AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas, Marshall Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
2:22-cv-78	3/14/2022	Eastern District of Texas, Marshall Division

PLAINTIFF	DEFENDANT
G+COMMUNICATIONS, LLC	SAMSUNG ELECTRONICS CO., LTD SAMSUNG ELECTRONICS AMERICA, INC.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	US 8,761,776 B2	6/24/2014	G+Communications, LLC
2	US 10,448,430 B2	10/15/2019	G+Communications, LLC
3	US 9,184,881 B2	11/10/2015	G+Communications, LLC
4	US 10,736,130 B2	4/4/2020	G+Communications, LLC
5	US 10,594,443 B2	3/17/2020	G+Communications, LLC

In the above---entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above---entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

PTO/SB/122 (04-15)
Approved for use through 01/31/2018. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

CHANGE OF CORRESPONDENCE ADDRESS
Application

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

Application Number	12/905,299
Filing Date	10-15-2010
First Named Inventor	Bo Dai
Art Unit	2471
Examiner Name	RIVAS
Attorney Docket Number	6284.00013/P34599ZTE

Please change the Correspondence Address for the above-identified patent application to:

☒ The address associated with Customer Number: 165927

OR

☐ Firm or Individual Name

Address

City	State	Zip

Country

Telephone	Email

This form cannot be used to change the data associated with a Customer Number. To change the data associated with an existing Customer Number use "Request for Customer Number Data Change" (PTO/SB/124).

I am the:

☐ Applicant/Inventor

☐ Assignee of record of the entire interest.
Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).

☐ Attorney or agent of record. Registration Number _____.

☒ Registered practitioner named in the application transmittal letter in an application without an executed oath or declaration. See 37 CFR 1.33(a)(1). Registration Number_____.

Signature	/Christopher P. Maiorana/
Typed or Printed Name	Christopher Maiorana
Date: 04/19/21	Telephone: 586-498-0670

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☑ *Total of 1 forms are submitted.

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

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

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 Acknowledgement Receipt	
EFS ID:	42482229
Application Number:	12905299
International Application Number:	
Confirmation Number:	7676
Title of Invention:	METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
First Named Inventor/Applicant Name:	Bo Dai
Customer Number:	21615
Filer:	Christopher P. Maiorana
Filer Authorized By:	
Attorney Docket Number:	6284.00013/P34599ZTE
Receipt Date:	19-APR-2021
Filing Date:	15-OCT-2010
Time Stamp:	02:54:53
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	Change of Address	ZTE-013.pdf	81700 c7a69e8cb68547b5ec219a581606b88caad66de4	no	2
Warnings:					

Information:	
Total Files Size (in bytes):	81700

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

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/905,299	11/10/2015	9184881	6284.00013/P34599ZTE	7676

21615 7590 10/21/2015

CHRISTOPHER P. MAIORANA, P.C.
24840 HARPER SUITE 100
ST. CLAIR SHORES, MI 48080

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 860 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):

Bo Dai, Shenzhen, CHINA;
Guanghui Yu, Shenzhen, CHINA;
Shuqiang Xia, Shenzhen, CHINA;
Peng Hao, Shenzhen, CHINA;
Chunli Liang, Shenzhen, CHINA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/905,299	10/15/2010	Bo Dai	6284.00013/P34599ZTE	7676

7590 10/08/2015

CHRISTOPHER P. MAIORANA, P.C.
24840 HARPER SUITE 100
ST. CLAIR SHORES, MI 48080

EXAMINER	
RIVAS, RAUL	
ART UNIT	PAPER NUMBER
2471	

DATE MAILED: 10/08/2015

PRIORITY ACKNOWLEDGMENT

☑ 1. Receipt is acknowledged of priority papers submitted under 35 U.S.C. 119. The papers have been placed of record in the file.

☐ 2. Applicant's claim for priority, based on papers filed in parent Application Number _____ submitted under 35 U.S.C. 119, is acknowledged.

☐ 3. The priority papers, submitted _____, after payment of the issue fee are

- ☐ acknowledged
  While the priority claim or certified copy filed will be placed in the file record, neither will be reviewed and the patent when published will not include the priority claim.
  See 37 CFR 1.55(a)(2).
- ☐ not acknowledged since the processing fee in 37 CFR 1.17(i) has not been received.

☐ 4. For utility and plant applications filed on or after November 29, 2000, the priority claim is not entered because the claim was not presented within the time limit required by 37 CFR 1.55(a)(1). A petition to accept a delayed claim for priority under 35 U.S.C. 119(a) - (d) or (f), or 365(a) may be filed. See 37 CFR 1.55(c) and MPEP 201.14(a).

/Timothy Caldwell/

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

PTOL-147 (Rev. 03/08)

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)

21615

CHRISTOPHER P. MAIORANA, P.C.
24840 HARPER SUITE 100
ST. CLAIR SHORES, MI 48080

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

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/905,299	10/15/2010	Bo Dai	6284.00013/P34599	7676

TITLE OF INVENTION:

METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$960	$0	$0	$960	10/22/15

EXAMINER	ART UNIT	CLASS-SUBCLASS
RIVAS, RAUL	2471	370-294000

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.

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: ZTE CORPORATION

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Shenzhen, Guangdong Province, P.R. China

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

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

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

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

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

Authorized Signature _____ Date October 06, 2015

Typed or printed name Christopher P. Maiorana Registration No. 42,829

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

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

Electronic Patent Application Fee Transmittal

Application Number:	12905299
Filing Date:	15-Oct-2010
Title of Invention:	METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
First Named Inventor/Applicant Name:	Bo Dai
Filer:	Christopher P. Maiorana/Mary Donna Berkley
Attorney Docket Number:	6284.00013/P34599ZTE

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl Issue Fee	1501	1	960	960

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**960**

Electronic Acknowledgement Receipt	
EFS ID:	23701524
Application Number:	12905299
International Application Number:	
Confirmation Number:	7676
Title of Invention:	METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
First Named Inventor/Applicant Name:	Bo Dai
Customer Number:	21615
Filer:	Christopher P. Maiorana/Mary Donna Berkley
Filer Authorized By:	Christopher P. Maiorana
Attorney Docket Number:	6284.00013/P34599ZTE
Receipt Date:	06-OCT-2015
Filing Date:	15-OCT-2010
Time Stamp:	12:16:07
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$960
RAM confirmation Number	10422
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	12905299_issuefee_100615.pdf	98690 95077f6fbd1da929eb934dff6a5a5f772d9a4f13	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30769 2688c084408e10a2dc8b3ccbba4edd3ee15f36cb	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	129459		

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

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

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

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

中华人民共和国国家知识产权局
STATE INTELLECTUAL PROPERTY OFFICE
OF THE PEOPLE'S REPUBLIC OF CHINA

证　明

本证明之附件是向本局提交的下列专利申请文件副本。

申　　请　　号：200810096053.2

申　请　类　型：发明专利

发明 创造 名称：在物理上行共享信道进行确认信息反馈的方法

申　　请　　日：2008 年 04 月 25 日

申　　请　　人：中兴通讯股份有限公司

发明人或设计人：戴博、郁光辉、夏树强、郝鹏、梁春丽

局长

申长雨

2015 年 09 月 23 日

08·04·28

权 利 要 求 书

P19207

1. 一种在物理上行共享信道进行确认信息反馈的方法，用于在时分双工系统中下行子帧的数量大于上行子帧的数量的情况下使用户设备向基站反馈是否正确接收所述下行子帧的数据，其特征在于，所述方法包括:

所述基站在下行控制信息中携带一个上行子帧反馈的确认信息对应的下行子帧的数量值，并在承载所述下行控制信息的子帧之后连续的多个下行子帧上传输数据，其中，所述传输数据的下行子帧的数量等于所述一个上行子帧反馈的确认信息对应的下行子帧的数量;

在所述用户设备接收到所述承载下行控制信息的下行子帧后，从该下行子帧之后的所述传输数据的下行子帧接收数据，并通过上行子帧将接收的确认信息经由物理上行共享信道反馈给所述基站。

2. 根据权利要求 1 所述的方法，其特征在于，所述基站利用所述下行控制信息中用于在下行子帧的数量小于上行子帧的数量的情况下表示传输上行数据所在的上行子帧索引的信令携带所述一个上行子帧反馈的确认信息对应的下行子帧的数量。

3. 根据权利要求 1 所述的方法，其特征在于，所述基站根据当前下行/上行子帧数配置模式确定所述一个上行子帧反馈的信息对应的全部下行子帧的数量值的集合，并根据实际需要的传输数据量从所述集合中选择相应的数量值携带在所述下行控制信息中。

4. 根据权利要求 1 所述的方法，其特征在于，所述基站将与所述物理上行共享信道分配相关的控制信令在所述上行子帧反馈的确认信息对应的下行子帧中的第一个下行子帧上发送。

5. 根据权利要求 1 所述的方法，其特征在于，在反馈给所述基站的上行子帧中，所述用户设备以接收的所述传输数据的下行子帧的编号的顺序对每个所述传输数据的下行子帧进行接收并反馈相应的确认信息。

6. 根据权利要求 1 至 5 中任一项所述的方法，其特征在于，在所述用户设备未从所述传输数据的子帧中检测到与传输的数据对应的物理下行控制信道、或未接收到其中的数据的情况下，所述用户设备反馈错误应答消息作为该下行子帧的确认信息；在所述用户设备从所述传输数据的子帧中检测到与传输的数据对应的物理下行控制信道的情况下，所述用户设备解析该下行子帧中的数据，并在成功解析的情况下反馈正确应答消息作为确认信息，否则反馈错误应答消息作为确认信息。

7. 根据权利要求 6 所述的方法，其特征在于，

在所述传输数据的下行子帧中的数据为单码字流发送的情况下，所述用户设备向所述基站反馈的所述上行子帧中的每个确认信息对应于一个传输数据的下行子帧的码字流；

在所述传输数据的下行子帧中的数据为多码字流发送的情况下，对于一个传输数据的下行子帧，所述用户设备获取对应于其中的每个码字流的确认信息，在获取的所述确认信息中的任意一个或多个确认信息为错误应答消息的情况下，所述用户设备将该下行子帧的确认信息置为错误应答；在获取的所述确认信息均为正确应答消息的情况下，所述用户设备将该下行子帧的确认信息置为正确应答。

8. 根据权利要求 6 所述的方法，其特征在于，

在所述用户设备反馈多组确认信息的情况下，每组反馈的确认信息数量等于该下行子帧中的最大码字流数，且每个组中的各确认信息与对应下行子帧的码字流的确认信息一一对应；

在下行子帧的码字流数小于所述下行子帧中的最大码字流数的情况下，用户反馈最大码字流数的确认信息，其中，将无对应码字流的确认信息设置为预设的固定值；

在所述用户设备未从所述传输数据的子帧中检测到与传输的数据对应的物理下行控制信道，所述用户设备反馈错误应答消息作为该下行子帧对应组内每个码字流的确认信息。

9. 根据权利要求 1 所述的方法，其特征在于，在所述基站发送给所述用户设备的下行子帧中包括不能够传输数据的特殊子帧的情况下，所述用户设备反馈确认信息时不考虑所述特殊子帧。

说 明 书

在物理上行共享信道进行确认信息反馈的方法

技术领域

本发明涉及通信领域，并且特别地，涉及一种在物理上行共享信道（Physical Uplink Shared Channel，PUSCH）进行确认信息反馈的方法。

背景技术

图 1 示出了长期演进（Long Term Evolution，LTE）系统时分双工（Time Division Duplex，TDD）模式的帧结构。如图 1 所示，在这种帧结构中，一个 10ms 的无线帧（radio frame）被分成两个半帧（half frame），每个半帧分成 10 个长度为 0.5ms 时隙，相邻两个时隙组成一个长度为 1ms 的子帧。一个半帧中包含 5 个子帧。对于标准循环前缀（Normal Cyclic Prefix，Normal CP），一个时隙包含 7 个长度为 66.7us 的符号，其中第一个符号的 CP 长度为 5.21us，其余 6 个符号的 CP 长度为 4.69us；对于扩展（Extended）CP，一个时隙包含 6 个符号，所有符号的 CP 长度均为 16.67us。在这种帧结构中，子帧的配制特点为：

（1）为了减少上下行子帧数的配置数目，LTE TDD 规定了 7 种上下行子帧数在一个无线帧中的配置方案，见表 1。所有子帧都分成三类，一是下行子帧；一是特殊子帧；一是上行子帧；如配置 1 时，子帧 2，3，7，8 用于上行传输，子帧 0，4，5，9 用于下行传输，同时子帧 1，6 为特殊子帧。

（2）特殊子帧包含 3 个特殊时隙，分别是下行导频时隙（Downlink Pilot Time Slot，DwPTS）、保护间隔（Guard Period，GP）及上行导频时隙（Uplink Pilot Time Slot，UpPTS），其中：DwPTS 用于下行，最少一个符号用于传输 P-SCH（Primary-Synchronization Channel，主同步信道）；GP 为保护时间，不传输任何数据；以及 UpPTS 用于上行，可以用于传输随机接入信道（Random Access Channel，RACH）、探测（sounding）导频等信号；及

（3）特殊子帧的前一个子帧固定用于下行传输；特殊子帧的后一个子帧固定用于上行传输。

DL/UL 比例配置	转换点周期	子帧号									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	10 ms	D	S	U	U	U	D	S	U	U	D

表 1

表 1 示出了 LTE TDD 上下行比例配置，其中，D 表示下行子帧，U 表示上行子帧，S 表示特殊子帧。

DL/UL 比例配置	转换点周期	子帧号									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	-	-	1	-	1	-	-	1	-	1
1		-	-	2	1	-	-	-	2	1	-
2		-	-	4	-	-	-	-	4	-	-
3	10 ms	-	-	3	2	2	-	-	-	-	-
4		-	-	4	4	-	-	-	-	-	-
5		-	-	9	-	-	-	-	-	-	-
6		-	-	1	1	1	-	-	1	1	-

表 2

表 2 示出了上行子帧反馈确认信息时对应的下行子帧数目。

在 LTE TDD 中，UE 应在子帧 n + k（k>3）的上行子帧物理上行控制信道（Physical Uplink Control Channel，PUCCH）中进行反馈对下行子帧 n 中的物理下行共享信道（Physical Downlink Shared Channel，PDSCH）数据的正确应答/错误应答消息（ACK/NACK）。也可以在该上行子帧中用于上行数据传输的物理上行共享信道中进行反馈该确认信息 ACK/NACK。其中，上行子帧 PUCCH 的索引通过发送下行数据的子帧序号和其对应的物理下行控制信道（Physical Downlink Control Channel，PDCCH）所在的最小控制信道单元（Control Channel Element，CCE）序号隐含指示；

下行控制信息（Downlink Control Information，DCI）格式 0（format 0）用于传输和 PUSCH 相关的控制信息；

在 LTE TDD 的某些上下行子帧数的配置下，下行分配的子帧数目会大于上行分配的子帧数目，即一个上行子帧需要反馈多个 PDSCH 子帧的 ACK/NACK 信息（表 2 示出了在表 1 的不同配置时，上行子帧反馈下行 PDSCH 对应的 ACK/NACK 数目）。由于 LTE 上行需要满足单载波特性，因此一个必需要解决的问题是如何在一个

上行子帧中反馈多个下行 PDSCH 子帧的 ACK/NACK 信息。一种方法就是将多个下行子帧的 ACK/NACK 信息和上行数据一起在物理上行共享信道（Physical Uplink Shared Channel，PUSCH）中进行传输。

当采用上述方法时，如果没有正确检测到下行数据对应的控制信道时，用户设备（User Equipment，UE）就不会反馈 ACK/NACK 信息，即，出现断续传输（Discontinuous Transmission，DTX）的情况，那么该下行数据对应的确认信息就不能和其他下行数据对应的确认信息一起在 PUSCH 上发送，由于基站不知道发送的下行数据是否发生 DTX，以及哪个下行数据发生 DTX，仍然，按照所有下行数据全部接收到来处理，这样很容易把本应该反馈 NACK 的确认信息（DTX 应该视为 NACK）误以 ACK 作为确认信息进行反馈，更有可能由于反馈的确认信息的数量不一致，导致其他下行数据的确认信息检测错误，结果就会出现该下行子帧数据丢失的情况，UE 就不能正确的获取接收到的数据块所传递的信息，需要更高层来进行重传处理，这就增加了额外的延时。

然而，目前尚未提出能够解决这种下行数据丢失的问题的技术方案。

发明内容

考虑到上述问题而做出本发明，为此，本发明的主要目的在于提供一种物理上行共享信道进行消息反馈的方案，以解决相关技术中存在的下行数据丢失的问题。

根据本发明的实施例，提供了一种在物理上行共享信道进行确认信息反馈的方法，用于在时分双工系统中下行子帧的数量大于上

行子帧的数量的情况下使用户设备向基站反馈是否正确接收下行子帧的数据。

该方法包括：基站在下行控制信息中携带一个上行子帧反馈的确认信息对应的下行子帧的数量值，并在承载下行控制信息的子帧之后连续的多个下行子帧上传输数据，其中，传输数据的下行子帧的数量等于一个上行子帧反馈的确认信息对应的下行子帧的数量；在用户设备接收到承载该下行控制信息的下行子帧后，从该下行子帧之后的传输数据的下行子帧上接收数据，并通过上行子帧将接收的确认信息经由物理上行共享信道反馈给基站。

其中，基站利用下行控制信息中用于在下行子帧的数量小于上行子帧的数量的情况下表示传输上行数据所在的上行子帧索引的信令携带一个上行子帧反馈的确认信息对应的下行子帧的数量。

另外，基站根据当前下行/上行子帧数配置模式确定一个上行子帧反馈的信息对应的全部下行子帧的数量值的集合，并根据实际需要的传输数据量从集合中选择相应的数量值携带在下行控制信息中。

优选地，基站将与物理上行共享信道分配相关的控制信令在上行子帧反馈的确认信息对应的下行子帧中的第一个下行子帧上发送。

并且，在反馈给基站的上行子帧中，用户设备以接收的传输数据的下行子帧的编号的顺序对每个传输数据的下行子帧进行接收并反馈相应的接收确认信息。

优选地，在用户设备未从传输数据的子帧中检测到与传输的数据对应的物理下行控制信道、或未接收到其中的数据的情况下，用户设备反馈错误应答消息作为该下行子帧的确认信息；在用户设备

从传输数据的子帧中检测到与传输的数据对应的物理下行控制信道的情况下，用户设备解析该下行子帧中的数据，并在成功解析的情况下反馈正确应答消息作为确认信息，否则反馈错误应答消息作为确认信息。

其中，一方面，在传输数据的下行子帧中的数据为单码字流发送的情况下，用户设备向基站反馈的上行子帧中的每个确认信息对应于一个传输数据的下行子帧的码字流；在传输数据的下行子帧中的数据为多码字流发送的情况下，对于一个传输数据的下行子帧，UE 获取对应于其中的每个码字流的确认信息，在获取的确认信息中的任意一个或多个确认信息为错误应答消息的情况下，用户设备将该下行子帧的确认信息置为错误应答；在获取的确认信息均为正确应答消息的情况下，用户设备将该下行子帧的确认信息置为正确应答。

另一方面，在用户设备反馈多组确认信息的情况下，每组反馈的确认信息数量等于该下行子帧中的最大码字流数，且每个组中的各确认信息与对应下行子帧的码字流的确认信息一一对应；在下行子帧的码字流数小于下行子帧中的最大码字流数的情况下，用户反馈最大码字流数的确认信息，其中，将无对应码字流的确认信息设置为预设的固定值；在用户设备未从传输数据的子帧中检测到与传输的数据对应的物理下行控制信道，用户设备反馈错误应答消息作为该下行子帧对应组内每个码字流的确认信息。

此外，在基站发送给用户设备的下行子帧中包括不能够传输数据的特殊子帧的情况下，用户设备反馈确认信息时不考虑特殊子帧。

通过本发明的上述技术方案，能够提高反馈效率和系统工作效率，保证上行单载波的特性解决下行数据丢失的问题，减少时延，保证系统的性能。

附图说明

此处所说明的附图用来提供对本发明的进一步理解，构成本申请的一部分，本发明的示意性实施例及其说明用于解释本发明，并不构成对本发明的不当限定。在附图中：

图 1 是根据相关技术的 LTE 系统在 TDD 模式下的帧结构的示意图；

图 2 是根据本发明实施例的在 PUSCH 进行确认信息反馈的方法的流程图；

图 3 是根据本发明实施例的方法的处理实例中进行反馈时上下行子帧的对应关系的示意图。

具体实施方式

在本发明实施例中，提供了一种在 PUSCH 进行确认信息反馈的方法，用于在时分双工系统中下行子帧的数量大于上行子帧的数量的情况下使 UE 向基站反馈是否正确接收下行子帧的数据。

