471 08/12/2011 PAT 8743720 ** FOREIGN APPLICATIONS ***** REPUBLIC OF KOREA 10-2010-0077880 08/12/2010 REPUBLIC OF KOREA 10-2010-0110649 11/08/2010 ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** ** SMALL ENTITY ** 09/02/2015						
Foreign Priority claimed ☒ Yes ☐ No 35 USC 119(a-d) conditions met ☒ Yes ☐ No Verified and Acknowledged <u>/WARNER WONG/</u> Examiner's Signature		☐ Met after Allowance <u> </u> Initials	STATE OR COUNTRY KOREA, REPUBLIC OF	SHEETS DRAWINGS 5	TOTAL CLAIMS 8	INDEPENDENT CLAIMS 2
ADDRESS NSIP LAW P.O. Box 65745 Washington, DC 20035 UNITED STATES						
TITLE METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM						
FILING FEE RECEIVED 730	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

Search Notes 	Application/Control No. 14831023	Applicant(s)/Patent Under Reexamination LEE ET AL.
	Examiner WARNER WONG	Art Unit 2469

CPC- SEARCHED		
Symbol	Date	Examiner
H04W72/02,04,12 H04L27/0014 H04L5/003 H04L27/00143 H04L27/2657	4/16/2015	WW
H04W76/046,048 H04W52/0216 H04W72/00,04	5/23/2016	WW

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
370	252,277,282,329,341,350,503,464-465	11/5/2014	WW

SEARCH NOTES		
Search Notes	Date	Examiner
Inventors and assignee names searches (EAST); keyword searches using subclasses	11/5/2014	WW
updated search; CPC search	4/16/2015	WW
H04W76/046,048 H04W52/0216 H04W72/00,04	5/23/2016	WW

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	interference search	4/16/2015	WW

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Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>			Complete if Known		
			Application Number	Not Yet Assigned	
			Filing Date	Concurrently Herewith	
			First Named Inventor	Kyoung Seok Lee	
			Art Unit	Not Yet Assigned	
			Examiner Name	Not Yet Assigned	
Sheet	1	of	2	Attorney Docket Number	175090.0011C1

Substitute for PTO/SB/08a/b

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No. ¹	Document Number Number - Kind Code ² (if known)	Patent or Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US 2010/0020733 A1	01-28-2010	Hartman	
		US 2010/0130137 A1	05-27-2010	Pelletier et al.	
		US 2010/0130219 A1	05-27-2010	Cave et al.	
		US 2010/0240406 A1	09-23-2010	Tseng	
		US 2010/0304786 A1	12-02-2010	Ou	
		US 2011/0002281 A1	01-06-2011	Terry et al.	
		US 2011/0103331 A1	05-05-2011	Kuo	
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		US 2011/0243048 A1	10-06-2011	Wang et al.	
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		US 8,270,988 B1	09-18-2012	Sarkar et al.	
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		US 2014/0328284 A1	11-06-2014	Jang et al.	
		US 8,976,694 B2	03-10-2015	Feuersanger et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /W.W/

Examiner Signature	/WARNER WONG/	Date Considered	05/24/2016
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*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. ¹Applicant's unique citation designation number (optional). ²See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04(a). ³Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶Applicant is to place a check mark here if English language Translation is attached (X indicates Abstract only provided).

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Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>				Complete if Known	
				Application Number	Not Yet Assigned
				Filing Date	Concurrently Herewith
				First Named Inventor	Kyoung Seok Lee
				Art Unit	Not Yet Assigned
				Examiner Name	Not Yet Assigned
Sheet	2	of	2	Attorney Docket Number	175090.0011C1

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document	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
		Country Code ³ - Number ⁴ - Kind Code ⁵ (if known)				
		KR 10-2009-0074279 A1	07-06-2009	Interdigital Technology Corporation		X
		KR 10-2010-0118067 A1	11-04-2010	LG Electronics Inc.		X
		WO 12/064052 A3	05-18-2012	Electronics and Telecommunications Research Institute		X

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author, title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ⁶
		Ericsson, ST-Ericsson, "DXR with Carrier Aggregation in LTE-Advanced," 3GPP TSG-RAN WG2 #67bis, Tdoc R2-095809, 4 pages (2009)	
		International Search Report and Written Opinion for Application No. PCT/KR2011/008404, 14 pages, dated May 29, 2012.	

Examiner Signature	/WARNER WONG/	Date Considered	05/24/2016
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*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. ¹Applicant's unique citation designation number (optional). ²See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04(a). ³Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶Applicant is to place a check mark here if English language Translation is attached (X indicates Abstract only provided).

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Petitioners' Ex. 1003

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /W.W./ EX.1003.00132

Doc Code: DIST.E.FILE Document Description: Electronic Terminal Disclaimer - Filed		PTO/SB/26 U.S. Patent and Trademark Office Department of Commerce	
Electronic Petition Request		TERMINAL DISCLAIMER TO OBIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	
Application Number		14831023	
Filing Date		20-Aug-2015	
First Named Inventor		Kyoung Seok LEE	
Attorney Docket Number		175090.0011C1	
Title of Invention		METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM	
☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action ☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.			
Owner		Percent Interest	
Electronics and Telecommunications Research Institute		100%	
The owner(s) with percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent number(s) 9144106 as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns. In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later: - expires for failure to pay a maintenance fee; - is held unenforceable; - is found invalid by a court of competent jurisdiction; - is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321; - has all claims canceled by a reexamination certificate; - is reissued; or - is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.			
☒ Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request. IPR2024-00608 Petitioners' Ex. 1003 Ex.1003.00133			

☐ I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.	
Applicant claims the following fee status: ☒ Small Entity ☐ Micro Entity ☐ Regular Undiscounted	
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.	
THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES I certify, in accordance with 37 CFR 1.4(d)(4) that I am: ☒ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application Registration Number <u>74160</u> ☐ A sole inventor ☐ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application ☐ A joint inventor; all of whom are signing this request	
Signature	/Michael W Chao/
Name	Michael W. Chao

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
 Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

Electronic Patent Application Fee Transmittal

Application Number:	14831023			
Filing Date:	20-Aug-2015			
Title of Invention:	METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM			
First Named Inventor/Applicant Name:	Kyoung Seok LEE			
Filer:	Michael Wenchang Chao			
Attorney Docket Number:	175090.0011C1			
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Statutory or Terminal Disclaimer	2814	1	160	160
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

IPR2024-00608

Petitioners' Ex. 1003
Ex.1003.00135

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				160

Doc Code: DISQ.E.FILE

Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 14831023

Filing Date: 20-Aug-2015

Applicant/Patent under Reexamination: LEE et al.

Electronic Terminal Disclaimer filed on August 26, 2016

☒ APPROVED

This patent is subject to a terminal disclaimer

☐ DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

Electronic Acknowledgement Receipt

EFS ID:	26759891
Application Number:	14831023
International Application Number:	
Confirmation Number:	8602
Title of Invention:	METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Kyoung Seok LEE
Customer Number:	89980
Filer:	Michael Wenchang Chao
Filer Authorized By:	
Attorney Docket Number:	175090.0011C1
Receipt Date:	26-AUG-2016
Filing Date:	20-AUG-2015
Time Stamp:	13:54:04
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 160
RAM confirmation Number	13792
Deposit Account	
Authorized User	

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Petitioners' Ex. 1003
Ex.1003.00138

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Electronic Terminal Disclaimer-Filed	eTerminal-Disclaimer.pdf	33615	no	2
			251ae1dbceddc63529e792c82de8dfdf38d0233		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30695	no	2
			1e0162cded47f3db745985867970f5d22565696e		
Warnings:					
Information:					
Total Files Size (in bytes):			64310		
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Kyoung Seok LEE

Application No. 14/831,023

Art Unit: 2469

Confirmation No. 8602

Filed: August 20, 2015

Examiner: WONG, WARNER

For: METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION
ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM

ARGUMENT UNDER 37 C.F.R. § 1.111

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

Sir:

This is in response to the Office Action mailed May 27, 2016, and having a period for response set to expire on August 29, 2016, due to August 27 being a Saturday.

The following amendments and remarks are respectfully submitted. Reconsideration of the claims is respectfully requested.

A listing of the claims begins on page 2 of this Paper.

Remarks begin on page 4 of this Paper.

IN THE CLAIMS:

This listing of the claims replaces all prior versions and listings of the claims in this application.

The text of all pending claims (including any withdrawn claims) is set forth below. Canceled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~striketrough~~. The status of each claim is listed with one of (Original), (Currently amended), (Canceled), (Withdrawn), (Previously presented), (New), and (Not entered).

A listing of the claims 1-8 follows:

1. (Previously presented) A carrier management method of a base station for use in a carrier aggregation environment, comprising:

transmitting a deactivation message for a secondary carrier to a terminal;
changing the secondary carrier to a deactivation state based on a predetermined time from the transmission of the deactivation message; and
stopping downlink (DL) data transmission of the secondary carrier and initializing uplink (UL) and DL buffers associated with the secondary carrier after transmitting the deactivation message.