如图 2 所示，根据本发明实施例的在物理上行共享信道进行确认信息反馈的方法包括：步骤 S202，基站在下行控制信息（DCI）中携带一个上行子帧反馈的确认信息对应的下行子帧的数量值，并在承载 DCI 的子帧之后连续的多个下行子帧上传输数据，其中，传输数据的下行子帧的数量等于一个上行子帧反馈的确认信息对应的下行子帧的数量；步骤 S204，在 UE 接收到承载 DCI 的下行子帧后，从该下行子帧之后的传输数据的下行子帧接收数据，并通过上行子帧将接收的确认信息经由物理上行共享信道反馈给基站。

其中，基站利用 DCI 中用于在下行子帧的数量小于上行子帧的数量的情况下表示传输上行数据所在的上行子帧索引的信令携带一个上行子帧反馈的确认信息对应的下行子帧的数量。

在 DCI format 0 中发送表示在一个上行子帧中反馈的确认信息对应的下行子帧数量（k）的信令；

也就是说，在 DCI format 0 中用 TDD 系统中表示传输上行数据所在的上行子帧索引的信令，在下行子帧数量大于上行子帧的数量时，可以复用表示在一个上行子帧中反馈的确认信息对应的下行子帧数的信令。且该信令还可以表示从承载 DCI format 0 的下行子帧开始，连续 k 个下行子帧都发送有目标 UE 的数据；k 是 H 集合中的一个元素，由用作 TDD 系统中表示传输上行数据所在的上行子帧索引的信令来指示 k 的取值。

另外，基站根据当前下行/上行子帧数配置模式确定一个上行子帧反馈的信息对应的全部下行子帧的数量值的集合，并根据实际需要的传输数据量从集合中选择相应的数量值携带在 DCI 中。

也就是说，上述 k 的取值范围（集合 H）根据上下行比例配置来选择，例如，针对 5ms 周期转换点，根据配置模式的选择如下：

配置 1，H 是集合 M 的任意非空子集，其中 M = {1, 2}；推荐 H={1，2}；

配置 2，H 是集合 M 的任意非空子集，其中 M = {1, 2, 3, 4}；推荐 H={1, 2, 3, 4}；

针对 10ms 周期转换点，选择如下：

配置 3，H 是集合 M 的任意非空子集，其中 M = {1, 2, 3}；推荐 H={1, 2, 3}；

配置 4，H 是集合 M 的任意非空子集，其中 M = {1, 2, 3, 4};推荐 H={1, 2, 3, 4}；

配置 5，H 是集合 M 的任意非空子集，其中 M = {1, 2, 3, 4, 5, 6, 7, 8, 9}；推荐 H={1, 2, 3, 4}、或者 H={1, 3, 6, 9} 。

并且，在反馈给基站的上行子帧中，UE 以接收的传输数据的下行子帧的编号的顺序对每个传输数据的下行子帧进行接收并反馈相应的确认信息。

此外，在该方法中，在 UE 未从传输数据的子帧中检测到与传输的数据对应的物理下行控制信道、或未接收到其中的数据的情况下，UE 反馈 NACK 消息作为该下行子帧的确认信息；在 UE 从传输数据的子帧中检测到与传输的数据对应的物理下行控制信道的情况下，UE 解析该下行子帧中的数据，并在成功解析的情况下反馈 ACK 消息作为确认信息，否则反馈 NACK 消息作为确认信息。

也就是说，从发送上行数据相关的控制信令的下行子帧开始，按照下行子帧序号依次反馈 ACK/NACK，反馈 ACK/NACK 顺序与 ACK/NACK 所在下行子帧顺序相对应；当 UE 在应该传输数据的下行子帧上没有检测到相应的 PDCCH 时，该下行子帧反馈的确认信息为 NACK；如果检测到相应的 PDCCH，就解数据并反馈相应的 ACK/NACK。

此外，在传输数据的下行子帧中的数据为单码字流发送的情况下，UE 向基站反馈的上行子帧中的每个确认信息对应于一个传输数据的下行子帧的码字流；在传输数据的下行子帧中的数据为多码字流发送的情况下，对于一个传输数据的下行子帧，用户设备获取

对应于其中的每个码字流的确认信息，在获取的确认信息中的任意一个或多个确认信息为 NACK 消息的情况下，UE 将该下行子帧的确认信息置为 NACK；在获取的确认信息均为 ACK 消息的情况下，UE 将该下行子帧的确认信息置为 ACK。

也就是说，假设有 k 个下行子帧的 ACK/NACK 信息在一个上行子帧上反馈，当 k>1 时，每个下行子帧反馈一个 ACK/NACK 信息，当下行数据为单码字流发送时，每个发送单码字流的下行子帧反馈一个 ACK/NACK；当下行数据为多码字流发送时，每个发送多码字流的下行子帧，先将所有码字流对应的 ACK/NACK 进行‘与’操作，然后，将与操作的结果反馈给基站；

而当 k=1 时，多码字流不需要进行与操作，直接将各码字流对应的 ACK/NACK，按照码字流序号的顺序反馈对应的 ACK/NACK。

另一方面，在用户设备反馈多组确认信息的情况下，每组反馈的确认信息数量等于该下行子帧中的最大码字流数，且每个组中的各确认信息与对应下行子帧的码字流的确认信息一一对应；在下行子帧的码字流数小于下行子帧中的最大码字流数的情况下，用户反馈最大码字流数的确认信息，其中，将无对应码字流的确认信息设置为预设的固定值；在用户设备未从传输数据的子帧中检测到与传输的数据对应的物理下行控制信道，用户设备反馈错误应答消息作为该下行子帧对应组内每个码字流的确认信息。

也就是说，在 k 个下行子帧的 ACK/NACK 信息在一个上行子帧上反馈，下行子帧的最大码字流数为 m 的情况下，UE 反馈 k 组 ACK/NACK 信息，每一个组对应一个下行子帧，每组包含 m 个 ACK/NACK 信息，组中每一个 ACK/NACK 信对应该组对应的下行子帧中的一个码字流的 ACK/NACK 信息，当单码字流时，其他码字流的 ACK/NACK 信息为默认值，该默认值为 NACK 信息。

在基站发送给用户设备的下行子帧中包括不能够传输数据的特殊子帧的情况下，用户设备反馈确认信息时不考虑特殊子帧。即，当特殊子帧不能发送下行数据时，特殊子帧不包括在上述连续下行子帧内，基站计算和 UE 接收时可以不把特殊子帧包括进来，此时，特殊子帧不需要反馈 ACK/NACK 信息。

此外，在该方法中，优选地，DCI format 0 会在该上行子帧反馈的确认信息对应的下行子帧中的第一个下行子帧上发送。

此外，还可以将这些反馈的 ACK/NACK 信息和上行数据一起在 PUSCH 上发送。

下面将结合具体实例描述本发明。

以 LTE TDD 系统为例，假设存在连续 20 个子帧，上下行比例配置为上述表 1 的配置 4 时，子帧 0、子帧 1、子帧 4、子帧 5、子帧 6、子帧 7、子帧 8、子帧 9、子帧 10、子帧 11、子帧 14、子帧 15、子帧 16、子帧 17、子帧 18、子帧 19 为下行子帧，子帧 2、子帧 3、子帧 12、子帧 13 为上行子帧，根据下行定时关系，子帧 0、1、4、5 的 ACK/NACK 在子帧 12 反馈，子帧 6、7、8、9 的 ACK/NACK 在子帧 13 反馈，如图 3 所示；

显然，此时 H={1，2，3，4}；

假设基站在下行子帧 6、7、8、9 上发送数据给目标 UE，目标 UE 在子帧 13 传输上行数据和相应的下行子帧的 ACK/NACK 信息；

目标 UE 的 DCI format 0 的信令信息在下行子帧 6 上发送，并且，利用 DCI format 0 中专门用于 TDD 系统中指示该上行数据所在上行子帧索引的信令来表示用于承载基站发送给目标 UE 的数据的下行子帧的数量；

目标 UE 在下行子帧 6 上检测到 DCI format 0 的信息，获知下行子帧 6、7、8、9 有数据发送，目标 UE 在下行子帧 6、7、8、9 上检测相应的下行控制信道，根据下行控制信道找到相应下行数据的位置，进行解码，如果译码正确反馈 ACK，如果译码不正确反馈 NACK，当在目标下行子帧上没有检测到相应下行控制信道时候，该下行子帧反馈 NACK;

最后，将这些按照下行子帧序号依次排好的反馈信息和上行数据一起在 PUSCH 上发送;

如果承载基站发送给目标 UE 数据的下行子帧的数量为 1，该下行子帧上为多码字流传输，则每个码字流反馈一个确认信息，如果译码正确反馈 ACK，如果译码不正确反馈 NACK，最后，将这些按照码字流序号排序的确认信息和上行数据一起在 PUSCH 上发送;

如果承载基站发送给目标 UE 数据的下行子帧的数量大于 1，下行子帧中有多码字流传输，则多码字流传输的下行子帧需要将多个码字流的确认信息合并为一个确认信息，作为该子帧的确认信息，最后，将这些按照下行子帧编号排序的确认信息和上行数据一起在 PUSCH 上发送。

综上所述，本发明实现了在上行 PUSCH 上发送多个下行子帧 ACK/NACK 的目的，借助于本发明的技术方案，可以有效提高反馈效率和系统工作效率，保证上行单载波的特性解决下行数据丢失的问题，减少时延，保证系统的性能。

以上所述仅为本发明的优选实施例而已，并不用于限制本发明，对于本领域的技术人员来说，本发明可以有各种更改和变化。凡在本发明的精神和原则之内，所作的任何修改、等同替换、改进等，均应包含在本发明的保护范围之内。

说 明 书 附 图

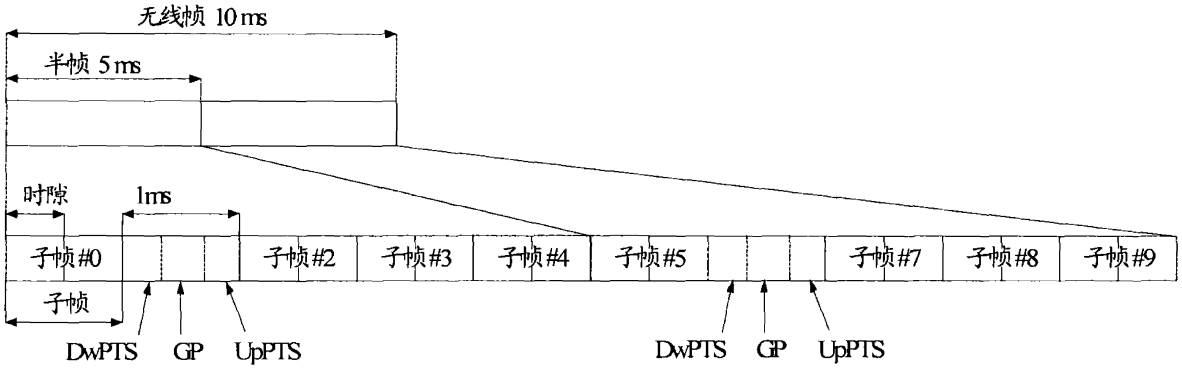

无线帧 10 ms
半帧 5 ms
时隙
1ms
子帧#0
子帧#2
子帧#3
子帧#4
子帧#5
子帧#7
子帧#8
子帧#9
子帧
DwPTS
GP
UpPTS
DwPTS
GP
UpPTS

图 1

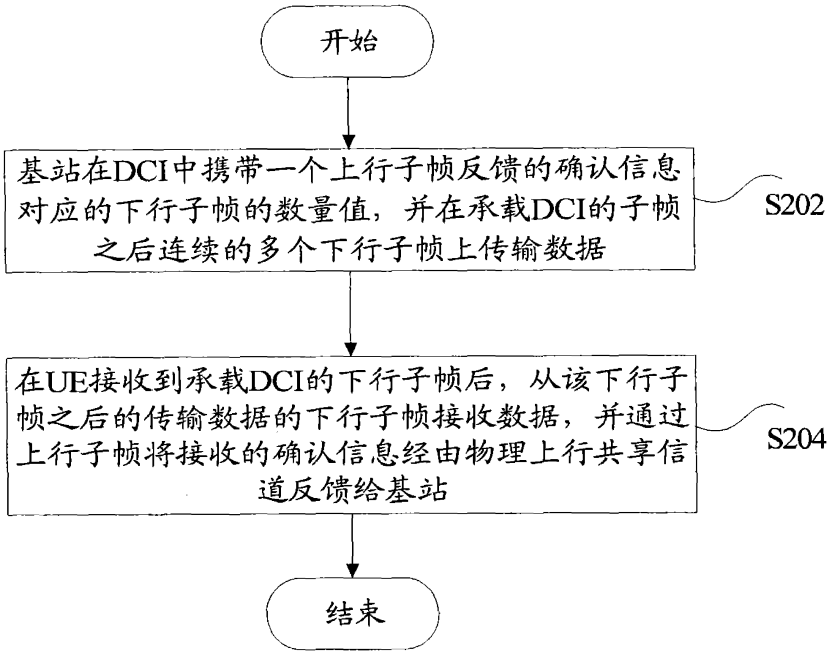

开始
基站在DCI中携带一个上行子帧反馈的确认信息对应的下行子帧的数量值，并在承载DCI的子帧之后连续的多个下行子帧上传输数据
S202
在UE接收到承载DCI的下行子帧后，从该下行子帧之后的传输数据的下行子帧接收数据，并通过上行子帧将接收的确认信息经由物理上行共享信道反馈给基站
S204
结束

图 2

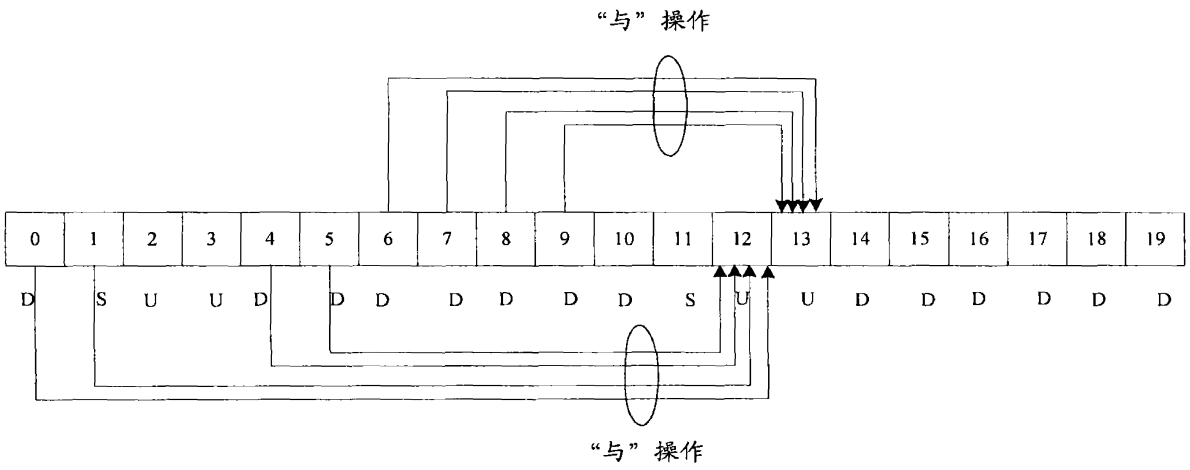

“与”操作
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
D S U U D D D D D D D S U U D D D D D D
“与”操作

图 3

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/905,299	10/15/2010	2471	1090	6284.00013/P34599ZTE	16	2

CONFIRMATION NO. 7676

REPLACEMENT FILING RECEIPT

21615
CHRISTOPHER P. MAIORANA, P.C.
24840 HARPER SUITE 100
ST. CLAIR SHORES, MI 48080

OC000000077590012

Date Mailed: 09/23/2015

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)

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Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of PCT/CN2009/071008 03/25/2009

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.)
CHINA 200810096053.2 04/25/2008

Request to Retrieve - This application either claims priority to one or more applications filed in an intellectual property Office that participates in the Priority Document Exchange (PDX) program or contains a proper **Request to**

Retrieve Electronic Priority Application(s) (PTO/SB/38 or its equivalent). Consequently, the USPTO will attempt to electronically retrieve these priority documents.

If Required, Foreign Filing License Granted: 10/23/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/905,299**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No

Title

METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL

Preliminary Class

370

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

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

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Doc Code: PD.REQ.RETR
Document Description: Request for USPTO to retrieve priority docs

PTO/SB/38 (04-13)
Approved for use through 05/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Request to Retrieve Electronic Priority Application(s)

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

COMPLETE IF KNOWN	
Application Number	12/905,299
Filing Date	October 15, 2010
First Named Inventor	Bo DAI
Art Unit	2471
Examiner Name	Rivas, Raul
Attorney Docket Number	6284.00013/P34599ZTE

Pursuant to 37 CFR 1.55(h), the undersigned hereby requests that the USPTO retrieve an electronic copy of each of the following foreign applications for which priority has been claimed under 35 U.S.C. 119(a)-(d) from a foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement. This Request must be submitted:

- within the later of sixteen months from the filing date of the prior foreign application or four months from the actual filing date of an application under 35 U.S.C. 111(a),
- within four months from the later of the date of commencement (37 CFR 1.491(a)) or the date of the initial submission under 35 U.S.C. 371 of an application entering the national stage under 35 U.S.C. 371, or
- with a petition under 37 CFR 1.55(e).

☐ **OPTION A**

Please retrieve the priority application identified in Column C, a certified copy of which is contained in the EP or JP application identified in Columns A and B:

	A	B		C	
	Code for Participating Office (EP or JP only)	Application containing the non-participating priority application		Non-participating priority application to be retrieved	
		App. No.	Filing Date	Country Code	App. No.
1					

☑ **OPTION B**

This Request may be used for the infrequent circumstance when a claim for priority to an application filed in a participating foreign intellectual property office was made prior to that foreign intellectual property office becoming a participating foreign intellectual property office.

Please retrieve the priority application identified in Columns A and B:

	A	B		
	Code for Participating Office (e.g., EP, JP, KR) or WIPO DAS Depositing Office (e.g., AU, DK, ES, FI)	Application to be retrieved		
		App. No.	Filing Date	Access Code (for WIPO DAS Depositing Office)
1	CN	200810096053.2	2008-04-25	98CD
2				

The USPTO will not attempt to retrieve the identified priority application(s) unless an identical claim for foreign priority to the application identified above is made pursuant to 37 CFR 1.55(c) or (d) or a petition is granted under 37 CFR 1.55(e). Applicants are advised to consult Private PAIR (accessed through www.uspto.gov) to assure that the retrieval has been successful. The 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 set forth in 37 CFR 1.55(g)(1).

I hereby declare that I have the authority to grant access to the above-identified foreign application(s).

Signature	September 21, 2015 (Date)
Christopher P. Maiorana (Printed or Typed Name)	(586) 498-0670 (Telephone Number)
Attorney (Title)	42,829 (Registration Number, if applicable)

This collection of information is required by 37 CFR 1.55(d). 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 8 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.**

Electronic Acknowledgement Receipt	
EFS ID:	23548860
Application Number:	12905299
International Application Number:	
Confirmation Number:	7676
Title of Invention:	METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
First Named Inventor/Applicant Name:	Bo Dai
Customer Number:	21615
Filer:	Christopher P. Maiorana/Mary Donna Berkley
Filer Authorized By:	Christopher P. Maiorana
Attorney Docket Number:	6284.00013/P34599ZTE
Receipt Date:	21-SEP-2015
Filing Date:	15-OCT-2010
Time Stamp:	12:20:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for USPTO to retrieve priority docs	12905299_sb0038_092115.pdf	91285 5c6e1a9767de4dc84a7cbaf5e5dc786166dab206	no	1
Warnings:					
Information:					

Total Files Size (in bytes):	91285

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

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

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

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

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United States Patent and Trademark Office
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www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

21615 7590 07/22/2015
CHRISTOPHER P. MAIORANA, P.C.
24840 HARPER SUITE 100
ST. CLAIR SHORES, MI 48080

EXAMINER
RIVAS, RAUL

ART UNIT	PAPER NUMBER
2471	

DATE MAILED: 07/22/2015

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/905,299	10/15/2010	Bo Dai	6284.00013/P34599ZTE	7676

TITLE OF INVENTION: METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$960	$0	$0	$960	10/22/2015

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

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

HOW TO REPLY TO THIS NOTICE:

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

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

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

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

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

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

PART B - FEE(S) TRANSMITTAL

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

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

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

21615 7590 07/22/2015
CHRISTOPHER P. MAIORANA, P.C.
24840 HARPER SUITE 100
ST. CLAIR SHORES, MI 48080

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

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/905,299	10/15/2010	Bo Dai	6284.00013/P34599ZTE	7676

TITLE OF INVENTION: METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$960	$0	$0	$960	10/22/2015

EXAMINER	ART UNIT	CLASS-SUBCLASS
RIVAS, RAUL	2471	370-294000

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

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

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

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

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

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

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

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

5. **Change in Entity Status** (from status indicated above)
- ❑ Applicant certifying micro entity status. See 37 CFR 1.29 — NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
- ❑ Applicant asserting small entity status. See 37 CFR 1.27 — NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
- ❑ Applicant changing to regular undiscounted fee status. — NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

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

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/905,299	10/15/2010	Bo Dai	6284.00013/P34599ZTE	7676

21615 7590 07/22/2015

CHRISTOPHER P. MAIORANA, P.C.
24840 HARPER SUITE 100
ST. CLAIR SHORES, MI 48080

EXAMINER	
RIVAS, RAUL	

ART UNIT	PAPER NUMBER
2471	

DATE MAILED: 07/22/2015

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

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

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

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

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

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

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

Privacy Act Statement

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

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

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

Notice of Allowability	Application No. 12/905,299	Applicant(s) DAI ET AL.	
	Examiner RAUL RIVAS	Art Unit 2471	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 *applicant's remarks and amended claims filed on 06/25/2015*.
   ☐ 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 *1-7,9-11 and 13-16*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov .
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

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

   * Certified copies not received: _____.

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

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

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

/R. R./
Examiner, Art Unit 2471

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

Reasons for Allowance

2. Claims 1 and 10 are allowed.

The following is an examiner's statement of reasons for allowance:

The closest prior art Gao et al. (U.S. Pub. 2009/0046649) disclose Mapping of uplink ACK in TDD with asymmetric frame structure. Method and Techniques to allocate uplink and downlink resources to a mobile/user equipment and associating acknowledgement messages or lack thereof to a particular radio resource/subframe granted to a mobile/user equipment by the network when there are multiple resource granted in a frame by storing a pre-determined grouping of a plurality of downlink subframes that map to one uplink subframe for each of at least two instances of a ratio of number of downlink subframes exceeding number of uplink subframes in a frame; scheduling a series of downlink and uplink subframes in a frame corresponding to one of the ratios and sending scheduling grants to user equipments in at least some of the scheduled downlink subframes. Gao fails to suggest the claimed limitations in Claim 10 by Dai, which introduce a novel and non-obvious method and system for feeding back confirmation information on a physical uplink shared channel, wherein in several different situations that a user equipment detects or fails to detect a physical downlink control channel corresponding to transmitted data in a sub-frame transmitting data, or

receives or fails to receive the data thereof, the user equipment analyzes data in the downlink sub-frame, and feeds back the proper acknowledgement message as the confirmation information in accordance with each situation. The related prior art to rely upon but not applied is as follows: Kakura (U.S. Pub. 2011/0211538) teaches, Communication system, and device, method, and program used for same. Torsner et al. (U.S. Pub. 2010/0074153) teach Method and Apparatus in a Telecommunication System. Claim 10 is similarly claimed. The above features in conjunction with all other limitations of the dependent and independent claims 1-7, 9-11 and 13-16 are hereby allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RAUL RIVAS whose telephone number is (571)270–5590. The examiner can normally be reached on Monday – Friday, from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on (571) 272–3179. 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.

/RR/

Examiner, Art Unit 2471

/CHI H PHAM/

Supervisory Patent Examiner, Art Unit 2471

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12905299	DAI ET AL.
	Examiner	Art Unit
	RAUL RIVAS	2471

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
370	Updated Text Search, see search history	7/10/2015	RR

SEARCH NOTES		
Search Notes	Date	Examiner
Inventorship search	7/10/2015	RR
Updated Internet search	7/10/2015	RR
Updated EAST search	7/10/2015	RR
Consulted with SPE Chi Pham	7/10/2015	RR

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
370	Updated Text Search, see search history	7/10/2015	RR

/R.R./ Examiner.Art Unit 2471	

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12905299	DAI ET AL.
	Examiner	**Art Unit**
	RAUL RIVAS	2471

CPC							
Symbol						**Type**	**Version**
H04L		1	/	1867		F	2013-01-01
H04L		1	/	1887		I	2013-01-01
H04L		1	/	1896		I	2013-01-01
H04W		28	/	04		A	2013-01-01
H04W		72	/	042		A	2013-01-01
H04L		1	/	1635		I	2013-01-01
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CPC Combination Sets								
Symbol					**Type**	**Set**	**Ranking**	**Version**
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/R.R./ Examiner.Art Unit 2471 (Assistant Examiner)	07/10/2015 (Date)	**Total Claims Allowed:** 14	
/CHI H PHAM/ Supervisory Patent Examiner.Art Unit 2471 (Primary Examiner)	07/13/2015 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12905299	DAI ET AL.
	Examiner	**Art Unit**
	RAUL RIVAS	2471

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION										
CLASS	SUBCLASS	CLAIMED					NON-CLAIMED					
370	294	H	0	4	L	5 / 14 (2006.01.01)						

CROSS REFERENCE(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

/R.R./ Examiner.Art Unit 2471	07/10/2015	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	14	
/CHI H PHAM/ Supervisory Patent Examiner.Art Unit 2471	07/13/2015	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12905299	DAI ET AL.
	Examiner	**Art Unit**
	RAUL RIVAS	2471

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

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1														
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/R.R./ Examiner.Art Unit 2471	07/10/2015	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	14	
/CHI H PHAM/ Supervisory Patent Examiner.Art Unit 2471	07/13/2015	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	"12905299".rlan. or ("12".src. and "905299".ap.)	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2015/07/10 20:41
L2	503	"370/294".CCLS.	US-PGPUB; USPAT; USOCR	OR	ON	2015/07/10 20:41
L3	154	((BO) near2 (DAI)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2015/07/10 20:41
L4	58	((GUANGHUI) near2 (YU)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2015/07/10 20:41
L5	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41

		US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
L6	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41

		6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
L7	23	L6 and ((feedback ack acknowledgement) near2 confirmat$3)	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L8	18	L7 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L9	805	((feedback ack acknowledgement) near5 authorizat$3)	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L10	484	L9 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L11	205676	(370/335 370/329 455/561 607/31 455/517 455/436 455/450 370/328 455/562.1 455/522 375/267 370/330 607/32 370/322 370/331 455/442 370/252 714/749 455/422.1 370/332 455/450 370/329 455/62 370/347 455/562.1 455/63.1 370/331 370/328 455/509 370/322 370/341 455/464 455/67.13 455/504 455/505 370/317 455/501)".ccls"	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L12	48	L10 and L11	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L13	2	send$3 near5 (index amount) near2 sub$1frame with (feedback ack acknowledgement) with (downlink down$1link)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L14	4	WO2009022295	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L15	0	WO2009022295.PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L16	3	"20090046649", .PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L17	2	L16 AND (index amount feedback ack acknowledgement NACK downlink	US-PGPUB; USPAT;	OR	ON	2015/07/10 20:41

		down$1link UPLINK)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
L18	105	map$4 near3 code$1word near5 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L19	6	L18 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L20	42838	code$1word stream near3 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L21	38343	code$1word stream near3 (feedback ack acknowledgement NACK) near down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L22	9	(code$1word near stream) near3 (feedback ack acknowledgement NACK) near6 down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L23	5	"101114868"	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2015/07/10 20:41
L24	3	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2015/07/10 20:41
L25	11	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L26	480	(ZHUO near GAO).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L27	29	(Feedback fed$1back) near2 codeword with down$1link	US-PGPUB; USPAT; USOCR;	OR	ON	2015/07/10 20:41

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
L28	169	((sub$1frame near2 data)(special near2 sub$1frame)) near5 feedback	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L29	11	L28 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L30	1	"12905299".rlan. or ("12".src. and "905299".ap.)	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2015/07/10 20:41
L31	503	"370/294".CCLS.	US-PGPUB; USPAT; USOCR	OR	ON	2015/07/10 20:41
L32	154	((BO) near2 (DAI)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2015/07/10 20:41
L33	58	((GUANGHUI) near2 (YU)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2015/07/10 20:41
L34	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41

		4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
L35	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41

		6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
L36	23	L35 and ((feedback ack acknowledgement) near2 confirmat$3)	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L37	18	L36 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L38	805	((feedback ack acknowledgement) near5 authorizat$3)	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L39	484	L38 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L40	205676	(370/335 370/329 455/561 607/31 455/517 455/436 455/450 370/328 455/562.1 455/522 375/267 370/330 607/32 370/322 370/331 455/442 370/252 714/749 455/422.1 370/332 455/450 370/329 455/62 370/347 455/562.1 455/63.1 370/331 370/328 455/509 370/322 370/341 455/464 455/67.13 455/504 455/505 370/317 455/501)".ccls"	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L41	48	L39 and L40	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L42	2	send$3 near5 (index amount) near2 sub$1frame with (feedback ack acknowledgement) with (downlink down$1link)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L43	4	WO2009022295	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L44	0	WO2009022295.PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L45	3	"20090046649", .PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2015/07/10 20:41

			IBM_TDB			
L46	2	L45 AND (index amount feedback ack acknowledgement NACK downlink down$1link UPLINK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L47	105	map$4 near3 code$1word near5 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L48	6	L47 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L49	42838	code$1word stream near3 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L50	38343	code$1word stream near3 (feedback ack acknowledgement NACK) near down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L51	9	(code$1word near stream) near3 (feedback ack acknowledgement NACK) near6 down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L52	5	"101114868"	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2015/07/10 20:41
L53	3	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2015/07/10 20:41
L54	11	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L55	480	(ZHUO near GAO).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41

L56	29	(Feedback fed$1back) near2 codeword with down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L57	169	((sub$1frame near2 data)(special near2 sub$1frame)) near5 feedback	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L58	11	L57 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L59	4	("20030169701" "20040224697").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L60	16517	(uplink) near5 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L61	284	(uplink) near5 (feedback ack acknowledgement NACK) near7 bundl$5	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L62	8	L61 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L63	59	(uplink) with (feedback ack acknowledgement NACK) with bundl$5 with ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L64	0	L63 and (@ay <"2009") not L61	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L65	70	(uplink) with (feedback ack acknowledgement NACK) with bundl$5 same ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L66	0	L65 and (@ay <"2009") not L61	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L67	279	((uplink) with (feedback ack acknowledgement NACK) with bundl$5)and ((Physical adj uplink adj Shared	US-PGPUB; USPAT; USOCR;	OR	ON	2015/07/10 20:41

		adj Channel) or (PuSCH))	FPRS; EPO; JPO; DERWENT; IBM_TDB			
L68	0	L67 and (@ay <"2009") not L61	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L69	1	L67 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L70	3849	((uplink) with (feedback ack acknowledgement NACK (FEED$3 adj BACK))) same ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L71	232	L70 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L72	2666	((uplink) with (feedback ack acknowledgement NACK (FEED$3 adj BACK))) with ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L73	150	L72 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L74	1	"12905299".rlan. or ("12".src. and "905299".ap.)	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2015/07/10 20:41
L75	503	"370/294".CCLS.	US-PGPUB; USPAT; USOCR	OR	ON	2015/07/10 20:41
L76	154	((BO) near2 (DAI)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2015/07/10 20:41
L77	58	((GUANGHUI) near2 (YU)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2015/07/10 20:41
L78	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41

		or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
L79	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41

		6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
L80	23	L79 and ((feedback ack acknowledgement) near2 confirmat$3)	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L81	18	L80 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L82	805	((feedback ack acknowledgement) near5 authorizat$3)	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L83	484	L82 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L84	205676	(370/335 370/329 455/561 607/31 455/517 455/436 455/450 370/328 455/562.1 455/522 375/267 370/330 607/32 370/322 370/331 455/442 370/252 714/749 455/422.1 370/332 455/450 370/329 455/62 370/347 455/562.1 455/63.1 370/331 370/328 455/509 370/322 370/341 455/464 455/67.13 455/504 455/505 370/317 455/501)".ccls"	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L85	48	L83 and L84	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L86	2	send$3 near5 (index amount) near2 sub$1frame with (feedback ack acknowledgement) with (downlink down$1link)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L87	4	WO2009022295	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2015/07/10 20:41

			IBM_TDB			
L88	0	WO2009022295.PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L89	3	"20090046649", .PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L90	2	L89 AND (index amount feedback ack acknowledgement NACK downlink down$1link UPLINK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L91	105	map$4 near3 code$1word near5 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L92	6	L91 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L93	42838	code$1word stream near3 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L94	38343	code$1word stream near3 (feedback ack acknowledgement NACK) near down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L95	9	(code$1word near stream) near3 (feedback ack acknowledgement NACK) near6 down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L96	5	"101114868"	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2015/07/10 20:41
L97	3	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2015/07/10 20:41

L98	11	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L99	480	(ZHUO near GAO).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L100	29	(Feedback fed$1back) near2 codeword with down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L101	169	((sub$1frame near2 data)(special near2 sub$1frame)) near5 feedback	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L102	11	L101 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L103	1	"12905299".rlan. or ("12".src. and "905299".ap.)	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2015/07/10 20:41
L104	503	"370/294".CCLS.	US-PGPUB; USPAT; USOCR	OR	ON	2015/07/10 20:41
L105	154	((BO) near2 (DAI)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2015/07/10 20:41
L106	58	((GUANGHUI) near2 (YU)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2015/07/10 20:41
L107	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41

		20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
L108	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41

		8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
L109	23	L108 and ((feedback ack acknowledgement) near2 confirmat$3)	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L110	18	L109 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L111	805	((feedback ack acknowledgement) near5 authorizat$3)	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L112	484	L111 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L113	205676	(370/335 370/329 455/561 607/31 455/517 455/436 455/450 370/328 455/562.1 455/522 375/267 370/330 607/32 370/322 370/331 455/442 370/252 714/749 455/422.1 370/332 455/450 370/329 455/62 370/347 455/562.1 455/63.1 370/331 370/328 455/509 370/322 370/341 455/464 455/67.13 455/504 455/505 370/317 455/501)".ccls"	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L114	48	L112 and L113	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L115	2	send$3 near5 (index amount) near2 sub$1frame with (feedback ack acknowledgement) with (downlink down$1link)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L116	4	WO2009022295	US-PGPUB; USPAT; USOCR;	OR	ON	2015/07/10 20:41

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
L117	0	WO2009022295.PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L118	3	"20090046649", .PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L119	2	L118 AND (index amount feedback ack acknowledgement NACK downlink down$1link UPLINK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L120	105	map$4 near3 code$1word near5 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L121	6	L120 and (@ay < "2009")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L122	42838	code$1word stream near3 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L123	38343	code$1word stream near3 (feedback ack acknowledgement NACK) near down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L124	9	(code$1word near stream) near3 (feedback ack acknowledgement NACK) near6 down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L125	5	"101114868"	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2015/07/10 20:41
L126	3	Feedback adj channel adj distribution	US-PGPUB;	OR	ON	2015/07/10

			USPAT; USOCR; DERWENT			20:41
L127	11	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L128	480	(ZHUO near GAO).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L129	29	(Feedback fed$1back) near2 codeword with down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L130	169	((sub$1frame near2 data)(special near2 sub$1frame)) near5 feedback	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L131	11	L130 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L132	4	("20030169701" "20040224697").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L133	16517	(uplink) near5 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L134	284	(uplink) near5 (feedback ack acknowledgement NACK) near7 bundl$5	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L135	8	L134 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L136	59	(uplink) with (feedback ack acknowledgement NACK) with bundl$5 with ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2015/07/10 20:41

			EPO; JPO; DERWENT; IBM_TDB			
L137	0	L136 and (@ay <"2009") not L134	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L138	70	(uplink) with (feedback ack acknowledgement NACK) with bundl$5 same ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L139	0	L138 and (@ay <"2009") not L134	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L140	279	((uplink) with (feedback ack acknowledgement NACK) with bundl$5)and ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L141	0	L140 and (@ay <"2009") not L134	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L142	1	L140 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L143	3849	((uplink) with (feedback ack acknowledgement NACK (FEED$3 adj BACK))) same ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L144	232	L143 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41
L145	2666	((uplink) with (feedback ack acknowledgement NACK (FEED$3 adj BACK))) with ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/07/10 20:41
L146	150	L145 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/07/10 20:41

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L147	0	(when the confirmation information is fed back together with uplink data on the physical uplink shared channel in a situation that a user equipment fails to detect a physical downlink control channel corresponding to transmitted data in a sub-frame transmitting data the user equipment feeds back a negative acknowledgement message as confirmation information of this downlink sub-frame).clm.	US-PGPUB; USPAT; UPAD	ADJ	ON	2015/07/10 20:41
L148	0	(in a situation that the user equipment detects	US-	ADJ	ON	2015/07/10

		the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data the user equipment analyzes data in this downlink sub-frame and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful otherwise the negative acknowledgement message is fed back as the confirmation information).clm.	PGPUB; USPAT; UPAD			20:41
L149	0	(wherein in a situation that the user equipment feeds back a plurality of groups of the confirmation information an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame).clm.	US-PGPUB; USPAT; UPAD	ADJ	ON	2015/07/10 20:41
L150	0	(in a situation that the number of the codeword streams of the downlink sub-frame is smaller than the maximum number of the codeword streams of the downlink sub-frame the user equipment feeds back the confirmation information of the maximum number of the codeword streams wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value).clm.	US-PGPUB; USPAT; UPAD	ADJ	ON	2015/07/10 20:41
L151	0	(when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame).clm.	US-PGPUB; USPAT; UPAD	ADJ	ON	2015/07/10 20:41

7/10/2015 9:46:47 PM
C:\Users\rrivas\Documents\EAST\Workspaces\12-2012\12905299 - Dai - FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL.wsp

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12905299	DAI ET AL.
	Examiner	**Art Unit**
	RAUL RIVAS	2471

✓	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	07/23/2013	01/12/2014	09/23/2014	04/29/2015	07/10/2015				
1	1	✓	✓	✓	✓	=				
2	2	✓	✓	✓	✓	=				
3	3	✓	✓	✓	✓	=				
4	4	✓	✓	✓	✓	=				
5	5	✓	✓	✓	✓	=				
6	6	✓	✓	✓	✓	=				
7	7	✓	✓	✓	✓	=				
	8	✓	✓	✓	✓	-				
8	9	✓	✓	✓	✓	=				
9	10	✓	✓	✓	=	=				
10	11	✓	✓	✓	=	=				
	12	✓	✓	✓	-	-				
11	13	✓	✓	✓	✓	=				
12	14	✓	✓	✓	✓	=				
13	15	✓	✓	✓	✓	=				
14	16	✓	✓	✓	✓	=				

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Bo DAI et al.
Serial No.:	12/905,299
Title:	METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
Filed:	October 15, 2010
Attorney Docket No.:	6284.00013 / P34599ZTE
Examiner:	Rivas, Raul
Art Unit:	2471
In Response To:	Office Action mailed May 6, 2015

AMENDMENT AFTER FINAL

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

Sir:

In response to the Office Action mailed May 6, 2015, please amend the above-identified application as follows:

AMENDMENTS TO THE CLAIMS

1. (CURRENTLY AMENDED) A method for feeding back confirmation information on a physical uplink shared channel, which is used for enabling a user equipment to feed back to an eNodeB whether data of a downlink sub-frame is correctly received in a situation that a number of the downlink sub-frames is greater than a number of uplink sub-frames in a time division duplex system, wherein the method comprises:

the eNodeB carries, in downlink control information, a number value of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame, and transmits data on a plurality of continuous downlink sub-frames after the sub-frame carrying the downlink control information, wherein the number of the downlink sub-frames which transmit the data is equal to a number of the downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame;

after the user equipment receives the downlink sub-frame which carries the downlink control information, the data is received from the downlink sub-frame which transmits the data after this downlink sub-frame, and the confirmation information of receiving the data is fed back together with uplink data to the

eNodeB through a physical uplink shared channel through an uplink sub-frame;

wherein, in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame; in the situation that the number of codeword streams of the downlink sub-frames is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the number of the maximum codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value; when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame.