2. (Original) The carrier management method of claim 1, wherein the predetermined time is a value predefined to make state information that is managed by the base station consistent with state information that is managed by the terminal for the secondary carrier.

3. (Original) The carrier management method of claim 1, further comprising:
receiving a reception success message for the deactivation message from the terminal after transmitting the deactivation message,
wherein the changing of the secondary carrier to the deactivation state includes changing, by the base station, the secondary carrier to the deactivation state after a predetermined time from an arrival time of the reception success message.

4. (Original) The carrier management method of claim 1, further comprising:
immediately stopping, by the base station, data transmission and retransmission
using the secondary carrier immediately after transmitting the deactivation message.

5. (Previously presented) A carrier management method of a terminal for use in a
carrier aggregation environment, comprising:

receiving a deactivation message for a secondary carrier from a base station;
changing the secondary carrier to a deactivation state based on a predetermined
time from the reception of the deactivation message; and
stopping UL data transmission of the secondary carrier and initializing UL and DL
buffers associated with the secondary carrier after receiving the deactivation message.

6. (Original) The carrier management method of claim 5, wherein the
predetermined time is a value predefined to make state information that is managed by
the base station consistent with state information that is managed by the terminal for the
secondary carrier.

7. (Original) The carrier management method of claim 5, further comprising:
transmitting a reception success message for the deactivation message to the
base station after receiving the deactivation message,
wherein the changing of the secondary carrier to the deactivation state includes
changing, by the terminal, the secondary carrier to the deactivation state after a
predetermined time from a transmission time of the reception success message.

8. (Previously presented) The carrier management method of claim 5, further
comprising:
stopping, by the terminal, demodulation of a physical downlink control channel
(PDCCH) of the secondary carrier.

REMARKS

At the outset, the Office is thanked for the review and consideration of the pending application. The Office Action dated May 27, 2016, has been received and its contents reviewed. Reconsideration of the pending application is respectfully requested in view of the following remarks.

Claims 1-8 are pending, with claim 1, being independent.

Preliminary Remarks

a) Drawings:

The Office is thanked for acknowledging that the drawings filed on August 20, 2015, have been accepted.

b) Foreign Priority:

Applicant respectfully requests that the Office acknowledge Applicant's claim for foreign priority and that all of the certified copies of the foreign priority applications, Korean Application 10-2010-0077880, which has a foreign priority date of August 12, 2010, and Korean Application 10-2010-0110649, which has a foreign priority date of November 8, 2016, have been received, i.e. the certified copies of the foreign priority applications were respectively electronically retrieved by the USPTO on September 15 and 16, 2015.

c) Information Disclosure Statement(s):

Applicant further thanks the Office for considering the Information Disclosure Statement(s) filed on August 20, 2015.

Double Patenting

In the Office Action of May 27, 2016, pages 2-5, the Office rejects claims 1-8 under nonstatutory double patenting in view of U.S. patent 9,144,106 and Nimbalker, US 2012/0087396. A terminal disclaimer is filed herewith renders this issue moot.

Claim Rejections Under 35 U.S.C. § 103

In the Office Action of May 27, 2016, pages 5-9, the Office rejected **claims 1-8** as obvious under 35 U.S.C. § 103 in view of Xu, US 2013/0016639, and Nimbalker, US 2012/0087396. Applicant respectfully traverses.

Claim 1 recites, *inter alia*, “changing the secondary carrier to a deactivation state based on a predetermined time from the transmission of the deactivation message.”

On page 6 of the Office Action, the Office alleges that the above features are disclosed by Xu by stating that “(abstract & para. 11y, when downlink traffic decreases, BS deactivates additional carrier after x DRX cycles & deletes such timer.” Applicant respectfully submits that Xu does not describe “a predetermined time from the transmission of the deactivation message,” as featured in claim 1.

Initially, Xu’s abstract does not feature relevant description for the above noted features and Xu paragraph 117 merely describes adding a second carrier, therefore, Applicant focuses on Xu paragraph 115, reproduced below, which describes deactivating a carrier.