2. (ORIGINAL) The method according to Claim 1, wherein the eNodeB uses a signaling in the downlink control information for representing an index of the uplink sub-frame for transmitting

uplink data in the situation that the number of the downlink sub-frames is smaller than the number of the uplink sub-frames to carry the number of the downlink sub-frames corresponding to the confirmation information which is fed back by the one uplink sub-frame.

3. (ORIGINAL) The method according to Claim 1, wherein the eNodeB determines a set of number values of all the downlink sub-frames corresponding to information which is fed back by the one uplink sub-frame according to a configuration pattern for the current number of downlink/uplink sub-frames, and selects corresponding number values from the set according to an amount of the data actually required to be transmitted to be carried in the downlink control information.

4. (ORIGINAL) The method according to Claim 1, wherein the eNodeB sends a control signaling associated with the allocation of the physical uplink shared channel on a first downlink sub-frame in the downlink sub-frames corresponding to the confirmation information fed back by the uplink sub-frame.

5. (ORIGINAL) The method according to Claim 1, wherein in the uplink sub-frames fed back to the eNodeB, the user equipment, according to the order of serial numbers of the received

downlink sub-frames which transmit the data, receives each downlink sub-frame which transmits the data and feeds back corresponding confirmation information.

6. (CURRENTLY AMENDED) The method according to Claim 1, wherein in a situation that the user equipment ~~fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or~~ fails to receive the data ~~thereof~~ of in the sub-frame, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

7. (ORIGINAL) The method according to Claim 6, wherein in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back

by the user equipment to the eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data;

in a situation that the data in the downlink sub-frame that transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the user equipment acquires the confirmation information corresponding to each codeword stream thereof, in a situation that any one or more pieces of confirmation information among the confirmation information acquired is the negative acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement; in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement.

8. (CANCELED).

9. (ORIGINAL) The method according to Claim 1, wherein in a situation that the downlink sub-frames sent by the eNodeB to the user equipment includes special sub-frames which cannot transmit data, the user equipment does not consider the special sub-frames when feeding back the confirmation information.

10. (PREVIOUSLY PRESENTED) A method for feeding back confirmation information on a physical uplink shared channel, wherein, when the confirmation information is fed back together with uplink data on the physical uplink shared channel, in a situation that a user equipment fails to detect a physical downlink control channel corresponding to transmitted data in a sub-frame transmitting data, the user equipment feeds back a negative acknowledgement message as confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information;

wherein

in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame;

in a situation that the number of the codeword streams of the downlink sub-frame is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the maximum number of the codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value;

when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame.

11. (ORIGINAL) The method according to Claim 10, wherein

in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back by the user equipment to an eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data;

in a situation that the data in the downlink sub-frame which transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the user equipment acquires the confirmation information corresponding to each codeword stream thereof, in a situation that any one or more pieces

of confirmation information among the confirmation information acquired is the negative acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement; in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement.

12. (CANCELED).

13. (ORIGINAL) The method according to Claim 2, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

14. (ORIGINAL) The method according to Claim 3, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

15. (ORIGINAL) The method according to Claim 4, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in

the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

16. (ORIGINAL) The method according to Claim 5, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

R E M A R K S

The first Office Action mailed on 05/06/2015, has been carefully considered. Reconsideration in view of the following remarks is respectfully requested.

Arguments Concerning Rejections under 35 U.S.C.§103(a)

Claims 1-9 and 13-16 were rejected under 35 U.S.C. 103(a) as being unpatentable by *Gao* et al. (U.S. Pub. 2009/0046649) in view of Kakura (US2011/0211538), of which Claim 1 is independent claim. This Rejection is respectfully traversed based on at least following reasons.

First, applicant incorporates the technical features "in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame; in the situation that the number of codeword streams of the downlink sub-frames is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the number of the maximum codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined

fixed value; when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame" into Claim 1, and correspondingly replaces the additional technical feature "the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof" in Claim 6 with "the user equipment fails to receive the data in the sub-frame" and deletes the Claim 8.

Since para. 21th of the "Detailed Description of Embodiments" of present application states "On the other hand, in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame; in the situation that the number of codeword streams of the downlink sub-frames is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the number of the

maximum codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value; when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame", above amendments can be supported by original description.

Second, since examiner has acknowledged that amended Claim 10 is allowable subject matter, and the reason for this is that Gao in view of Kakura and further in view of Torsner fail to teach or suggest the additional technical features of original Claim 12. In other words, the additional technical features of original Claim 12 can possess inventiveness over Gao in view of Kakura and further in view of Torsner. Thus, the above technical features incorporated into Claim 1, which are corresponding to the additional technical features of original Claim 12, also possess inventiveness over Gao in view of Kakura and further in view of Torsner.

Furthermore, applicant submits amended Claim 1 possesses inventiveness over Gao in view of Kakura and further in view of Torsner for the following reasons.

The recited para. 0031 of Gao is reproduced below:

[0031] For FDD, since the DL and UL are symmetric (DL=UL), each DL transmission in one DL subframe will be responded by an ACK/NAK in a known UL subframe with a certain delay. For multiple UEs transmitting in the same DL subframe, it is agreed as seen in a paper entitled: DRAFT REPORT OF 3GPP TSG RAN WG1 #49B v0.3.0; MCC Support; Orlando, Fla., 25-29 Jun. 2007; section 7.13.2 at page 42 [Exhibit A of the U.S. priority document 60/964,633] that "for non-persistent scheduling the ACK/NAK resource is linked to the index of the control channel used for scheduling". In the case of FDD operation then, there is one to one mapping between UL subframe for ACK/NAK transmission and DL subframe for data transmission.

As disclosed above, for FDD, since the DL and UL are symmetric, each DL transmission in one DL subframe will be responded by the ACK/NAK in the known UL subframe. Moreover, in the case of FDD operation then, there is one to one mapping between UL subframe for ACK/NAK transmission and DL subframe for data transmission. In other word, Gao merely discloses that the one to one mapping relationship exists between the UL subframe for ACK/NAK transmission and the DL subframe for data transmission. However, Gao fails to teach or suggest the relationship between the amount

of the confirmation information fed back in each group and the maximum number of codeword streams in this downlink sub-frame and the relationship between respective confirmation information in each group and the confirmation information of the codeword stream of a corresponding downlink sub-frame in the case of the user equipment feeding back a plurality of groups of the confirmation information. Furthermore, Gao fails to teach or suggest the content of the confirmation information feed back by the user equipment and how to configure the confirmation information without a corresponding codeword stream in case of that the number of codeword streams of the downlink sub-frames is smaller than the maximum number of the codeword streams of the downlink sub-frame. In addition, Gao is silent about how to configure the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data.

On the contrary, amended Claim 1 of present application states the following technical feature: 1) "**in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword**

stream of a corresponding downlink sub-frame"; 2) "**in the situation that the number of codeword streams of the downlink sub-frames is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the number of the maximum codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value**" and 3) "**when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame**".

As stated by above technical feature 1), Claim 1 clearly limits the relationship between the amount of the confirmation information fed back in each group and the maximum number of codeword streams in this downlink sub-frame is that the amount of the confirmation information fed back in each group is equal to the maximum number of codeword streams in this downlink sub-frame, which is different from the disclosure of Gao. In particularly, respective confirmation information in each group corresponding to the confirmation information of the codeword stream of a corresponding downlink sub-frame in amended Claim 1 is different from the one to one mapping relationship existing between the UL

subframe for ACK/NAK transmission and the DL subframe for data transmission as disclosed by Gao.

As stated by above technical feature 2), the user equipment can feed back the confirmation information of the number of the maximum codeword streams, and the confirmation information without a corresponding codeword stream can be configured to a predefined fixed value, which is not disclosed by Gao.

As to examiner asserts that the above technical feature 2) is disclosed by para. 52 and 53 of Torsner. However, applicant respectfully disagrees for the following reasons.

The recited para. 52 and 53 of Torsner is reproduced as follows:

[0052] Briefly described, when scheduling individual feedback reports for plural received data blocks, a feedback schedule which is shared by both the data transmitting party and the data receiving party must be used. According to this feedback schedule, the communication unit (i.e. the data receiving party) spreads or distributes the individual feedback reports evenly over the available sub-frames allocated for the reverse link. The feedback reports are then spread or distributed according to a predetermined spreading rule, which is determined by the allocation of sub-frames to TX and RX as well as other allocation parameters stipulated for the current connection.

[0053] The number of feedback reports in a sub-frame can also be reduced by sending a "compressed" or "concatenated" feedback report to the data sending party that refers to a set of plural received data blocks collectively. In that case, a mapping operation is performed to associate the feedback report with the received sub-frames in the set and to generate the feedback report from decoding results of the respective received sub-frames, depending on the prevailing allocation parameters including which sub-frames that were received. A compressed feedback report can be used in combination with the above-described spreading of individual feedback reports, or separately. Various exemplary embodiments for realising the present solution will be described in more detail below.

As disclosed above, the feedback schedule which is shared by both the data transmitting party and the data receiving party must be used when scheduling individual feedback reports for plural received data blocks. That is, Torsner merely refers to that in what case the feedback schedule needs to be used. However, Torsner fails to teach or suggest the content of the confirmation information feed back by the user equipment and how to configure the confirmation information without a corresponding codeword stream in case of that the number of codeword streams of the downlink sub-frames is smaller than the maximum number of the codeword streams of the downlink sub-frame.

Whereas, in the above technical feature 2), the confirmation information feed back by the user equipment is limited to the confirmation information of the number of the maximum codeword streams and the precondition of the confirmation information feed back by the user equipment is that the number of codeword streams of the downlink sub-frames is smaller than the maximum number of the codeword streams of the downlink sub-frame, which are not disclosed by Torsner. In addition, confirmation information without a corresponding codeword stream is set as a predefined fixed value is also not disclosed by Torsner.

As stated by above technical feature 3), if the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data,

the user equipment can feed back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame. That is, the above technical feature 3) clearly limits the setting mode of the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame if the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, which is not disclosed by Gao.

As to examiner asserts that the above technical feature 3) is disclosed by para. 77 of Torsner. However, applicant respectfully disagrees for the following reasons.

The recited para. 77 of Torsner is reproduced as follows:

> **[0077]** A basic example is when B=1 and A>1 resulting in a compressed feedback report for A RX sub-frames. Then, a single NACK will be transmitted if data in one or more of the received RX sub-frames is erroneous, whereas a single ACK will be transmitted for the case that all data in the RX sub-frames has been received correctly.

As disclosed above, the single NACK will be transmitted if data in one or more of the received RX sub-frames is erroneous. That is, if the RX subframes has not been received correctly, the single NACK will be transmitted. However, Torsner fails to teach

or suggest how to feed back the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame if the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data.

Contrary to Torsner, the precondition of the confirmation information feed back by the user equipment is that the user equipment **fails to detect the physical downlink control channel** corresponding to the transmitted data in the sub-frame which transmits the data instead of **the RX subframes** having not been received correctly disclosed by Torsner. Furthermore, in above technical feature 3), the negative acknowledgement message is defined as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame, which is different from the general description of "the single NACK" without detailed limitation disclosed by Torsner.

Thus, it is submitted that Gao in view of Torsner do not disclose above technical features 1) -3) in amended Claim 1 of present application.

Furthermore, examiner merely generally contends that above technical features 1)-3) are also disclosed by Kakura, but not point out which part of Kakura discloses above technical features 1)-3). Herein, applicant respectfully requests examiner to point

out which part of Kakura discloses above technical features 1)-3) in detail.

Thus, it is submitted that Kakura also does not disclose above technical features 1) -3) in amended Claim 1 of present application.

To sum up, it follows that the applied art does not disclose or suggest all of the features and relationships recited in amended Claim 1. Thus the Office has not established a case of *prima facie* obviousness. Further the Office has not established any apparent reason to modify the applied art to include this recited subject matter which is missing from the applied art. Withdrawal of the 35 U.S.C.§103(a) rejections of Claim 1 is respectfully requested.

On the basis that amended Claim 1 are patentable over *Gao* in view of Torsner and Kakura, also for at least the reasons set forth above, claims 2-7, 9 and 13-16, which are dependent from Claim 1, is patentable over *Gao* in view of Torsner and Kakura.

As such, the presently claimed invention is fully patentable over the cited references and the rejection should be withdrawn.

Accordingly, the present application is in condition for allowance. Early and favorable action by the Examiner is respectfully solicited.

The Examiner is respectfully invited to call the Applicant's representative between the hours of 9 a.m. and 5 p.m.

ET at 586-498-0670 should it be deemed beneficial to further advance prosecution of the application.

Respectfully submitted,

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Dated: June 25, 2015

Docket No.: 6284.00013

Electronic Acknowledgement Receipt	
EFS ID:	22738834
Application Number:	12905299
International Application Number:	
Confirmation Number:	7676
Title of Invention:	METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
First Named Inventor/Applicant Name:	Bo Dai
Customer Number:	21615
Filer:	Christopher P. Maiorana/Mary Donna Berkley
Filer Authorized By:	Christopher P. Maiorana
Attorney Docket Number:	6284.00013/P34599ZTE
Receipt Date:	25-JUN-2015
Filing Date:	15-OCT-2010
Time Stamp:	13:23:09
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Response After Final Action	12905299_amendment_062515.pdf	949968 1b6ef5d5c4a93b456764207cdcb2e58e589f60a9	no	24
Warnings:					
Information:					

Total Files Size (in bytes):	949968

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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.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/905,299	Filing Date 10/15/2010	☐ 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

AMENDMENT	06/25/2015	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 14	Minus	** 20	= 0	X $80 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $420 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

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

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/JAMES MASON/

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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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/905,299	10/15/2010	Bo Dai	6284.00013/P34599ZTE	7676

21615 7590 05/06/2015
CHRISTOPHER P. MAIORANA, P.C.
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EXAMINER	
RIVAS, RAUL	

ART UNIT	PAPER NUMBER
2471	

MAIL DATE	DELIVERY MODE
05/06/2015	PAPER

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

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

Office Action Summary	Application No. 12/905,299	Applicant(s) DAI ET AL.	
	Examiner RAUL RIVAS	Art Unit 2471	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 *01/08/2015*.

☐ 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) *1-11 and 13-16* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☒ Claim(s) *10 and 11* is/are allowed.

7)☒ Claim(s) *1-9 and 13-16* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

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

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

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

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

Priority under 35 U.S.C. § 119

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

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

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

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

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

4) ☐ Other: _____.

DETAILED ACTION

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

2. This action is in response to the Applicant's amendments filed on 01/08/2015 .

Claims 1-9 and 13-16 stand rejected.

Claim 12 is being canceled by the applicant.

Claims 10 and 11 are allowed.

Response to Arguments

3. Applicant's arguments filed 01/08/2015 have been fully considered but they are not persuasive.

A. Applicant's argument with respect to claim 1 regarding that Gao does not teach **a number value of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame**, the Examiner respectfully disagrees. Gao discloses, the approach is to divide the DL subframes into N groups, where N is the number of UL PRBs for ACK/NAK. The ACK for the ith group is sent through the ith UL ACK PRB. For UEs in the same DL group, their UL ACK/NACK

resource is implicitly determined by the control channel index in this DL group or explicitly signaled (See para. 51). For further clarification Gao further discloses, to give the network greater flexibility in allocating those UL resources as the UE's needs for radio resources change, the network is able to dynamically adjust the DL to UL ratio in any given frame of the PDCCH (See para. 29). The applicant also argues that "the number of the downlink subframes which map to the acknowledgements is fixed and is not dynamically configured by the base station. The Examiner respectfully disagree, there is no indication on the claimed subject matter that this number is "dynamically configured by the base station". Furthermore Gao does disclose three methods for the DL grouping in details (See para. 51-64), that can dynamically adjust the DL to UL ratio in any given frame, which means that the number of groups can change therefore the number value of correspondence with the UL ACK PRB also change and it is explicitly signaled. Thus Gao in combination with Kakura still meet the scope of the limitations as currently claimed.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., dynamically configured by the base station) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See In re Van Geuns, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Examiner has cited particular paragraphs / columns and line numbers in the reference(s) applied to the claims above for the convenience of the Applicant. Although

the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim(s), other passages and figures may apply as well. It is respectfully requested from the Applicant in preparing responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the cited passages as taught by the prior art or relied upon by the Examiner.

B. Applicant's argument with respect to claim 1 regarding that Gao does not teach **the confirmation information of receiving the data is fed back together with uplink data to the eNodeB *through a physical uplink shared channel through an uplink sub-frame***, the Examiner respectfully disagree, the Examiner pointed that Kakura teaches this feature, para. 21, since a user who transmits upstream data does not use a PUCCH in transmitting an ACK/NACK signal but transmits it along with the data through a shared channel (PUSCH: Physical Uplink Shared Channel). Furthermore Gao does disclose the UE can send an ACK PRB and user data on the same UL radio resource that the network granted it (See para. 52), the Examiner only agrees that the PUSCH (physical uplink shared channel) is not mentioned literally by the Gao reference, the Gao reference does describe the general principle of the concept that it is being discussed; for further clarification, Gao teaches an uplink scheduling grant indicates an identifier for the UE or UE group to which the subframe is being granted, and a hybrid ACK is used (up to one bit per transport block) for the allocated UE to

respond with an ACK/NAK bit (See para. 26). Hence the need for the combination of the Gao and Kakura references.

Thus Gao in combination with Kakura still meet the scope of the limitations as currently claimed.

Examiner has cited particular paragraphs / columns and line numbers in the reference(s) applied to the claims above for the convenience of the Applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim(s), other passages and figures may apply as well. It is respectfully requested from the Applicant in preparing responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the cited passages as taught by the prior art or relied upon by the Examiner.

Claim Rejections - 35 USC 103

4. The rejection of the Claims 1–7 and 13–16 under 35 U.S.C. 103(a) as being unpatentable over Gao et al. (U.S. Pub. 2009/0046649) in view of Kakura (U.S. Pub. 2011/0211538) and Claims 8 and 9 under 35 U.S.C. 103(a) as being unpatentable over Gao et al. (U.S. Pub. 2009/0046649) in view of Kakura (U.S. Pub. 2011/0211538), further, in view of Torsner et al. (U.S. Pub. 2010/0074153), are maintained. See previous Detailed Office Action mailed 09/25/2014.

Reasons for Allowance

5. Claims 10 and 11 are allowed.

The following is an examiner's statement of reasons for allowance:

The closest prior art Gao et al. (U.S. Pub. 2009/0046649) disclose Mapping of uplink ACK in TDD with asymmetric frame structure. Method and Techniques to allocate uplink and downlink resources to a mobile/user equipment and associating acknowledgement messages or lack thereof to a particular radio resource/subframe granted to a mobile/user equipment by the network when there are multiple resource granted in a frame by storing a pre-determined grouping of a plurality of downlink subframes that map to one uplink subframe for each of at least two instances of a ratio of number of downlink subframes exceeding number of uplink subframes in a frame; scheduling a series of downlink and uplink subframes in a frame corresponding to one of the ratios and sending scheduling grants to user equipments in at least some of the scheduled downlink subframes. Gao fails to suggest the claimed limitations in Claim 10 by Dai, which introduce a novel and non-obvious method and system for feeding back confirmation information on a physical uplink shared channel, wherein in several different situations that a user equipment detects or fails to detect a physical downlink control channel corresponding to transmitted data in a sub-frame transmitting data, or receives or fails to receive the data thereof, the user equipment analyzes data in the downlink sub-frame, and feeds back the proper acknowledgement message as the confirmation information in accordance with each situation. The related prior art to rely

upon but not applied is as follows: Kakura (U.S. Pub. 2011/0211538) teaches, Communication system, and device, method, and program used for same. Torsner et al. (U.S. Pub. 2010/0074153) teach, Method and Apparatus in a Telecommunication System. Claim 11 is similarly claimed. The above features in conjunction with all other limitations of the dependent and independent claims 10 and 11 are hereby allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RAUL RIVAS whose telephone number is (571)270-5590. The examiner can normally be reached on Monday - Friday, from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on (571) 272-3179. 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.

/RR/

Examiner, Art Unit 2471

/CHI H PHAM/

Supervisory Patent Examiner, Art Unit 2471

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S62	1	"12905299".rlan. or ("12".src. and "905299".ap.)	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2014/09/23 00:16
S63	478	"370/294".CCLS.	US-PGPUB; USPAT; USOCR	OR	ON	2014/09/23 00:16
S64	120	((BO) near2 (DAI)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2014/09/23 00:16
S65	52	((GUANGHUI) near2 (YU)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2014/09/23 00:16
S66	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16

		US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
S67	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16

		6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
S68	23	S67 and ((feedback ack acknowledgement) near2 confirmat$3)	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S69	18	S68 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S70	739	((feedback ack acknowledgement) near5 authorizat$3)	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S71	476	S70 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S72	185273	(370/335 370/329 455/561 607/31 455/517 455/436 455/450 370/328 455/562.1 455/522 375/267 370/330 607/32 370/322 370/331 455/442 370/252 714/749 455/422.1 370/332 455/450 370/329 455/62 370/347 455/562.1 455/63.1 370/331 370/328 455/509 370/322 370/341 455/464 455/67.13 455/504 455/505 370/317 455/501)".ccls"	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S73	46	S71 and S72	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S74	2	send$3 near5 (index amount) near2 sub$1frame with (feedback ack acknowledgement) with (downlink down$1link)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S75	2	WO2009022295	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S76	0	WO2009022295.PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S77	3	"20090046649", .PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S78	2	S77 AND (index amount feedback ack acknowledgement NACK downlink	US-PGPUB; USPAT;	OR	ON	2014/09/23 00:16

		down$1link UPLINK)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S79	81	map$4 near3 code$1word near5 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S80	5	S79 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S81	38684	code$1word stream near3 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S82	34568	code$1word stream near3 (feedback ack acknowledgement NACK) near down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S83	6	(code$1word near stream) near3 (feedback ack acknowledgement NACK) near6 down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S84	5	"101114868"	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2014/09/23 00:16
S85	3	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2014/09/23 00:16
S86	10	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S87	438	(ZHUO near GAO).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S88	24	(Feedback fed$1back) near2 codeword with down$1link	US-PGPUB; USPAT; USOCR;	OR	ON	2014/09/23 00:16

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S89	126	((sub$1frame near2 data)(special near2 sub$1frame)) near5 feedback	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S90	11	S89 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S91	1	"12905299".rlan. or ("12".src. and "905299".ap.)	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2014/09/23 00:16
S92	478	"370/294".CCLS.	US-PGPUB; USPAT; USOCR	OR	ON	2014/09/23 00:16
S93	120	((BO) near2 (DAI)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2014/09/23 00:16
S94	52	((GUANGHUI) near2 (YU)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2014/09/23 00:16
S95	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16

		4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.					
S96	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16

		6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
S97	23	S96 and ((feedback ack acknowledgement) near2 confirmat$3)	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S98	18	S97 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S99	739	((feedback ack acknowledgement) near5 authorizat$3)	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S100	476	S99 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S101	185273	(370/335 370/329 455/561 607/31 455/517 455/436 455/450 370/328 455/562.1 455/522 375/267 370/330 607/32 370/322 370/331 455/442 370/252 714/749 455/422.1 370/332 455/450 370/329 455/62 370/347 455/562.1 455/63.1 370/331 370/328 455/509 370/322 370/341 455/464 455/67.13 455/504 455/505 370/317 455/501)".ccls"	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S102	46	S100 and S101	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S103	2	send$3 near5 (index amount) near2 sub$1frame with (feedback ack acknowledgement) with (downlink down$1link)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S104	2	WO2009022295	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S105	0	WO2009022295.PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S106	3	"20090046649", .PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2014/09/23 00:16

			IBM_TDB			
S107	2	S106 AND (index amount feedback ack acknowledgement NACK downlink down$1link UPLINK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S108	81	map$4 near3 code$1word near5 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S109	5	S108 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S110	38684	code$1word stream near3 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S111	34568	code$1word stream near3 (feedback ack acknowledgement NACK) near down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S112	6	(code$1word near stream) near3 (feedback ack acknowledgement NACK) near6 down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S113	5	"101114868"	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2014/09/23 00:16
S114	3	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2014/09/23 00:16
S115	10	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S116	438	(ZHUO near GAO).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16

S117	24	(Feedback fed$1back) near2 codeword with down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S118	126	((sub$1frame near2 data)(special near2 sub$1frame)) near5 feedback	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S119	11	S118 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S120	4	("20030169701" "20040224697").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S121	13726	(uplink) near5 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 01:51
S122	212	(uplink) near5 (feedback ack acknowledgement NACK) near7 bundl$5	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 01:53
S123	7	S122 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2014/09/23 01:53
S124	39	(uplink) with (feedback ack acknowledgement NACK) with bundl$5 with ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 03:38
S125	0	S124 and (@ay <"2009") not S122	US-PGPUB; USPAT	OR	ON	2014/09/23 03:38
S126	45	(uplink) with (feedback ack acknowledgement NACK) with bundl$5 same ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 03:39
S127	0	S126 and (@ay <"2009") not S122	US-PGPUB; USPAT	OR	ON	2014/09/23 03:39
S128	195	((uplink) with (feedback ack acknowledgement NACK) with bundl$5)and ((Physical adj uplink adj Shared	US-PGPUB; USPAT; USOCR;	OR	ON	2014/09/23 03:39

		adj Channel) or (PuSCH))	FPRS; EPO; JPO; DERWENT; IBM_TDB			
S129	0	S128 and (@ay <"2009") not S122	US-PGPUB; USPAT	OR	ON	2014/09/23 03:39
S130	0	S128 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2014/09/23 03:39
S131	2812	((uplink) with (feedback ack acknowledgement NACK (FEED$3 adj BACK))) same ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 03:41
S132	227	S131 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2014/09/23 03:41
S133	1959	((uplink) with (feedback ack acknowledgement NACK (FEED$3 adj BACK))) with ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 03:42
S134	148	S133 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2014/09/23 03:42
S135	1	"12905299".rlan. or ("12".src. and "905299".ap.)	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2015/04/28 17:20
S136	500	"370/294".CCLS.	US-PGPUB; USPAT; USOCR	OR	ON	2015/04/28 17:20
S137	145	((BO) near2 (DAI)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2015/04/28 17:20
S138	57	((GUANGHUI) near2 (YU)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2015/04/28 17:20
S139	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20

		or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
S140	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20

		6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
S141	23	S140 and ((feedback ack acknowledgement) near2 confirmat$3)	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S142	18	S141 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S143	787	((feedback ack acknowledgement) near5 authorizat$3)	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S144	482	S143 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S145	201445	(370/335 370/329 455/561 607/31 455/517 455/436 455/450 370/328 455/562.1 455/522 375/267 370/330 607/32 370/322 370/331 455/442 370/252 714/749 455/422.1 370/332 455/450 370/329 455/62 370/347 455/562.1 455/63.1 370/331 370/328 455/509 370/322 370/341 455/464 455/67.13 455/504 455/505 370/317 455/501)".ccls"	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S146	48	S144 and S145	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S147	2	send$3 near5 (index amount) near2 sub$1frame with (feedback ack acknowledgement) with (downlink down$1link)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S148	4	WO2009022295	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2015/04/28 17:20

			IBM_TDB			
S149	0	WO2009022295.PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S150	3	"20090046649", .PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S151	2	S150 AND (index amount feedback ack acknowledgement NACK downlink down$1link UPLINK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S152	97	map$4 near3 code$1word near5 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S153	6	S152 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S154	41799	code$1word stream near3 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S155	37374	code$1word stream near3 (feedback ack acknowledgement NACK) near down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S156	9	(code$1word near stream) near3 (feedback ack acknowledgement NACK) near6 down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S157	5	"101114868"	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2015/04/28 17:20
S158	3	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2015/04/28 17:20

S159	11	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S160	476	(ZHUO near GAO).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S161	27	(Feedback fed$1back) near2 codeword with down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S162	162	((sub$1frame near2 data)(special near2 sub$1frame)) near5 feedback	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S163	11	S162 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S164	1	"12905299".rlan. or ("12".src. and "905299".ap.)	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2015/04/28 17:20
S165	500	"370/294".CCLS.	US-PGPUB; USPAT; USOCR	OR	ON	2015/04/28 17:20
S166	145	((BO) near2 (DAI)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2015/04/28 17:20
S167	57	((GUANGHUI) near2 (YU)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2015/04/28 17:20
S168	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20

		20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
S169	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20

		8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
S170	23	S169 and ((feedback ack acknowledgement) near2 confirmat$3)	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S171	18	S170 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S172	787	((feedback ack acknowledgement) near5 authorizat$3)	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S173	482	S172 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S174	201445	(370/335 370/329 455/561 607/31 455/517 455/436 455/450 370/328 455/562.1 455/522 375/267 370/330 607/32 370/322 370/331 455/442 370/252 714/749 455/422.1 370/332 455/450 370/329 455/62 370/347 455/562.1 455/63.1 370/331 370/328 455/509 370/322 370/341 455/464 455/67.13 455/504 455/505 370/317 455/501)".ccls"	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S175	48	S173 and S174	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S176	2	send$3 near5 (index amount) near2 sub$1frame with (feedback ack acknowledgement) with (downlink down$1link)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S177	4	WO2009022295	US-PGPUB; USPAT; USOCR;	OR	ON	2015/04/28 17:20

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S178	0	WO2009022295.PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S179	3	"20090046649", .PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S180	2	S179 AND (index amount feedback ack acknowledgement NACK downlink down$1link UPLINK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S181	97	map$4 near3 code$1word near5 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S182	6	S181 and (@ay < "2009")	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S183	41799	code$1word stream near3 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S184	37374	code$1word stream near3 (feedback ack acknowledgement NACK) near down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S185	9	(code$1word near stream) near3 (feedback ack acknowledgement NACK) near6 down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S186	5	"101114868"	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2015/04/28 17:20
S187	3	Feedback adj channel adj distribution	US-PGPUB;	OR	ON	2015/04/28

			USPAT; USOCR; DERWENT			17:20
S188	11	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S189	476	(ZHUO near GAO).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S190	27	(Feedback fed$1back) near2 codeword with down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S191	162	((sub$1frame near2 data)(special near2 sub$1frame)) near5 feedback	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S192	11	S191 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S193	4	("20030169701" "20040224697").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S194	15837	(uplink) near5 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S195	268	(uplink) near5 (feedback ack acknowledgement NACK) near7 bundl$5	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S196	8	S195 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S197	51	(uplink) with (feedback ack acknowledgement NACK) with bundl$5 with ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2015/04/28 17:20

			EPO; JPO; DERWENT; IBM_TDB			
S198	0	S197 and (@ay <"2009") not S195	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S199	61	(uplink) with (feedback ack acknowledgement NACK) with bundl$5 same ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S200	0	S199 and (@ay <"2009") not S195	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S201	255	((uplink) with (feedback ack acknowledgement NACK) with bundl$5)and ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S202	0	S201 and (@ay <"2009") not S195	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S203	1	S201 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S204	3581	((uplink) with (feedback ack acknowledgement NACK (FEED$3 adj BACK))) same ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S205	230	S204 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20
S206	2478	((uplink) with (feedback ack acknowledgement NACK (FEED$3 adj BACK))) with ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/04/28 17:20
S207	149	S206 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2015/04/28 17:20

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L5	0	(when the confirmation information is fed back together with uplink data on the physical uplink shared channel in a situation that a user equipment fails to detect a physical downlink control channel corresponding to transmitted data in a sub-frame transmitting data the user equipment feeds back a negative acknowledgement message as confirmation information of this downlink sub-frame).clm.	US-PGPUB; USPAT; UPAD	ADJ	ON	2015/04/29 10:04
L6	0	(in a situation that the user equipment detects the physical downlink control channel	US-PGPUB;	ADJ	ON	2015/04/29 10:05

		corresponding to the transmitted data in the sub-frame transmitting the data the user equipment analyzes data in this downlink sub-frame and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful otherwise the negative acknowledgement message is fed back as the confirmation information).clm.	USPAT; UPAD			
L7	0	(wherein in a situation that the user equipment feeds back a plurality of groups of the confirmation information an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame).clm.	US-PGPUB; USPAT; UPAD	ADJ	ON	2015/04/29 10:06
L8	0	(in a situation that the number of the codeword streams of the downlink sub-frame is smaller than the maximum number of the codeword streams of the downlink sub-frame the user equipment feeds back the confirmation information of the maximum number of the codeword streams wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value).clm.	US-PGPUB; USPAT; UPAD	ADJ	ON	2015/04/29 10:06
L9	0	(when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame).clm.	US-PGPUB; USPAT; UPAD	ADJ	ON	2015/04/29 10:07

4/29/2015 10:22:30 AM
C:\Users\rrivas\Documents\EAST\Workspaces\12-2012\12905299 - Dai - FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL.wsp

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12905299	DAI ET AL.
	Examiner	Art Unit
	RAUL RIVAS	2471

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
370	Updated Text Search, see search history	4/29/2015	RR

SEARCH NOTES		
Search Notes	Date	Examiner
Inventorship search	4/29/2015	RR
Updated Internet search	4/29/2015	RR
Updated EAST search	4/29/2015	RR
Consulted with SPE Chi Pham	4/29/2015	RR

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
370	Text Search, see search history	4/29/2015	RR

/R.R./ Examiner.Art Unit 2471	

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12905299	DAI ET AL.
	Examiner	**Art Unit**
	RAUL RIVAS	2471

✓	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	07/23/2013	01/12/2014	09/23/2014	04/29/2015					
	1	✓	✓	✓	✓					
	2	✓	✓	✓	✓					
	3	✓	✓	✓	✓					
	4	✓	✓	✓	✓					
	5	✓	✓	✓	✓					
	6	✓	✓	✓	✓					
	7	✓	✓	✓	✓					
	8	✓	✓	✓	✓					
	9	✓	✓	✓	✓					
	10	✓	✓	✓	=					
	11	✓	✓	✓	=					
	12	✓	✓	✓	-					
	13	✓	✓	✓	✓					
	14	✓	✓	✓	✓					
	15	✓	✓	✓	✓					
	16	✓	✓	✓	✓					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Bo DAI et al.
Serial No.:	12/905,299
Title:	METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
Filed:	October 15, 2010
Attorney Docket No.:	6284.00013 / P34599ZTE
Examiner:	Rivas, Raul
Art Unit:	2471
In Response To:	Office Action mailed September 25, 2014

AMENDMENT

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

Sir:

In response to the Office Action mailed September 25, 2014, please amend the above-identified application as follows:

AMENDMENTS TO THE CLAIMS

1. (PREVIOUSLY PRESENTED) A method for feeding back confirmation information on a physical uplink shared channel, which is used for enabling a user equipment to feed back to an eNodeB whether data of a downlink sub-frame is correctly received in a situation that a number of the downlink sub-frames is greater than a number of uplink sub-frames in a time division duplex system, wherein the method comprises:

the eNodeB carries, in downlink control information, a number value of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame, and transmits data on a plurality of continuous downlink sub-frames after the sub-frame carrying the downlink control information, wherein the number of the downlink sub-frames which transmit the data is equal to a number of the downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame;

after the user equipment receives the downlink sub-frame which carries the downlink control information, the data is received from the downlink sub-frame which transmits the data after this downlink sub-frame, and the confirmation information of receiving the data is fed back together with uplink data to the

eNodeB through a physical uplink shared channel through an uplink sub-frame.

2. (ORIGINAL) The method according to Claim 1, wherein the eNodeB uses a signaling in the downlink control information for representing an index of the uplink sub-frame for transmitting uplink data in the situation that the number of the downlink sub-frames is smaller than the number of the uplink sub-frames to carry the number of the downlink sub-frames corresponding to the confirmation information which is fed back by the one uplink sub-frame.

3. (ORIGINAL) The method according to Claim 1, wherein the eNodeB determines a set of number values of all the downlink sub-frames corresponding to information which is fed back by the one uplink sub-frame according to a configuration pattern for the current number of downlink/uplink sub-frames, and selects corresponding number values from the set according to an amount of the data actually required to be transmitted to be carried in the downlink control information.

4. (ORIGINAL) The method according to Claim 1, wherein the eNodeB sends a control signaling associated with the allocation of the physical uplink shared channel on a first downlink sub-frame

in the downlink sub-frames corresponding to the confirmation information fed back by the uplink sub-frame.

5. (ORIGINAL) The method according to Claim 1, wherein in the uplink sub-frames fed back to the eNodeB, the user equipment, according to the order of serial numbers of the received downlink sub-frames which transmit the data, receives each downlink sub-frame which transmits the data and feeds back corresponding confirmation information.

6. (ORIGINAL) The method according to Claim 1, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

7. (ORIGINAL) The method according to Claim 6, wherein

in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back by the user equipment to the eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data;

in a situation that the data in the downlink sub-frame that transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the user equipment acquires the confirmation information corresponding to each codeword stream thereof, in a situation that any one or more pieces of confirmation information among the confirmation information acquired is the negative acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement; in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement.

8. (ORIGINAL) The method according to Claim 6, wherein

in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a

maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame;

in the situation that the number of codeword streams of the downlink sub-frames is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the number of the maximum codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value;

when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame.

9. (ORIGINAL) The method according to Claim 1, wherein in a situation that the downlink sub-frames sent by the eNodeB to the user equipment includes special sub-frames which cannot transmit data, the user equipment does not consider the special sub-frames when feeding back the confirmation information.

10. (CURRENTLY AMENDED) A method for feeding back confirmation information on a physical uplink shared channel, wherein, when the confirmation information is fed back together with uplink data on the physical uplink shared channel, in a situation that a user equipment fails to detect a physical downlink control channel corresponding to transmitted data in a sub-frame transmitting data, the user equipment feeds back a negative acknowledgement message as confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information;

wherein

in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame;

in a situation that the number of the codeword streams of the downlink sub-frame is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the maximum number of the codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value;

when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame.

11. (ORIGINAL) The method according to Claim 10, wherein

in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back by the user equipment to an eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data;

in a situation that the data in the downlink sub-frame which transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the user equipment acquires the confirmation information corresponding to each codeword stream thereof, in a situation that any one or more pieces

of confirmation information among the confirmation information acquired is the negative acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement; in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement.

12. (CANCELED).

13. (ORIGINAL) The method according to Claim 2, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

14. (ORIGINAL) The method according to Claim 3, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

15. (ORIGINAL) The method according to Claim 4, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in

the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

16. (ORIGINAL) The method according to Claim 5, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

R E M A R K S

The first Office Action mailed on 09/25/2014, has been carefully considered. Reconsideration in view of the following remarks is respectfully requested.

ARGUMENTS CONCERNING REJECTIONS UNDER 35 U.S.C.§103(A)

Claims 1-7, 10, 11 and 13-16 were rejected under 35 U.S.C. 103(a) as being unpatentable by *Gao* et al. (U.S. Pub. 2009/0046649) in view of Kakura (US2011/0211538), of which Claims 1 and 10 are independent claims. This Rejection is respectfully traversed based on at least following reasons.

As per Claim 1

First, the recited para. 0036 of Gao is reproduced below:

[0036] In accordance with another exemplary embodiment of the invention is a memory embodying a program of machine readable instructions executable by a processor to perform actions directed to mapping acknowledgement messages. In this embodiment the actions include storing a predetermined grouping of a plurality of downlink subframes that map to one uplink subframe for each of at least two instances of a ratio of number of downlink subframes exceeding number of uplink subframes in a frame; scheduling a series of downlink and uplink subframes in a frame corresponding to one of the ratios and sending scheduling grants to user equipments in at least some of the scheduled downlink subframes, wherein the number of scheduled downlink subframes is greater than the number of scheduled uplink subframes in the frame; receiving acknowledgements from the user equipments to which the scheduling grants were sent, wherein multiple ones of the acknowledgements are received in a single uplink subframe; and mapping all of the multiple acknowledgements received in the single uplink subframe to the downlink subframes of the group that maps to the single uplink subframe according to the predetermined grouping for the corresponding ratio.

As disclosed above, there is a predetermined grouping of a plurality of downlink subframes, and the acknowledgements are received from the user equipments, wherein multiple ones of the acknowledgements are received in a single uplink subframe. Further, all of the multiple acknowledgements received in the single uplink subframe are mapped to the downlink subframes of the group that maps to the single uplink subframe according to predetermined grouping.

That is, the number of the downlink subframes which map to the acknowledgements received in the single uplink subframe **is predetermined**, instead of being indicated by the base station. In other words, **the number of the downlink subframes which map to the acknowledgements is fixed, and is not dynamically configured by the base station**.