After additional carrier 1 is activated, both the base station and the UE set a timer 1 for additional carrier 1. In the activated duration of additional carrier 1, the base station restarts the timer every time the control information is transmitted on the PDCCH or data is transmitted on the PDSCH for the UE. Meanwhile, the UE restarts the timer every time the control information is received on the PDCCH or data is received on the PDSCH. At the timing of t.sub.2, when the downlink traffic volume of the UE is decreased, the base station deactivates additional carrier 1 for the UE and deletes the corresponding timer, in case the base station does not transmit any control information or data on additional carrier 1 for the UE in successive X DRX cycles. Similarly, the UE deactivates additional carrier 1 and deletes the corresponding timer, **in case the UE does not receive any control information or data on additional carrier 1 in successive X DRX cycles**. Since the timer is synchronous at the base station side and the UE side, additional carrier 1 is synchronously deactivated by the base station and the UE. (Emphasis Applicants.)
See Xu ¶ 115.

Thus, Xu describes using a timer from the time the additional carrier is activated. Upon deactivation the timer is deleted. Hence, Xu does not describe “a predetermined time from the transmission of the deactivation message,” as featured in claim 1. Xu merely deactivates the additional carrier and, simultaneously, deletes the timer. Thus, the base station of Xu does not perform: “changing the secondary carrier to a deactivation state based on a predetermined time from the transmission of the deactivation message,” as recited in claim 1.

Furthermore, the DRX cycles of Xu, mentioned by the Office, are merely used by the User Equipment to determine when a carrier has been deactivated. The base station of Xu, which determines the deactivation, does not base the deactivation on the DRX cycles.

Additionally, Xu does not describe that the timer is related to the “deactivation indication” of Xu Figure 4. Instead Xu merely describes that the Base Station may explicitly signal the User

Equipment that a carrier is being deactivated. No timer or other timing aspect is disclosed relative to the “deactivation indication.” Thus, Xu fails to disclose “a predetermined time from the transmission of the deactivation message,” as featured in claim 1.

Furthermore, Xu states that the explicit “deactivation indication” of Xu Figure 4 is an alternate embodiment to the disclosure of Xu paragraphs 115, 117, and the embodiment of the DRX cycle. For example, Xu paragraphs 90 and 91 provide:

The above deactivating steps 430 and 440 of additional carrier as illustrated in FIG. 4 are performed through the explicit signaling. In order to save the air-interface resources, in another preferred embodiment of the present invention, the base station may notify the UE to deactivate one or more additional carriers in an activated state through an implicit singling when the downlink traffic volume of the UE is decreased.

The design method for the implicit singling is that the base station and the UE provide the same timer. The minimum timing unit of the timer is a Discontinuous Reception (DRX) cycle, which is configured by the base station when the UE sets up a service connection.
See Xu ¶¶ 90-91.

Thus, Xu describes that the embodiment of the “explicit signaling,” of Figure 4, is in the alternative to the embodiment that uses a timer and a DRX cycle, described in Xu paragraphs 115 and 117. Therefore, not only does Xu fail to disclose “changing the secondary carrier to a deactivation state based on a predetermined time from the transmission of the deactivation message,” as recited in claim 1, but Xu also fails to disclose the use of **both** “a deactivation message,” e.g. Xu Figure 4, and a “time from the transmission of the deactivation message,” e.g. Xu ¶¶ 115 and 117.

The Nimbalker reference was not cited for, nor does it remedy, the deficiencies of Xu. Therefore, Applicant respectfully submits that Xu and Nimbalker, alone or in combination, fail to disclose, at least, “changing the secondary carrier to a deactivation state based on a predetermined time from the transmission of the deactivation message,” as recited in claim 1.

Applicant respectfully requests that the rejection of claim 1 be withdrawn.

The dependent claims, claim numbers 2-8, depend from their allowable independent claim 1. Therefore, the rejections of claims 2-8 should be withdrawn for, at least, their dependence upon allowable independent claim 1.

In view of the foregoing amendments and remarks, Applicant respectfully submits that *all* claims in the application are now in condition for allowance. Accordingly, withdrawal of the rejections and allowance of all the claims is respectfully requested.

Conclusion

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Office is requested to telephone the undersigned to attend to these matters.

In the event this paper is not being timely filed, the Applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees only associated with the processing of this Response and any other documents filed concurrently with this Response may be charged to Counsel's Deposit Account 50-5113.