On the contrary, Claim 1 of present application states the following technical feature:

1) "*the eNodeB carries, in downlink control information, a number value of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame, and transmits data on a plurality of continuous downlink sub-frames after the sub-frame carrying the downlink control information, wherein the number of the downlink sub-frames which transmit the data is equal to a number of the downlink sub-frames corresponding to*

the confirmation information fed back by the one uplink sub-frame";

2) *"after the user equipment receives the downlink sub-frame which carries the downlink control information, the data is received from the downlink sub-frame which transmits the data after this downlink sub-frame, and the confirmation information of receiving the data is fed back together with uplink data to the eNodeB through a physical uplink shared channel through an uplink sub-frame".*

As stated by above technical feature 1) and 2), **a number value of the downlink sub-frame corresponding to the confirmation information** which is fed back by one uplink sub-frame **is indicated by the eNodeB**. That is, the number of the downlink sub-frame corresponding to the confirmation information can be dynamically indicated by the eNodeB in Claim 1, which is different from the predetermined and fixed number of the downlink subframes which map to the acknowledgements received in the single uplink subframe as disclosed by Gao.

Further, as stated by above technical feature 1) and 2) in Claim 1, based on the situation that the number value of the downlink sub-frame corresponding to the confirmation information is carried by the eNodeB in the downlink control information, **the number of the downlink sub-frames which**

transmit the data is equal to the number of the downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame, whereas Gao fails to teach whether the number of the downlink subframes which transmit the data is equal to the number of the downlink sub-frame corresponding to the confirmation information and indicated by the base station.

Moreover, para. 0036 of *Gao* discloses "receiving acknowledgements from the user equipments to which the scheduling grants were sent", and para. 0061 of *Gao* discloses "The ACK for the ith DL group is sent through the ith UL ACK PRB". As disclosed above by Gao, **only the acknowledgements** are fed back by the user equipment. In other words, in Gao, **the acknowledgements can not be fed back together with uplink data through the same channel**, whereas Claim 1 of present application states that the confirmation information of receiving the data is fed back **together with uplink data** to the eNodeB through a physical uplink shared channel through an uplink sub-frame.

Thus, it is submitted that Gao does not disclose above technical feature 1) and 2) in Claim 1 of present application.

Second, Examiner asserts in this Office Action that Kakura discloses the feature "the confirmation information of

receiving the data is fed back together with uplink data". However, applicant respectfully disagrees.

Examiner merely generally contends that above feature is disclosed by Kakura, but not point out which part of Kakura discloses above feature. Herein, applicant respectfully requests Examiner to point out which part of Kakura discloses above feature in detail.

Further, the Claim 60 of Kakura is reproduced below:

60. A communication system comprising:

a base station having

a resource allocator that defines M unit resources (M is an integer equal to or greater than two) in a first control channel through which first control information is transmitted as a basic resource, associates a resource in a second control channel through which second control information is transmitted with said basic resource, allocates at least part of said basic resource to said first control information, and associates the first control information to which at least part of said basic resource is allocated with a resource in the second control channel associated with one of the basic resources allocated to said first control information, and

a first control information transmitter that transmits said allocated first control information to a mobile station; and

a mobile station having

a second control information transmitter that receives said first control information, and transmits said second control information using the resource in the second control channel associated with said first control information.

As disclosed above by Kakura, **the control information transmitter of the mobile station receives the first control information, and transmits the second control information**. However, Kakura fails to teach that the confirmation information of receiving the data is fed back together with uplink data.

Thus, it is submitted that Kakura also does not disclose the feature "the confirmation information of receiving the data is fed back together with uplink data" in Claim 1 of present application.

To sum up, it follows that the applied art does not disclose or suggest all of the features and relationships recited in Claim 1. Thus the Office has not established a case of *prima facie* obviousness. Further the Office has not established any apparent reason to modify the applied art to include this recited subject matter which is missing from the applied art. Withdrawal of the 35 U.S.C.§103(a) rejections of Claim 1 is respectfully requested.

As per Claim 10

First, applicant incorporates all the additional technical features of Claim 12 into Claim 10, and correspondingly cancels Claim 12. Support for above amendments can be found at original Claims.

Second, applicant submits that amended Claim 10 is patentable by *Gao* in view of Kakura.

The recited paragraphs of Gao are reproduced below:

[0029] There has been some interest in developing LTE as to how exactly to map the UL resources that are allocated to a UE to the scheduling grant sent on a DL control channel (the PDCCH in LTE) that grants to the UE those UL resources. Because the control channel is a common channel to which multiple UE listen for their respective grants, much control signaling overhead may be saved by having some mapping from the scheduling grant itself to the radio resources being granted to the UE. Some proposals advance an implicit mapping and others advance explicit signaling of the mapping. For example and in the TDD operation mode, both network and UE may recognize an implicit mapping whereby a UL scheduling grant received in the ith DL sub-frame is mapped to the ith UL sub-frame. This one-to-one correspondence is valid where the number of UL subframes being allocated in a frame is no greater than the number of DL subframes in which the scheduling grants may be sent in that frame, DL≦UL in shorthand. Other more involved mapping schemes, either implicit, explicit, or hybrid, have been proposed for the more difficult instances where DL<UL. To give the network greater flexibility in allocating those UL resources as the UE's needs for radio resources change, the network is able to dynamically adjust the DL to UL ratio in any given frame of the PDCCH.

[0030] However the mapping may be done for the DL<UL scenario, a related problem arises in how the UEs receiving data transmissions on the scheduled DL subframes send their acknowledgements that they've received the data. In a HARQ scheme generally the UE sends an ACK message (as little as one bit) to confirm receipt of the DL data and the network recognizes that the absence of such an ACK message within a certain time constraint is a NAK, indicating the UE did not receive the transmitted data. Some systems have the UE send a NAK bit to positively indicate that expected data was not received (or was not properly decoded).

[0031] For FDD, since the DL and UL are symmetric (DL=UL), each DL transmission in one DL subframe will be responded by an ACK/NAK in a known UL subframe with a certain delay. For multiple UEs transmitting in the same DL subframe, it is agreed as seen in a paper entitled: DRAFT REPORT OF 3GPP TSG RAN WG1 #49B v0.3.0; MCC Support; Orlando, Fla., 25-29 Jun. 2007; section 7.13.2 at page 42 [Exhibit A of the U.S. priority document 60/964,633] that "for non-persistent scheduling the ACK/NAK resource is linked to the index of the control channel used for scheduling". In the case of FDD operation then, there is one to one mapping between UL subframe for ACK/NAK transmission and DL subframe for data transmission.

As disclosed above, in a HARQ scheme generally the UE sends an ACK message to confirm receipt of the DL data and the network recognizes that the absence of such an ACK message within a certain time constraint is a NAK, indicating the UE did not receive the transmitted data. That is, Gao merely discloses that the ACK message is sent as the receipt of the DL data. However, Gao fails to teach that the UE will detect the physical downlink control channel and analyze data in this downlink sub-frame before sending the ACK message. Further, Gao also does not teach the situation in which the NACK is sent. In other words, the NACK in Gao merely indicates that the data is not received and the ACK in Gao merely indicates that the data is received, but can not indicate the result of detecting the physical downlink control channel and analyzing data in this downlink sub-frame.

On the contrary, Claim 10 of present application defines the situation in which the negative acknowledgement message is fed back and the situation in which acknowledgement message is fed back. In above situations in which acknowledgement message or negative acknowledgement message is fed back, the user equipment performs the operation of detecting the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the

data, and/or the operation of analyzing data in this downlink sub-frame in Claim 10 of present application, which are not disclosed by Gao.

Further, Examiner asserts in this Office Action that Kakura discloses the feature "the confirmation information is fed back together with uplink data on the physical uplink shared channel". However, applicant respectfully disagrees.

Examiner merely generally contends that above feature is disclosed by Kakura, but not point out which part of Kakura discloses above feature. Herein, applicant respectfully requests examiner to point out which part of Kakura discloses above feature in detail.

Further, as disclosed by the Claim 60 of Kakura, the control information transmitter of the mobile station receives the first control information, and transmits the second control information. However, Kakura fails to teach that the confirmation information of receiving the data is fed back together with uplink data.

Thus, it is submitted that Kakura also does not disclose the feature "the confirmation information is fed back together with uplink data on the physical uplink shared channel" in Claim 10 of present application.

Thus, Gao does not disclose the technical feature 1) "*wherein, when the confirmation information is fed back together with uplink data on the physical uplink shared channel, in a situation that a*

user equipment fails to detect a physical downlink control channel corresponding to transmitted data in a sub-frame transmitting data, the user equipment feeds back a negative acknowledgement message as confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information" in Claim 10 of present application.

Further, as per the technical feature 2) *"in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame"*, examiner contends that the recited para. 0031 of Gao discloses above technical feature 2).

However, applicant respectfully disagrees on this matter.

As disclosed by the para. 0031 of Gao, each DL transmission in one DL subframe will be responded by an ACK/NACK in a known UL subframe. That is, the number of the ACK/NACK responded is equal to the number of DL transmission in one DL subframe, **instead of maximum number of codeword streams in the DL sub-frame**, whereas an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame in amended Claim 10.

Thus, it is submitted that Gao does not disclose above technical feature 2) in amended Claim 10.

Moreover, as per the technical feature 3) "*in a situation that the number of the codeword streams of the downlink sub-frame is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the maximum number of the codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value*", Examiner contends that the recited para. 0052 and 0053 of *Torsner* discloses above technical feature 3).

However, applicant respectfully disagrees on this matter. The recited para. 0052 and 0053 of Torsner are reproduced below:

[0052] Briefly described, when scheduling individual feedback reports for plural received data blocks, a feedback schedule which is shared by both the data transmitting party and the data receiving party must be used. According to this feedback schedule, the communication unit (i.e. the data receiving party) spreads or distributes the individual feedback reports evenly over the available sub-frames allocated for the reverse link. The feedback reports are then spread or distributed according to a predetermined spreading rule, which is determined by the allocation of sub-frames to TX and RX as well as other allocation parameters stipulated for the current connection.

[0053] The number of feedback reports in a sub-frame can also be reduced by sending a "compressed" or "concatenated" feedback report to the data sending party that refers to a set of plural received data blocks collectively. In that case, a mapping operation is performed to associate the feedback report with the received sub-frames in the set and to generate the feedback report from decoding results of the respective received sub-frames, depending on the prevailing allocation parameters including which sub-frames that were received. A compressed feedback report can be used in combination with the above-described spreading of individual feedback reports, or separately. Various exemplary embodiments for realising the present solution will be described in more detail below.

As disclosed above, the number of feedback reports in a sub-frame can be reduced, wherein a mapping operation is performed to associate the feedback report with the received sub-frames in the set and to generate the feedback report from decoding results of the respective received sub-frames.

However, above disclosure in Torsner fails to teach the relationship between the reduced feedback reports and the maximum number of the codeword streams of the downlink sub-frame, and the relationship between the number of the codeword streams of the downlink sub-frame and the maximum number of the codeword streams of the downlink sub-frame. Further, even though examiner contends that the number of reduced feedback reports is equal to the maximum number of the codeword streams of the downlink sub-frame, applicant submits that above disclosure in Torsner fails to teach how to feeds back the confirmation information without a corresponding codeword stream, whereas confirmation information without a corresponding codeword stream is set as a predefined fixed value in amend Claim 10.

Thus, it is submitted that Torsner does not disclose above technical feature 3) in amended Claim 10.

Further, as per the technical feature 4) "*when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-*

frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame", Examiner contends that the recited para. 0077 of *Torsner* discloses above technical feature 4).

However, applicant respectfully disagrees on this matter. The recited para. 0077 of Torsner is reproduced below:

> **[0077]** A basic example is when B=1 and A>1 resulting in a compressed feedback report for A RX sub-frames. Then, a single NACK will be transmitted if data in one or more of the received RX sub-frames is erroneous, whereas a single ACK will be transmitted for the case that all data in the RX sub-frames has been received correctly.

As disclosed above, a single NACK will be transmitted if data in one or more of the received RX sub-frames is erroneous, instead of failing to detect the data in one or more of the received RX sub-frames, whereas the user equipment feeds back the negative acknowledgement message as the confirmation information of **each codeword stream when the user equipment fails to detect the physical downlink control channel** corresponding to the transmitted data in the sub-frame in amended Claim 10.

Thus, it is submitted that Torsner does not disclose above technical feature 4) in amended Claim 10.

To sum up, Claim 10 of present application can is unpatentable by Gao in view of Torsner and Kakura. Withdrawal of the rejections to Claim 10 is respectfully requested.

On the basis that Claim 1 and 10 are patentable over *Gao* in view of Torsner and Kakura, also for at least the reasons set forth above, claims 2-7, 11 and 13-16, which are dependent from Claim 1 and 10, is patentable over *Gao* in view of Torsner and Kakura.

ARGUMENTS CONCERNING REJECTIONS UNDER 35 U.S.C.§103

Claims 8 and 9 were rejected under 35 U.S.C. 103(a) as being unpatentable over *Gao* et al. (U.S. Pub. 2009/0046649) in view of Kakura (US2011/0211538) and *Torsner* et al. (U.S. Pub. 2010/0074153).

Examiner merely uses *Torsner* to judge additional technical features in Claims 8 and 9, instead of the technical feature in their respective independent claim, such as, above technical feature 1)-2) in Claim 1 of present application. In other words, examiner does point out which part of *Torsner* discloses above technical feature 1)-2) in Claim 1 of present application.

Thus, it is submitted that *Torsner* does not disclose above technical feature 1)-2) in Claim 1 of present

application. Dependent Claims 8 and 9 should also be allowable accordingly for at least the reasons discussed previously with respect to their respective independent claim. Withdrawal of the 35 U.S.C.§103(a) rejections of dependent Claims is respectfully requested.

Respectfully submitted,

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Dated: January 8, 2015

Docket No.: 6284.00013

Electronic Patent Application Fee Transmittal	
Application Number:	12905299
Filing Date:	15-Oct-2010
Title of Invention:	METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
First Named Inventor/Applicant Name:	Bo Dai
Filer:	Christopher P. Maiorana/Mary Donna Berkley
Attorney Docket Number:	6284.00013/P34599ZTE
Filed as Large Entity	
Filing Fees for **Utility under 35 USC 111(a)**	

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

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 1 month with $0 paid	1251	1	200	200
Miscellaneous:				
			Total in USD ($)	**200**

Electronic Acknowledgement Receipt	
EFS ID:	21152271
Application Number:	12905299
International Application Number:	
Confirmation Number:	7676
Title of Invention:	METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
First Named Inventor/Applicant Name:	Bo Dai
Customer Number:	21615
Filer:	Christopher P. Maiorana/Mary Donna Berkley
Filer Authorized By:	Christopher P. Maiorana
Attorney Docket Number:	6284.00013/P34599ZTE
Receipt Date:	08-JAN-2015
Filing Date:	15-OCT-2010
Time Stamp:	11:00:46
Application Type:	Utility under 35 USC 111(a)

Payment information:

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Payment Type	Credit Card
Payment was successfully received in RAM	$200
RAM confirmation Number	7391
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Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment/Req. Reconsideration-After Non-Final Reject	12905299_amendment_010815.pdf	1171497 d0ac7c65cbcdf417ab6da17cbf41dac7aa2236f5	no	29
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	31008 e39006dbbb0529937dd49fbb0da09e1547a0c034	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1202505		

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

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

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

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

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/905,299	Filing Date 10/15/2010	☐ 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

AMENDMENT	01/08/2015	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 15	Minus	** 20	= 0	X $80 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $420 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

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

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/GOIGA DUCKETT/

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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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/905,299	10/15/2010	Bo Dai	6284.00013/P34599ZTE	7676

21615 7590 09/25/2014
CHRISTOPHER P. MAIORANA, P.C.
24840 HARPER SUITE 100
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EXAMINER	
RIVAS, RAUL	
ART UNIT	**PAPER NUMBER**
2471	
MAIL DATE	**DELIVERY MODE**
09/25/2014	PAPER

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

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

Office Action Summary	Application No. 12/905,299	Applicant(s) DAI ET AL.	
	Examiner RAUL RIVAS	Art Unit 2471	AIA (First Inventor to File) Status No

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

Period for Reply

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

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

Status

1)☒ Responsive to communication(s) filed on *03/17/2014*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

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

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-16* 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) *1-16* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

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

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

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

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

Priority under 35 U.S.C. § 119

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

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

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

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

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

4) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the Applicant's amendments filed on 03/17/2014.

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

Claim Rejections – 35 USC § 103

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

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1–7, 10, 11 and 13–16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gao et al. (U.S. Pub. 2009/0046649) in view of Kakura (U.S. Pub. 2011/0211538).

Regarding **claim 1** Gao disclose **a method for feeding back confirmation information on a physical uplink shared channel, which is used for enabling a user equipment to feed back to an eNodeB whether data of a downlink sub-frame is correctly received in a situation that a number of the downlink sub-frames is greater than a number of uplink sub-frames in a time division duplex system, wherein the method comprises** (para. 34, Fig. 1)**:**

the eNodeB carries, in downlink control information, a number value of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame, and transmits data on a plurality of continuous downlink sub-frames after the sub-frame carrying the downlink control information, wherein the number of the downlink sub-frames which transmit the data is equal to an number of the downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame (para. 36, Fig. 1); The Examiner notes that although the term PUSCH (physical uplink shared channel) is not mentioned literally by the reference, the reference does describe the general principle of the concept that it is being discussed; for further clarification, Gao

teaches an uplink scheduling grant indicates an identifier for the UE or UE group to which the subframe is being granted, and a hybrid ACK is used (up to one bit per transport block) for the allocated UE to respond with an ACK/NAK bit (See para. 26);

after the user equipment receives the downlink sub-frame which carries the downlink control information, the data is received from the downlink sub-frame which transmits the data after this downlink sub-frame, and *the confirmation information of receiving the data is fed back together with uplink data to the eNodeB through a physical uplink shared channel* through an uplink sub-frame (para. 61); for further clarification Gao also teach para. 27, downlink control signaling informs UE(s) what resources and respective transmission formats have been allocated. The scheduler can instantaneously choose the best multiplexing strategy from the available methods; e.g. frequency localized or frequency distributed transmission.

Gao does not specifically disclose, **the confirmation information of receiving the data is fed back together with uplink data,** however Kakura teaches this feature, since a user who transmits upstream data does not use a PUCCH in transmitting an ACK/NACK signal but transmits it along with the data through a shared channel (PUSCH: Physical Uplink Shared Channel), a PUCCH resource associated with CCE's constituting a Downlink grant for the user is possibly inefficiently used.

Gao and Kakura are analogous because they pertain to the field of wireless communication networks and, more specifically, to allocating resources.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Kakura in the system of Gao to efficiently make use of the communications medium. The motivation for doing so would have been to reduce the overhead and improve the efficient use of the control channel.

Regarding **claim 2** Gao disclose **wherein the eNodeB uses a signaling in the downlink control information for representing an index of the uplink sub-frame for transmitting uplink data in the situation that the number of the downlink sub-frames is smaller than the number of the uplink sub-frames to carry the number of the downlink sub-frames corresponding to the confirmation information which is fed back by the one uplink sub-frame** (para. 30, 31)**.**

Regarding **claim 3** Gao disclose **wherein the eNodeB determines a set of number values of all the downlink sub-frames corresponding to information which is fed back by the one uplink sub-frame according to a configuration pattern for the current number of downlink/uplink sub-frames, and selects corresponding number values from the set according to an amount of the data actually required to be transmitted to be carried in the downlink control information** (para. 61, 62)**.**

Regarding **claim 4** Gao disclose **wherein the eNodeB sends a control signaling associated with the allocation of the physical uplink shared channel on**

a first downlink sub-frame in the downlink sub-frames corresponding to the confirmation information fed back by the uplink sub-frame (para. 64)**.**

Regarding **claim 5** Gao disclose **wherein in the uplink sub-frames fed back to the eNodeB, the user equipment, according to the order of serial numbers of the received downlink sub-frames which transmit the data, receives each downlink sub-frame which transmits the data and feeds back corresponding confirmation information** (para. 61)**.**

Regarding **claim 6** Gao disclose **wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame** (para. 29, 30)**;**

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information (para. 29, 30); Gao disclose (para. 30, In a HARQ scheme generally the UE sends an ACK message (as little as one bit) to confirm receipt of the DL data and the network recognizes that the absence of such an ACK message within a certain time constraint is a NAK, indicating the UE did

not receive the transmitted data. Some systems have the UE send a NAK bit to positively indicate that expected data was not received (or was not properly decoded); for further clairification Gao disclose para. 31, For FDD, since the DL and UL are symmetric (DL=UL), each DL transmission in one DL subframe will be responded by an ACK/NAK in a known UL subframe with a certain delay. Further disclose, In the case of FDD operation then, there is one to one mapping between UL subframe for ACK/NAK transmission and DL subframe for data transmission.