Respectfully submitted,

Date: August 26, 2016

/Michael W Chao/

Michael W. Chao
Registration No. 74,160

NSIP Law
1120 Connecticut Avenue, NW, Suite 304
Washington, DC 20036
Telephone (202) 429-0020
Facsimile (202) 315-3758

Electronic Acknowledgement Receipt

EFS ID:	26760079
Application Number:	14831023
International Application Number:	
Confirmation Number:	8602
Title of Invention:	METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Kyoung Seok LEE
Customer Number:	89980
Filer:	Michael Wenchang Chao
Filer Authorized By:	
Attorney Docket Number:	175090.0011C1
Receipt Date:	26-AUG-2016
Filing Date:	20-AUG-2015
Time Stamp:	13:59:23
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		OA20160527_1750900011C1_R espAsFiled.pdf	71094 bce534acc60f949ef06b345b38a06b4ad5d 4f18c	yes	7

IPR2024-00608
Petitioners' Ex. 1003
Ex.1003.00147

Multipart Description/PDF files in .zip description			
Document Description	Start	End	
Amendment/Req. Reconsideration-After Non-Final Reject	1	1	
Claims	2	3	
Applicant Arguments/Remarks Made in an Amendment	4	7	

Warnings:

Information:

Total Files Size (in bytes):	71094
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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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

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

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 14/831,023		Filing Date 08/20/2015		☐ To be Mailed			
ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO												
APPLICATION AS FILED – PART I												
(Column 1)			(Column 2)									
FOR		NUMBER FILED		NUMBER EXTRA		RATE (\$)		FEE (\$)				
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A		N/A		N/A						
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))		N/A		N/A		N/A						
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A		N/A		N/A						
TOTAL CLAIMS (37 CFR 1.16(i))		minus 20 =		*		X \$ =						
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 =		*		X \$ =						
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).										
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))												
* If the difference in column 1 is less than zero, enter "0" in column 2.						TOTAL						
APPLICATION AS AMENDED – PART II												
(Column 1)			(Column 2)			(Column 3)						
AMENDMENT	08/26/2016		CLAIMS REMAINING AFTER AMENDMENT			HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))		* 8		Minus	** 20	= 0		X \$40 =		0	
	Independent (37 CFR 1.16(h))		* 2		Minus	*** 3	= 0		X \$210 =		0	
	☐ Application Size Fee (37 CFR 1.16(s))											
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))											
									TOTAL ADD'L FEE		0	
(Column 1)			(Column 2)			(Column 3)						
AMENDMENT			CLAIMS REMAINING AFTER AMENDMENT			HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))		*		Minus	**	=		X \$ =			
	Independent (37 CFR 1.16(h))		*		Minus	***	=		X \$ =			
	☐ Application Size Fee (37 CFR 1.16(s))											
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))											
									TOTAL ADD'L FEE			
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.											LIE /ERIC V. BURNS/	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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NOTICE OF ALLOWANCE AND FEE(S) DUE

89980 7590 09/22/2016
NSIP LAW
P.O. Box 65745
Washington, DC 20035

EXAMINER

WONG, WARNER

ART UNIT

PAPER NUMBER

2469

DATE MAILED: 09/22/2016

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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14/831,023

08/20/2015

Kyoung Seok LEE

175090.0011C1

8602

TITLE OF INVENTION: METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
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nonprovisional

SMALL

\$480

\$0

\$0

\$480

12/22/2016

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

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

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I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

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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.

IPR2024-00608

Petitioners' Ex. 1003
Ex.1003.00150

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Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE
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89980 7590 09/22/2016
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_____ (Signature)
_____ (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/831,023	08/20/2015	Kyoung Seok LEE	175090.0011C1	8602

TITLE OF INVENTION: METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0	\$0	\$480	12/22/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS
WONG, WARNER	2469	370-311000

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, 1 _____
- (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. 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

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- ☐ Advance Order - # of Copies _____

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- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

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

- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
- ☐ Applicant asserting small entity status. See 37 CFR 1.27
- ☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

IPR2024-00608

**Petitioners' Ex. 1003
Ex.1003.00151**



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/831,023	08/20/2015	Kyoung Seok LEE	175090.0011C1	8602
89980	7590	09/22/2016	EXAMINER	
NSIP LAW			WONG, WARNER	
P.O. Box 65745			ART UNIT	
Washington, DC 20035			PAPER NUMBER	
			2469	
DATE MAILED: 09/22/2016				

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

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

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

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

IPR2024-00608
Petitioners' Ex. 1003
Ex. 1003.00153

Notice of Allowability	Application No. 14/831,023	Applicant(s) LEE ET AL.	
	Examiner WARNER WONG	Art Unit 2469	AIA (First Inventor to File) Status No

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

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

1. ☒ This communication is responsive to 26 August 2016.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are 1-8. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

- a) ☒ All b) ☐ Some *c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

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

/WARNER WONG/
Primary Examiner, Art Unit 2469

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

REASONS FOR ALLOWANCE

1. The Applicants have effectively argued on pp. 5-6 that Xu and Nimbalker fails to fulfill the claim limitations as a whole, particularly the recitation of "changing the secondary carrier to a deactivation state based on a predetermined time from the transmission of the deactivation message", that Xu's alternate embodiment of explicit deactivation signaling does not use the timer and the DRX cycle period.