Regarding **claim 7** Gao disclose **wherein in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back by the user equipment to the eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data** (para. 85);

in a situation that the data in the downlink sub-frame that transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the user equipment acquires the confirmation information corresponding to each codeword stream thereof (para. 31),

in a situation that any one or more pieces of confirmation information among the confirmation information acquired is the negative acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement (para. 81);

in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement (para. 36).

Regarding **claim 10** Gao disclose **a method for feeding back confirmation information on a physical uplink shared channel, wherein in a situation that a user equipment fails to detect a physical downlink control channel corresponding to transmitted data in a sub-frame transmitting data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as confirmation information of this downlink sub-frame** (para. 29, 30); Gao disclose (para. 30, In a HARQ scheme generally the UE sends an ACK message (as little as one bit) to confirm receipt of the DL data and the network recognizes that the absence of such an ACK message within a certain time constraint is a NAK, indicating the UE did not receive the transmitted data. Some systems have the UE send a NAK bit to positively indicate that expected data was not received (or was not properly decoded); for further clairification Gao disclose para. 31, For FDD, since the DL and UL are symmetric (DL=UL), each DL transmission in one DL subframe will be responded by an ACK/NAK in a known UL subframe with a certain delay. Further disclose, In the case of FDD operation then, there is one to one mapping between UL subframe for ACK/NAK transmission and DL subframe for data transmission;

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes data in this downlink sub-

frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information (para. 29, 30).

Regarding **claim 11** Gao disclose **wherein in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back by the user equipment to an eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data (para. 85);**

in a situation that the data in the downlink sub-frame which transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the user equipment acquires the confirmation information corresponding to each codeword stream thereof (para. 31),

in a situation that any one or more pieces of confirmation information among the confirmation information acquired is the negative acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement (para. 81);

in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement (para. 36).

Regarding **claim 13** Gao disclose **wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame (para. 29, 30);**

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information (para. 29, 30).

Regarding **claim 14** Gao disclose **wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame (para. 29, 30);**

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative

acknowledgement message is fed back as the confirmation information (para. 29, 30).

Regarding **claim 15** Gao disclose **wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame(para. 29, 30);**

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information (para. 29, 30).

Regarding **claim 16** Gao disclose **wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame (para. 29, 30);**

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds

back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information (para. 29, 30).

5. Claims 8, 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gao et al. (U.S. Pub. 2009/0046649) in view of Kakura (U.S. Pub. 2011/0211538), further, in view of Torsner et al. (U.S. Pub. 2010/0074153).

Regarding **claim 8** Gao disclose **wherein in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame** (para. 31).

Torsner further disclose **in the situation that the number of codeword streams of the downlink sub-frames is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the number of the maximum codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value** (para. 52, 53)**;**

when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame (para. 77)**.**

Gao, Kakura and Torsner are analogous because they pertain to the field of wireless communication networks.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Torsner in the system of Gao and Kakura so the spreading rules can cover the different distributions of the sub-frames. The motivation for doing so would have been to be able to map all the feedback reports with their respective downlink sub-frames.

Regarding **claim 9** Torsner discloses **wherein in a situation that the downlink sub-frames sent by the eNodeB to the user equipment includes special sub-frames which cannot transmit data, the user equipment does not consider the special sub-frames when feeding back the confirmation information** (para. 83)**.**

Gao, Kakura and Torsner are analogous because they pertain to the field of wireless communication networks.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Torsner in the system of Gao and Kakura so the system recognizes different types of sub-frames. The motivation

for doing so would have been optimizing the wireless communication transmission protocol.

Regarding **claim 12** Gao disclose **wherein in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame** (para. 31)**.**

Torsner further disclose **in a situation that the number of the codeword streams of the downlink sub-frame is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the maximum number of the codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value** (para. 52, 53)**;**

when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame (para. 77,)**.**

Gao, Kakura and Torsner are analogous because they pertain to the field of wireless communication networks.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Torsner in the system of Gao and Kakura so the spreading rules can cover the different distributions of the sub-frames. The motivation for doing so would have been to be able to map all the feedback reports with their respective downlink sub-frames.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RAUL RIVAS whose telephone number is (571)270-5590. The examiner can normally be reached on Monday - Friday, from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on (571) 272-3179. 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.

/RR/

Examiner, Art Unit 2471

/CHI H PHAM/

Supervisory Patent Examiner, Art Unit 2471

Notice of References Cited	Application/Control No. 12/905,299	Applicant(s)/Patent Under Reexamination DAI ET AL.	
	Examiner RAUL RIVAS	Art Unit 2471	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2011/0211538	09-2011	Kakura, Yoshikazu	370/329
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

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

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

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12905299	DAI ET AL.
	Examiner	**Art Unit**
	RAUL RIVAS	2471

✓	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	07/23/2013	01/12/2014	09/23/2014						
	1	✓	✓	✓						
	2	✓	✓	✓						
	3	✓	✓	✓						
	4	✓	✓	✓						
	5	✓	✓	✓						
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	7	✓	✓	✓						
	8	✓	✓	✓						
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	10	✓	✓	✓						
	11	✓	✓	✓						
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	14	✓	✓	✓						
	15	✓	✓	✓						
	16	✓	✓	✓						

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12905299	DAI ET AL.
	Examiner	Art Unit
	RAUL RIVAS	2471

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
370	Updated Text Search, see search history	9/23/2014	RR

SEARCH NOTES		
Search Notes	Date	Examiner
Inventorship search	9/23/2014	RR
Updated Internet search	9/23/2014	RR
Updated EAST search	9/23/2014	RR
Consulted with SPE Chi Pham	9/23/2014	RR

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

/R.R./ Examiner.Art Unit 2471	

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S62	1	"12905299".rlan. or ("12".src. and "905299".ap.)	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2014/09/23 00:16
S63	478	"370/294".CCLS.	US-PGPUB; USPAT; USOCR	OR	ON	2014/09/23 00:16
S64	120	((BO) near2 (DAI)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2014/09/23 00:16
S65	52	((GUANGHUI) near2 (YU)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2014/09/23 00:16
S66	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16

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S67	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16

		6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
S68	23	S67 and ((feedback ack acknowledgement) near2 confirmat$3)	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
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S70	739	((feedback ack acknowledgement) near5 authorizat$3)	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S71	476	S70 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S72	185273	(370/335 370/329 455/561 607/31 455/517 455/436 455/450 370/328 455/562.1 455/522 375/267 370/330 607/32 370/322 370/331 455/442 370/252 714/749 455/422.1 370/332 455/450 370/329 455/62 370/347 455/562.1 455/63.1 370/331 370/328 455/509 370/322 370/341 455/464 455/67.13 455/504 455/505 370/317 455/501)".ccls"	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S73	46	S71 and S72	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S74	2	send$3 near5 (index amount) near2 sub$1frame with (feedback ack acknowledgement) with (downlink down$1link)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S75	2	WO2009022295	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S76	0	WO2009022295.PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S77	3	"20090046649", .PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S78	2	S77 AND (index amount feedback ack acknowledgement NACK downlink	US-PGPUB; USPAT;	OR	ON	2014/09/23 00:16

		down$1link UPLINK)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S79	81	map$4 near3 code$1word near5 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S80	5	S79 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S81	38684	code$1word stream near3 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S82	34568	code$1word stream near3 (feedback ack acknowledgement NACK) near down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S83	6	(code$1word near stream) near3 (feedback ack acknowledgement NACK) near6 down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S84	5	"101114868"	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2014/09/23 00:16
S85	3	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2014/09/23 00:16
S86	10	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S87	438	(ZHUO near GAO).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S88	24	(Feedback fed$1back) near2 codeword with down$1link	US-PGPUB; USPAT; USOCR;	OR	ON	2014/09/23 00:16

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S89	126	((sub$1frame near2 data)(special near2 sub$1frame)) near5 feedback	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S90	11	S89 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S91	1	"12905299".rlan. or ("12".src. and "905299".ap.)	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2014/09/23 00:16
S92	478	"370/294".CCLS.	US-PGPUB; USPAT; USOCR	OR	ON	2014/09/23 00:16
S93	120	((BO) near2 (DAI)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2014/09/23 00:16
S94	52	((GUANGHUI) near2 (YU)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2014/09/23 00:16
S95	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16

		4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
S96	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16

		6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
S97	23	S96 and ((feedback ack acknowledgement) near2 confirmat$3)	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S98	18	S97 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S99	739	((feedback ack acknowledgement) near5 authorizat$3)	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S100	476	S99 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S101	185273	(370/335 370/329 455/561 607/31 455/517 455/436 455/450 370/328 455/562.1 455/522 375/267 370/330 607/32 370/322 370/331 455/442 370/252 714/749 455/422.1 370/332 455/450 370/329 455/62 370/347 455/562.1 455/63.1 370/331 370/328 455/509 370/322 370/341 455/464 455/67.13 455/504 455/505 370/317 455/501)".ccls"	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S102	46	S100 and S101	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S103	2	send$3 near5 (index amount) near2 sub$1frame with (feedback ack acknowledgement) with (downlink down$1link)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S104	2	WO2009022295	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S105	0	WO2009022295.PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S106	3	"20090046649", .PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2014/09/23 00:16

			IBM_TDB			
S107	2	S106 AND (index amount feedback ack acknowledgement NACK downlink down$1link UPLINK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S108	81	map$4 near3 code$1word near5 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S109	5	S108 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S110	38684	code$1word stream near3 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S111	34568	code$1word stream near3 (feedback ack acknowledgement NACK) near down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S112	6	(code$1word near stream) near3 (feedback ack acknowledgement NACK) near6 down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S113	5	"101114868"	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2014/09/23 00:16
S114	3	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2014/09/23 00:16
S115	10	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S116	438	(ZHUO near GAO).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16

S117	24	(Feedback fed$1back) near2 codeword with down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S118	126	((sub$1frame near2 data)(special near2 sub$1frame)) near5 feedback	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S119	11	S118 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2014/09/23 00:16
S120	4	("20030169701" "20040224697").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 00:16
S121	13726	(uplink) near5 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 01:51
S122	212	(uplink) near5 (feedback ack acknowledgement NACK) near7 bundl$5	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 01:53
S123	7	S122 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2014/09/23 01:53
S124	39	(uplink) with (feedback ack acknowledgement NACK) with bundl$5 with ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 03:38
S125	0	S124 and (@ay <"2009") not S122	US-PGPUB; USPAT	OR	ON	2014/09/23 03:38
S126	45	(uplink) with (feedback ack acknowledgement NACK) with bundl$5 same ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 03:39
S127	0	S126 and (@ay <"2009") not S122	US-PGPUB; USPAT	OR	ON	2014/09/23 03:39
S128	195	((uplink) with (feedback ack acknowledgement NACK) with bundl$5)and ((Physical adj uplink adj Shared	US-PGPUB; USPAT; USOCR;	OR	ON	2014/09/23 03:39

		adj Channel) or (PuSCH))	FPRS; EPO; JPO; DERWENT; IBM_TDB			
S129	0	S128 and (@ay <"2009") not S122	US-PGPUB; USPAT	OR	ON	2014/09/23 03:39
S130	0	S128 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2014/09/23 03:39
S131	2812	((uplink) with (feedback ack acknowledgement NACK (FEED$3 adj BACK))) same ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 03:41
S132	227	S131 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2014/09/23 03:41
S133	1959	((uplink) with (feedback ack acknowledgement NACK (FEED$3 adj BACK))) with ((Physical adj uplink adj Shared adj Channel) or (PuSCH))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/09/23 03:42
S134	148	S133 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2014/09/23 03:42

EAST Search History (Interference)

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9/23/2014 7:57:07 PM
C:\Users\rrivas\Documents\EAST\Workspaces\2012\12905299 - Dai - FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL.wsp

Form PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY DOCKET NO. 6284.00013 / P34599ZTE	SERIAL NO. 12/905,299
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	APPLICANT: Bo DAI et al.	
	FILING DATE October 15, 2010	GROUP 2471

U.S. PATENT DOCUMENTS

Examiner Initial	Document No.	Date	Name	Class	Sub-Class	Filing Date

FOREIGN PATENT DOCUMENTS

	Document No.	Date	Country	Class	Sub-Class	Transl.	
						Yes	No

OTHER DOCUMENTS (Incl. Author, Title, Date, Pertinent Pages, etc.)

	Ericsson, "Details of ACK/NAK Bundling for TDD", 3GPP Draft; R1-081528, vol. RAN WGI, no. Shenzhen, China; 20080327, 27 March 2008 (2008-03-27), 4 pages.
	Ericsson et al, "Uplink ACK/NACK Timing for TDD", 3GPP Draft; R1-081542, vol. RAN WGI, 27 March 2008 (2008-03-27), 4 pages.
	Ericsson, "Uplink Transmission of ACK/NACK for E-UTRA TDD", 3GPP Draft; R1-071894 vol. RAN WGI, 17 April 2007 (2007-04-17), 3 pages.
	LG Electronics, "Handling Problem with Uplink ACK/NACK Bundling", 3GPP Draft; R1-081256, vol. RAN WGI, no. Shenzhen, China; 20080326, 26 March 2008 (2008-03-26), 4 pages.

Examiner	/Raul Rivas/ (09/23/2014)	Date Considered

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Bo DAI et al.
Serial No.:	12/905,299
Title:	METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
Filed:	October 15, 2010
Attorney Docket No.:	6284.00013 / P34599ZTE
Examiner:	Rivas, Raul
Art Unit:	2471
In Response To:	Office Action mailed January 14, 2014

REQUEST FOR CONTINUED EXAMINATION (RCE)
UNDER 37 C.F.R. § 1.114 OF THE ABOVE-IDENTIFIED APPLICATION

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

Sir:

1. Submission required under 37 C.F.R. § 1.114
   a. [X] Previously submitted
      i. [X] Consider the amendment(s)/reply under 37 C.F.R. § 1.116 previously filed on March 17, 2014.
      ii. [ ] Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____.
      iii. [ ] Other _____.

   b. [X] Enclosed
      i. [ ] Amendment/Reply
      ii. [ ] Affidavit(s)/Declaration(s)
      iii. [X] Information Disclosure Statement (IDS)
      iv. [ ] Other _____.

2. Miscellaneous
   a. [ ] Suspension of action on the above-identified application is requested under 37 C.F.R. § 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 C.F.R. § 1.17(i) **required**).

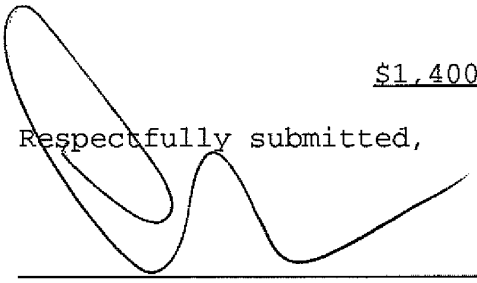
b. [ ] Other _____.

3. [X] Filing fee of $1,200.00 paid during on-line filing.

4. [X] Applicant also requests a one month extension of time for $200.00 .

5. Total Filing Fee - $1,400.00

Respectfully submitted,



By _____

Date: May 14, 2014

Christopher P. Maiorana (42,829)
CHRISTOPHER P. MAIORANA, P.C.
24840 Harper Avenue, Suite 100
St. Clair Shores, MI 48080
(586) 498-0670

Attorney Docket No.: 6284.00013

Form PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY DOCKET NO. 6284.00013 / P34599ZTE	SERIAL NO. 12/905,299
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	APPLICANT: Bo DAI et al.	
	FILING DATE October 15, 2010	GROUP 2471

U.S. PATENT DOCUMENTS

Examiner Initial	Document No.	Date	Name	Class	Sub-Class	Filing Date

FOREIGN PATENT DOCUMENTS

	Document No.	Date	Country	Class	Sub-Class	Transl.	
						Yes	No

OTHER DOCUMENTS (Incl. Author, Title, Date, Pertinent Pages, etc.)

	Ericsson, "Details of ACK/NAK Bundling for TDD", 3GPP Draft; R1-081528, vol. RAN WGI, no. Shenzhen, China; 20080327, 27 March 2008 (2008-03-27), 4 pages.
	Ericsson et al, "Uplink ACK/NACK Timing for TDD", 3GPP Draft; R1-081542, vol. RAN WGI, 27 March 2008 (2008-03-27), 4 pages.
	Ericsson, "Uplink Transmission of ACK/NACK for E-UTRA TDD", 3GPP Draft; R1-071894 vol. RAN WGI, 17 April 2007 (2007-04-17), 3 pages.
	LG Electronics, "Handling Problem with Uplink ACK/NACK Bundling", 3GPP Draft; R1-081256, vol. RAN WGI, no. Shenzhen, China; 20080326, 26 March 2008 (2008-03-26), 4 pages.

Examiner	Date Considered

Examiner: Initial if references 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.

Electronic Patent Application Fee Transmittal

Application Number:	12905299
Filing Date:	15-Oct-2010
Title of Invention:	METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
First Named Inventor/Applicant Name:	Bo Dai
Filer:	Christopher P. Maiorana/Mary Donna Berkley
Attorney Docket Number:	6284.00013/P34599ZTE

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 1 month with $0 paid	1251	1	200	200

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for Continued Examination	1801	1	1200	1200
		Total in USD ($)		**1400**

Electronic Acknowledgement Receipt	
EFS ID:	19026584
Application Number:	12905299
International Application Number:	
Confirmation Number:	7676
Title of Invention:	METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
First Named Inventor/Applicant Name:	Bo Dai
Customer Number:	21615
Filer:	Christopher P. Maiorana/Mary Donna Berkley
Filer Authorized By:	Christopher P. Maiorana
Attorney Docket Number:	6284.00013/P34599ZTE
Receipt Date:	14-MAY-2014
Filing Date:	15-OCT-2010
Time Stamp:	10:43:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1400
RAM confirmation Number	7603
Deposit Account	
Authorized User	

File Listing:

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

1		12905299_rcetransmittal_051414.pdf	1019092 02e15f057ca4d94d8d5bed8e29a998500c57f57c	yes	18

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Request for Continued Examination (RCE)	1	2
	Information Disclosure Statement (IDS) Form (SB08)	3	3
	Non Patent Literature	4	18

Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32537 edb4eac4da2e801239e08ce8dd433a51c49b189a	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1051629		

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

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

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

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/905,299	10/15/2010	Bo Dai	6284.00013/P34599ZTE	7676

21615 7590 04/02/2014
CHRISTOPHER P. MAIORANA, P.C.
24840 HARPER SUITE 100
ST. CLAIR SHORES, MI 48080

EXAMINER	
RIVAS, RAUL	
ART UNIT	**PAPER NUMBER**
2471	
MAIL DATE	**DELIVERY MODE**
04/02/2014	PAPER

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

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

Advisory Action Before the Filing of an Appeal Brief	**Application No.** 12/905,299	**Applicant(s)** DAI ET AL.	
	Examiner RAUL RIVAS	**Art Unit** 2471	**AIA (First Inventor to File) Status** No

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

THE REPLY FILED 17 March 2014 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☒ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:
   a) ☒ The period for reply expires *3* months from the mailing date of the final rejection.
   b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
   c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection. The current period for reply expires months from the mailing date of *the prior Advisory Action* or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.
   Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANT'S FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☒ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   a) ☒ They raise new issues that would require further consideration and/or search (see NOTE below);
   b) ☐ They raise the issue of new matter (see NOTE below);
   c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.
   NOTE: *See Continuation Sheet*. (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☒ For purposes of appeal, the proposed amendment(s): (a) ☒ will not be entered, or (b) ☐ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.
9. ☐ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
10. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
11. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. ☐ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: _____.
13. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
14. ☐ Other: _____.

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:
    Claim(s) allowed: .
    Claim(s) objected to: .
    Claim(s) rejected: .
    Claim(s) withdrawn from consideration: .

/CHI PHAM/ Supervisory Patent Examiner, Art Unit 2471	/R. R./ Examiner, Art Unit 2471

Continuation of 3. NOTE: The newly amended idependent claims 1 and 10 require further search and/or consideration..