With the approved terminal disclaimer overcoming the non-statutory double patenting rejection, independent claim 1 now almost mirrors independent claim one of parent patent US 9,144,106, with minor word change from "after a predetermined time" to "based on a predetermined time".

The closest prior art, Xu and Nimbalker, along with either Guo (US 2015/0382398) describing deactivating a SCell after receiving an indication of period + expiry of timer based on such a period (fig. 9) or Kone (US 8,724,55) describing handling of secondary cell (SCell) reactivation (fig. 9), in combination, fail to render the above features obvious.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WARNER WONG whose telephone number is (571)272-8197. The examiner can normally be reached on 6:30AM - 4:00PM, M-R.

Art Unit: 2469

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ian Moore can be reached on (571) 272-3085. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Warner Wong
Primary Examiner
Art Unit 2469

/WARNER WONG/
Primary Examiner, Art Unit 2469

Notice of References Cited	Application/Control No. 14/831,023		Applicant(s)/Patent Under Reexamination LEE ET AL.	
	Examiner WARNER WONG		Art Unit 2469	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2015/0382398 A1	12-2015	Guo; Yu-Hsuan	H04W52/0206	370/328
*	B	US-8,724,550 B2	05-2014	Kone; Mamadou	H04L5/001	370/328
	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	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

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

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes 	Application/Control No. 14831023	Applicant(s)/Patent Under Reexamination LEE ET AL.
	Examiner WARNER WONG	Art Unit 2469

CPC- SEARCHED		
Symbol	Date	Examiner
H04W72/02,04,12 H04L27/0014 H04L5/003 H04L27/00143 H04L27/2657	4/16/2015	WW
H04W76/046,048 H04W52/0216 H04W72/00,04	5/23/2016	WW

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
370	252,277,282,329,341,350,503,464-465	11/5/2014	WW

SEARCH NOTES		
Search Notes	Date	Examiner
Inventors and assignee names searches (EAST); keyword searches using subclasses	11/5/2014	WW
updated search; CPC search	4/16/2015	WW
H04W76/046,048 H04W52/0216 H04W72/00,04 (updated 9/9/2016)/	5/23/2016	WW

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	interference search history	4/16/2015	WW
	interference search history	9/9/2016	WW

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	0	H04W76/046.cpc and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and ((CC ((component secondary supplement\$3) adj1 carrier)) near1 (buffer queue)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 11:01
L3	8	H04W76/048.cpc. and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and ((CC ((component secondary) adj1 carrier)) near1 (buffer queue)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 11:03
L4	8	H04W52/0216.cpc. and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and ((CC ((component secondary supplement\$3) adj1 carrier)) near1 (buffer queue)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 11:03
L5	11	H04L5/0098.cpc. and (((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 and ((CC ((component secondary supplement\$3) adj1 carrier)) near1 (buffer queue)))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 11:04
L6	29	(H04L27/2657).cpc. and ((frequency band carrier) near1 aggregation\$) and de\$1activat\$3	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 11:05
L7	187	(H04W).cpcl. and ((frequency band carrier) near1 aggregation\$) and de\$1activat\$3 same (timing offset defer\$4) same state	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 11:07
L8	255	(H04W72/04).cpc. and ((frequency band carrier) near1 aggregation\$) and de\$1activat\$3	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 11:10
L9	103	(H04W72/02).cpc. and ((frequency band carrier) near1 aggregation\$) and de\$1activat\$3	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 12:17
L10	0	(H04L5/003).cpcl. and ((frequency band carrier) near1 aggregation\$) and de\$1activat\$3	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 12:31
L11	0	(H04L27/00143).cpcl. and ((frequency band carrier) near1 aggregation\$) and de\$1activat\$3	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 12:43

IPR2024-00608
Petitioners' Ex. 1003
Ex.1003.00159

L12	0	(H04L27/0014).cpcl. and ((frequency band carrier) near1 aggregation\$) and de\$1activat\$3	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 12:43
L13	0	(H04L27/2657).cpcl. and ((frequency band carrier) near1 aggregation\$) and de\$1activat\$3	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 12:44
L14	0	(H045/0035).cpcl. and ((frequency band carrier) near1 aggregation\$) and de\$1activat\$3	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 12:44
L15	149	(H04L5/003).cpc. and ((frequency band carrier) near1 aggregation\$) and de\$1activat\$3	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 12:45
L18	139	(H04L\$).cpc. and ((frequency band carrier) near1 aggregation\$) and disabl\$3 same (postpon\$5 deferr\$3 period duration timer expir\$5)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 12:49
L19	217	(H04W\$).cpc. and ((frequency band carrier) near1 aggregation\$) and disabl\$3 same (postpon\$5 deferr\$3 period duration timer expir\$5)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 13:05

9/ 9/ 2016 2:00:37 PM
H:\ Workspaces\ 13884216.wsp

Issue Classification 	Application/Control No. 14831023	Applicant(s)/Patent Under Reexamination LEE ET AL.	
	Examiner WARNER WONG	Art Unit 2469	

CPC						
Symbol					Type	Version
H04W		72	/	0406	F	2013-01-01
H04W		72	/	02	I	2013-01-01
H04W		52	/	0216	I	2013-01-01
H04L		1	/	0026	A	2013-01-01
H04L		1	/	1825	I	2013-01-01
H04L		1	/	1854	I	2013-01-01
H04L		1	/	1864	I	2013-01-01
H04L		1	/	1887	I	2013-01-01
H04L		1	/	1896	I	2013-01-01
H04L		5	/	001	I	2013-01-01
H04L		5	/	0098	I	2013-01-01
H04W		24	/	00	A	2013-01-01
H04W		28	/	04	A	2013-01-01
H04W		28	/	06	A	2013-01-01
H04W		48	/	08	A	2013-01-01
H04W		72	/	00	A	2013-01-01
H04W		72	/	04	I	2013-01-01
H04W		76	/	048	I	2013-01-01
H04W		76	/	068	I	2013-01-01

CPC Combination Sets					
Symbol		Type	Set	Ranking	Version

NONE		Total Claims Allowed:	
		8	
(Assistant Examiner)	(Date)		
WARNER WONG/ Primary Examiner.Art Unit 2469	9/9/2016	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Kyoung Seok LEE et al.

Application No. 14/831,023

Art Unit: 2469

Confirmation No. 8602

Filed: August 20, 2015

Examiner: WONG, WARNER

For: METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION
ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM

AMENDMENT AFTER ALLOWANCE UNDER 37 CFR 1.312

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

Sir:

This is in response to the Notice of Allowance mailed September 22, 2016. The Issue and Publication fees have not yet been paid.

The following amendments and remarks are respectfully submitted.

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

Remarks begin on page 3 of this paper.

IN THE SPECIFICATION:

The specification as amended below with replacement paragraphs shows added text with underlining and deleted text with ~~strikethrough~~.

【Cross-Reference to Related Applications】

This application is a continuation of U.S. Application No. 13/884,216, filed on May 8, 2013, which is a 35 U.S.C. § 371 National Stage filing of International Application No.

PCT/KR2011/008404 which was filed November 7, 2011, and which claims the benefit of Korean Application No. 10-2010-0110649 filed on November 8, 2010, Korean Application No.

10-2010-0077880, filed on August 12, 2010, and US Patent No. 8,743,720, issued on ~~May 14~~June 3, 2014, the entire disclosures of which are incorporated herein by reference for all purposes.

REMARKS

In accordance with the foregoing, the specification has been amended. More specifically, a "Cross-Reference to Related Applications" has been amended for priority clarity. No new matter is presented in this Amendment.

Finally, if there are any formal matters remaining after this response, the Office is requested to telephone the undersigned to attend to these matters. Please charge any fees under 37 CFR 1.16 and 1.17 that may be required for this paper only to Deposit Account No. 50-5113 in the name of North Star Intellectual Property Law, PC.

Respectfully submitted,

Date: October 18, 2016

/Michael W. Chao/

Michael W. Chao

Registration No. 74,160

CYP/MWC/yrk
NSIP Law
P.O. Box 65745
Washington, DC 20035
(202)429-0020

Electronic Acknowledgement Receipt

EFS ID:	27248157
Application Number:	14831023
International Application Number:	
Confirmation Number:	8602
Title of Invention:	METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Kyoung Seok LEE
Customer Number:	89980
Filer:	Michael Wenchang Chao/Yuri Kang
Filer Authorized By:	Michael Wenchang Chao
Attorney Docket Number:	175090.0011C1
Receipt Date:	18-OCT-2016
Filing Date:	20-AUG-2015
Time Stamp:	14:39:26
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		NOA20160922_1750900011C1_312AmendAsFiled.pdf	18919	yes	3
			2a04f785f7c6e1a3f6656aa71bc6a2ecc3d3fa8		

IPR2024-00608
Petitioners' Ex. 1003
Ex.1003.00167

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Amendment after Notice of Allowance (Rule 312)	1	1
	Specification	2	2
	Applicant Arguments/Remarks Made in an Amendment	3	3
Warnings:			
Information:			
Total Files Size (in bytes):		18919	
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.			



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UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/831,023	08/20/2015	Kyoung Seok LEE	175090.0011C1	8602
89980	7590	11/01/2016	EXAMINER	
NSIP LAW			WONG, WARNER	
P.O. Box 65745			ART UNIT	PAPER NUMBER
Washington, DC 20035			2469	
			NOTIFICATION DATE	DELIVERY MODE
			11/01/2016	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

pto@nsiplaw.com
pto.nsip@gmail.com

Response to Rule 312 Communication	Application No. 14/831,023	Applicant(s) LEE ET AL.
	Examiner WARNER WONG	Art Unit 2469

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

1. ☒ The amendment filed on 18 October 2016 under 37 CFR 1.312 has been considered, and has been:

a) ☐ entered.

b) ☒ entered as directed to matters of form not affecting the scope of the invention.

c) ☐ disapproved because the amendment was filed after the payment of the issue fee.

Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue.

d) ☐ disapproved. See explanation below.

e) ☐ entered in part. See explanation below.

	/WARNER WONG/ Primary Examiner, Art Unit 2469
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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)

89980
NSIP LAW
P.O. Box 65745
Washington, DC 20035

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

Certificate of Mailing or Transmission

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/831,023	08/20/2015	Kyoung Seok LEE	175090.0011C1	8602

TITLE OF INVENTION:

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0	\$0	\$480	12/22/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS

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.

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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)

Electronics and Telecommunications Research Institute Daejeon, 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 50-5113 (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 /Charles Park/

Date December 22, 2016

Typed or printed name Charles Park

Registration No. 50,709

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 **1545-0047**

Petitioners' Ex. 1003
Ex.1003.00171

Privacy Act Statement

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	14831023			
Filing Date:	20-Aug-2015			
Title of Invention:	METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM			
First Named Inventor/Applicant Name:	Kyoung Seok LEE			
Filer:	Charles Y. Park/Nichole McRorie			
Attorney Docket Number:	175090.0011C1			
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

IPR2024-00608
Petitioners' Ex. 1003
Ex.1003.00173

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
UTILITY APPL ISSUE FEE	2501	1	480	480
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				480

Electronic Acknowledgement Receipt

EFS ID:	27866211
Application Number:	14831023
International Application Number:	
Confirmation Number:	8602
Title of Invention:	METHOD FOR CARRIER MANAGEMENT IN A CARRIER AGGREGATION ENVIRONMENT OF A MOBILE COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Kyoung Seok LEE
Customer Number:	89980
Filer:	Charles Y. Park/Nichole McRorie
Filer Authorized By:	Charles Y. Park
Attorney Docket Number:	175090.0011C1
Receipt Date:	21-DEC-2016
Filing Date:	20-AUG-2015
Time Stamp:	15:28:39
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 480
RAM confirmation Number	122216INTEFSW15290400
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

IPR2024-00608
Petitioners' Ex. 1003
Ex.1003.00175

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)	NOA20160922_1750900011C1_IssueFeeTransmittal.pdf	73928	no	2
			bc80a755cd2adad1ed2526ce982f7e0c6e152218		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32264	no	2
			28de0967c143cd76a014eefa96ac4b1ac15bc56c		
Warnings:					
Information:					
Total Files Size (in bytes):			106192		
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.					



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www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/831,023	02/07/2017	9565662	175090.0011C1	8602

89980 7590 01/18/2017
NSIP LAW
P.O. Box 65745
Washington, DC 20035

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):

Kyoung Seok LEE, Daejeon, KOREA, REPUBLIC OF;
Electronics and Telecommunications Research Institute, Daejeon, KOREA, REPUBLIC OF;
Jae Heung KIM, Daejeon, KOREA, REPUBLIC OF;
Kook Jin LEE, Daejeon, KOREA, REPUBLIC OF;

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