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Bo DAI et al.
Serial No.:	12/905,299
Title:	METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
Filed:	October 15, 2010
Attorney Docket No.:	6284.00013 / P34599ZTE
Examiner:	Rivas, Raul
Art Unit:	2471
In Response To:	Office Action mailed January 14, 2014

AMENDMENT AFTER FINAL

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

Sir:

In response to the Office Action mailed January 14, 2014, please amend the above-identified application as follows:

AMENDMENTS TO THE CLAIMS

1. (CURRENTLY AMENDED) A method for feeding back confirmation information on a physical uplink shared channel, which is used for enabling a user equipment to feed back to an eNodeB whether data of a downlink sub-frame is correctly received in a situation that a number of the downlink sub-frames is greater than a number of uplink sub-frames in a time division duplex system, wherein the method comprises:

the eNodeB carries, in downlink control information, a number value of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame, and transmits data on a plurality of continuous downlink sub-frames after the sub-frame carrying the downlink control information, wherein the number of the downlink sub-frames which transmit the data is equal to a ~~an~~ number of the downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame;

after the user equipment receives the downlink sub-frame which carries the downlink control information, the data is received from the downlink sub-frame which transmits the data after this downlink sub-frame, and the confirmation information of receiving the data ~~received~~ is fed back together with uplink data

to the eNodeB through a physical uplink shared channel through an uplink sub-frame.

2. (ORIGINAL) The method according to Claim 1, wherein the eNodeB uses a signaling in the downlink control information for representing an index of the uplink sub-frame for transmitting uplink data in the situation that the number of the downlink sub-frames is smaller than the number of the uplink sub-frames to carry the number of the downlink sub-frames corresponding to the confirmation information which is fed back by the one uplink sub-frame.

3. (ORIGINAL) The method according to Claim 1, wherein the eNodeB determines a set of number values of all the downlink sub-frames corresponding to information which is fed back by the one uplink sub-frame according to a configuration pattern for the current number of downlink/uplink sub-frames, and selects corresponding number values from the set according to an amount of the data actually required to be transmitted to be carried in the downlink control information.

4. (ORIGINAL) The method according to Claim 1, wherein the eNodeB sends a control signaling associated with the allocation of the physical uplink shared channel on a first downlink sub-frame

in the downlink sub-frames corresponding to the confirmation information fed back by the uplink sub-frame.

5. (ORIGINAL) The method according to Claim 1, wherein in the uplink sub-frames fed back to the eNodeB, the user equipment, according to the order of serial numbers of the received downlink sub-frames which transmit the data, receives each downlink sub-frame which transmits the data and feeds back corresponding confirmation information.

6. (ORIGINAL) The method according to Claim 1, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

7. (ORIGINAL) The method according to Claim 6, wherein

in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back by the user equipment to the eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data;

in a situation that the data in the downlink sub-frame that transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the user equipment acquires the confirmation information corresponding to each codeword stream thereof, in a situation that any one or more pieces of confirmation information among the confirmation information acquired is the negative acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement; in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement.

8. (ORIGINAL) The method according to Claim 6, wherein

in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a

maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame;

in the situation that the number of codeword streams of the downlink sub-frames is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the number of the maximum codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value;

when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame.

9. (ORIGINAL) The method according to Claim 1, wherein in a situation that the downlink sub-frames sent by the eNodeB to the user equipment includes special sub-frames which cannot transmit data, the user equipment does not consider the special sub-frames when feeding back the confirmation information.

10. (CURRENTLY AMENDED) A method for feeding back confirmation information on a physical uplink shared channel, wherein, when the confirmation information is fed back together with uplink data on the physical uplink shared channel, in a situation that a user equipment fails to detect a physical downlink control channel corresponding to transmitted data in a sub-frame transmitting data, ~~or fails to receive the data thereof,~~ the user equipment feeds back a negative acknowledgement message as confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

11. (ORIGINAL) The method according to Claim 10, wherein

in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back by the user equipment to an eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data;

in a situation that the data in the downlink sub-frame which transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the user equipment acquires the confirmation information corresponding to each codeword stream thereof, in a situation that any one or more pieces of confirmation information among the confirmation information acquired is the negative acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement; in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement.

12. (ORIGINAL) The method according to Claim 10, wherein

in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame;

in a situation that the number of the codeword streams of the downlink sub-frame is smaller than the maximum number of the

codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the maximum number of the codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value;

when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame.

13. (ORIGINAL) The method according to Claim 2, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative

acknowledgement message is fed back as the confirmation information.

14. (ORIGINAL) The method according to Claim 3, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

15. (ORIGINAL) The method according to Claim 4, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame;

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

16. (ORIGINAL) The method according to Claim 5, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

R E M A R K S

The first Office Action mailed on January 14, 2014, has been carefully considered. Reconsideration in view of the following remarks is respectfully requested.

AMENDMENTS/ARGUMENTS CONCERNING REJECTIONS UNDER 35 U.S.C.§102

Claims 1-7, 10, 11 and 13-16 were rejected under 35 U.S.C. 102(b) as being anticipated by *Gao* et al. (U.S. Pub. 2009/0046649), of which Claims 1 and 10 are independent claims. This Rejection is respectfully traversed based on at least following reasons.

As per Claim 1

Firstly, applicant replaces "the confirmation information received is fed back to the eNodeB through a physical uplink shared channel through an uplink sub-frame" with "the confirmation information **of receiving the data** is fed back **together with uplink data** to the eNodeB through a physical uplink shared channel through an uplink sub-frame" in Claim 1 of present application, and makes corresponding amendments on Claim 10 of present application. Support for above amendments can be found at the first paragraph of "Detailed Description of Embodiments" of original description.

Secondly, para.0036 of *Gao* discloses "receiving acknowledgements from the user equipments to which the scheduling

grants were sent", and para.0061 of *Gao* discloses "The ACK for the ith DL group is sent through the ith UL ACK PRB". As disclosed above, what are sent from the user equipment are the acknowledgements to the scheduling grants, but not the acknowledgements to whether data of a downlink sub-frame is correctly received. Thus, Gao does not disclose the technical feature 1) "**which is used for enabling a user equipment to feed back to an eNodeB whether data of a downlink sub-frame is correctly received**" in amended Claim 1 of present application.

Further, as disclosed above by Gao, **only the acknowledgements** are fed back by the user equipment. In other words, in Gao, **the acknowledgements can not be fed back together with uplink data through the same channel**.

On the contrary, amended Claim 1 of present application states the technical feature 2) "the confirmation information **of receiving the data** is fed back **together with uplink data** to the eNodeB through a physical uplink shared channel through an uplink sub-frame". As stated above, both the confirmation information and the uplink data are fed back through the same physical uplink shared channel, which is different from the disclosure that **only the acknowledgements** are fed back by the user equipment in Gao.

Thus, it is submitted that Gao does not disclose the technical feature 2) "the confirmation information **of receiving the**

data is fed back **together with uplink data** to the eNodeB through a physical uplink shared channel through an uplink sub-frame" in amended Claim 1 of present application.

Moreover, para.0036 of Gao discloses "a radio of number of downlink subframes exceeding number of uplink subframes in a frame...mapping all of the multiple acknowledgements received in the single uplink subframe to the downlink subframes of the group that maps to the single uplink subframe according to the predetermined grouping for the corresponding ratio". As disclosed above, what is considered for mapping downlink subframes is **the radio of number of downlink subframes exceeding number of uplink subframes in a frame, but not the number of downlink subframes themselves**. Further, **Gao merely discloses that the radio can be used for mapping the downlink subframes, but not teach the radio or the number of the downlink subframes corresponds to the confirmation information fed back by the one uplink sub-frame**.

Thus, the radio of number of downlink subframes exceeding number of uplink subframes in a frame in Gao does not equal to number of the downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame in amended Claim 1 of present application.

Further, as disclosed above at para.0036 and 0061 in Gao, the skilled person in the art can know that what are sent from the user equipment are the acknowledgements to the scheduling grants,

and there is corresponding relationship between the downlink sub-frame and uplink sub-frame. However, Gao does not mention how to transmit and receive the scheduling grants. For example, **the skilled person in the art can not know from Gao which downlink sub-frames and how many downlink sub-frames are used to transmit the scheduling grants, and correspondingly, the user equipment can not know which downlink sub-frames and how many downlink sub-frames are used to receive the scheduling grants**.

On the contrary, amended Claim 1 of present application states the technical feature 3) "the eNodeB carries, in downlink control information, a number value of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame, and transmits data on a plurality of continuous downlink sub-frames after the sub-frame carrying the downlink control information" and 4) "wherein the number of the downlink sub-frames which transmit the data is equal to a number of the downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame".

In above technical feature 3) and 4), the eNodeB carries in downlink control information **a number value of the downlink sub-frame, and** further, the data are transmitted on **a plurality of continuous downlink sub-frames after the sub-frame carrying the downlink control information**, wherein **the number of the downlink sub-frames which transmit the data is equal to a number of the**

downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame. Based on above relationship among the number of **the downlink sub-frame carried in the** downlink control information**, the** downlink control information and **the number of the downlink sub-frames which transmit the data,** the eNodeB can inform the user equipment how many downlink sub-frames are used to transmit the data (i.e., a number value of the downlink sub-frame) and the position of the downlink sub-frames which transmit data (i.e., continuous downlink sub-frames after the sub-frame carrying the downlink control information), which are both not disclosed by Gao.

Thus, it is submitted that Gao does not disclose the technical feature 3) and 4) in amended Claim 1 of present application.

To sum up, amended Claim 1 of present application can not be anticipated by Gao. Withdrawal of the rejections to Claim 1 is respectfully requested.

As per Claim 10

As per Claim 10, applicant incorporates the technical feature "when the confirmation information is fed back together with uplink data on the physical uplink shared channel" into Claim 10, and remove the expression "or fails to receive the data

thereof". Support for above amendments can be found by original Claim 10.

Further, para.0030 of Gao discloses "In a HARQ scheme generally the UE sends an ACK message to confirm receipt of the DL data and the network recognizes that the absence of such an ACK message within a certain time constraint is a NAK, indicating the UE did not receive the transmitted data". That is, Gao merely discloses that the ACK message is sent as the receipt of the DL data. However, Gao fails to teach that the UE will detect the physical downlink control channel and analyze data in this downlink sub-frame before sending the ACK message. Further, Gao also does not teach the situation in which the NACK is sent. In other words, the NACK in Gao merely indicates that the data is not received and the ACK in Gao merely indicates that the data is received, but can not indicate the result of detecting the physical downlink control channel and analyzing data in this downlink sub-frame.

On the contrary, Claim 10 of present application defines the situation in which the negative acknowledgement message is fed back and the situation in which acknowledgement message is fed back. In above situations in which acknowledgement message or negative acknowledgement message is fed back, the user equipment performs the operation of detecting the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, and/or the operation of analyzing data in

this downlink sub-frame in Claim 10 of present application, which are not disclosed by Gao.

Thus, Gao does not disclose the technical feature "wherein, when the confirmation information is fed back together with uplink data on the physical uplink shared channel, in a situation that a user equipment fails to detect a physical downlink control channel corresponding to transmitted data in a sub-frame transmitting data, the user equipment feeds back a negative acknowledgement message as confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information" in Claim 10 of present application.

To sum up, amended Claim 10 of present application can not be anticipated by Gao. Withdrawal of the rejections to Claim 10 is respectfully requested.

On the basis that Claim 1 and 10 are patentable over *Gao*, also for at least the reasons set forth above, claims 2-7, 11 and 13-16, which are dependent from Claim 1 and 10, is patentable over *Gao*.

ARGUMENTS CONCERNING REJECTIONS UNDER 35 U.S.C.§103

Claims 8, 9 and 12 were rejected under 35 U.S.C. 103(a) as being unpatentable over *Gao* et al. (U.S. Pub. 2009/0046649) in view of *Torsner* et al. (U.S. Pub. 2010/0074153).

Examiner merely uses *Torsner* to judge additional technical features in Claims 8, 9 and 12, instead of the technical feature in their respective independent claim, such as, above technical feature 1)-4) in Claim 1 of present application. In other words, examiner does point out which part of *Torsner* discloses above technical feature 1)-4) in Claim 1 of present application.

Thus, it is submitted that *Torsner* does not disclose above technical feature 1)-4) in Claim 1 of present application. Dependent Claims 8, 9 and 12 should also be allowable accordingly for at least the reasons discussed previously with respect to their respective independent claim. Withdrawal of the 35 U.S.C.§¡ì103(a) rejections of dependent Claims is respectfully requested.

Respectfully submitted,

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Dated: March 17, 2014

Docket No.: 6284.00013

Electronic Acknowledgement Receipt	
EFS ID:	18492616
Application Number:	12905299
International Application Number:	
Confirmation Number:	7676
Title of Invention:	METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
First Named Inventor/Applicant Name:	Bo Dai
Customer Number:	21615
Filer:	Christopher P. Maiorana/Mary Donna Berkley
Filer Authorized By:	Christopher P. Maiorana
Attorney Docket Number:	6284.00013/P34599ZTE
Receipt Date:	17-MAR-2014
Filing Date:	15-OCT-2010
Time Stamp:	14:09:10
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Response After Final Action	12905299_amendment_031714.pdf	648341 94a1b61d30ba1686009cf99565f089864a6d0b54	no	19
Warnings:					
Information:					

Total Files Size (in bytes):	648341

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

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

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

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

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/905,299	Filing Date 10/15/2010	☐ 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

AMENDMENT	03/17/2014	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 16	Minus	** 20	= 0	X $80 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $420 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

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

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/JACQUELYN WILLIAMS/

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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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/905,299	10/15/2010	Bo Dai	6284.00013/P34599ZTE	7676

21615 7590 01/14/2014

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EXAMINER	
RIVAS, RAUL	
ART UNIT	**PAPER NUMBER**
2471	
MAIL DATE	**DELIVERY MODE**
01/14/2014	PAPER

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

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

Office Action Summary	Application No. 12/905,299	Applicant(s) DAI ET AL.	
	Examiner RAUL RIVAS	Art Unit 2471	AIA (First Inventor to File) Status No

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

Period for Reply

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

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

Status

1)☒ Responsive to communication(s) filed on *10/23/2013*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

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

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-16* 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) *1-16* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

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

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

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

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

Priority under 35 U.S.C. § 119

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

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

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

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

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

4) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the Applicant's amendments filed on October 23rd, 2013.

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

Response to Arguments

3. Applicant's arguments filed October 23rd, 2013 have been fully considered but they are not persuasive.

4. A. Applicant's argument with respect to claim 1 has misconstrued the examiner's position regarding **physical uplink shared channel**. Although the term PUSCH (physical uplink shared channel) is not mentioned literally by the reference, the reference does describe the general principle of the concept that it is being discussed; for further clarification, Gao teaches an uplink scheduling grant indicates an identifier for the UE or UE group to which the subframe is being granted, and a hybrid ACK is used (up to one bit per transport block) for the allocated UE to respond with an ACK/NAK bit (See para. 26). Thus Gao still meet the scope of the limitations as currently claimed.

B. Regarding the position with respect to claim 1 regarding **downlink control information**. For further clarification Gao also teach **downlink control information**, para. 27, downlink control signaling informs UE(s) what resources and respective transmission formats have been allocated. The scheduler can instantaneously choose the best multiplexing strategy from the available methods; e.g. frequency localized or frequency distributed transmission. Thus Gao still meet the scope of the limitations as currently claimed.

C. In response to applicant's argument regarding the **number value of the downlink sub-frame.** Gao disclose **the eNodeB carries, in downlink control information, a number value of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame, and transmits data on a plurality of continuous downlink sub-frames after the sub-frame carrying the downlink control information** (para. 36, Fig. 1). The Examiner notes that in order to be able to map the downlink subframes to the uplink subframe it has to be present a reference value that indicates the correct mapping policy or schedule; for further clarification Gao also teach para. 61, There being N groups of DL subframes, the N ACK PRBs may then be indexed to the N groups of DL subframes. The ACK for the ith DL group is sent through the ith UL ACK PRB. For UEs in the same DL group, their UL ACK/NACK resource is implicitly determined by the control channel index in this DL group or explicitly signaled. para. 65, then there are a total of five UL ACK/NAK PRBs reserved. Then the DL subframes are divided into N=5 groups according to the first embodiment. Each DL subframe is in one group, and there is one

to one mapping. One of ordinary skill in the art at the time of the invention would clearly understand Gao to teach the physical uplink shared channel, downlink control information and a number value of the downlink subframe. Thus Gao still meet the scope of the limitations.

D. In response to applicant's argument regarding that Gao targets different technical problem and involves different technical solution from the present application, thus Gao cannot anticipate the present application, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See In re Van Geuns, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Thus Gao still meet the scope of the limitations.

E. Applicant's argument with respect to claim 10 pointing out the argument of claim 6, has misconstrued the examiner's position regarding **the user equipment feeds back a negative acknowledgement message.** Gao disclose (para. 30, In a HARQ scheme generally the UE sends an ACK message (as little as one bit) to confirm receipt of the DL data and the network recognizes that the absence of such an ACK message within a certain time constraint is a NAK, indicating the UE did not receive the

transmitted data. Some systems have the UE send a NAK bit to positively indicate that expected data was not received (or was not properly decoded); for further clairification Gao disclose para. 31, For FDD, since the DL and UL are symmetric (DL=UL), each DL transmission in one DL subframe will be responded by an ACK/NAK in a known UL subframe with a certain delay. Further disclose, In the case of FDD operation then, there is one to one mapping between UL subframe for ACK/NAK transmission and DL subframe for data transmission. One of ordinary skill in the art at the time of the invention would clearly understand Gao to teach end a negative acknowledge bit (NAK bit) to positively indicate that expected data was not received. Thus Gao still meet the scope of the limitations.

Claim Rejections – 35 USC § 102

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

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1–7, 10, 11 and 13–16 are rejected under 35 U.S.C. 102(b) as being anticipated by Gao et al. (U.S. Pub. 2009/0046649).

Regarding **claim 1** Gao disclose **a method for feeding back confirmation information on a physical uplink shared channel, which is used for enabling a user equipment to feed back to an eNodeB whether data of a downlink sub-frame is correctly received in a situation that a number of the downlink sub-frames is greater than a number of uplink sub-frames in a time division duplex system, wherein the method comprises** (para. 34, Fig. 1)**:**

the eNodeB carries, in downlink control information, a number value of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame, and transmits data on a plurality of continuous downlink sub-frames after the sub-frame carrying the downlink control information, wherein the number of the downlink sub-frames which transmit the data is equal to an number of the downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame (para. 36, Fig. 1); The Examiner notes that although the term PUSCH (physical uplink shared channel) is not mentioned literally by the reference, the reference does describe the general principle of the concept that it is being discussed; for further clarification, Gao teaches an uplink scheduling grant indicates an identifier for the UE or UE group to which the subframe is being granted, and a hybrid ACK is used (up to one bit per transport block) for the allocated UE to respond with an ACK/NAK bit (See para. 26)**;**

after the user equipment receives the downlink sub-frame which carries the downlink control information, the data is received from the downlink sub-frame which transmits the data after this downlink sub-frame, and the confirmation

information received is fed back to the eNodeB through a physical uplink shared channel through an uplink sub-frame (para. 61); for further clarification Gao also teach para. 27, downlink control signaling informs UE(s) what resources and respective transmission formats have been allocated. The scheduler can instantaneously choose the best multiplexing strategy from the available methods; e.g. frequency localized or frequency distributed transmission**.**

Regarding **claim 2** Gao disclose **wherein the eNodeB uses a signaling in the downlink control information for representing an index of the uplink sub-frame for transmitting uplink data in the situation that the number of the downlink sub-frames is smaller than the number of the uplink sub-frames to carry the number of the downlink sub-frames corresponding to the confirmation information which is fed back by the one uplink sub-frame** (para. 30, 31)**.**

Regarding **claim 3** Gao disclose **wherein the eNodeB determines a set of number values of all the downlink sub-frames corresponding to information which is fed back by the one uplink sub-frame according to a configuration pattern for the current number of downlink/uplink sub-frames, and selects corresponding number values from the set according to an amount of the data actually required to be transmitted to be carried in the downlink control information** (para. 61, 62)**.**

Regarding **claim 4** Gao disclose **wherein the eNodeB sends a control signaling associated with the allocation of the physical uplink shared channel on**

a first downlink sub-frame in the downlink sub-frames corresponding to the confirmation information fed back by the uplink sub-frame (para. 64)**.**

Regarding **claim 5** Gao disclose **wherein in the uplink sub-frames fed back to the eNodeB, the user equipment, according to the order of serial numbers of the received downlink sub-frames which transmit the data, receives each downlink sub-frame which transmits the data and feeds back corresponding confirmation information** (para. 61)**.**

Regarding **claim 6** Gao disclose **wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame** (para. 29, 30)**;**

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information (para. 29, 30); Gao disclose (para. 30, In a HARQ scheme generally the UE sends an ACK message (as little as one bit) to confirm receipt of the DL data and the network recognizes that the absence of such an ACK message within a certain time constraint is a NAK, indicating the UE did

not receive the transmitted data. Some systems have the UE send a NAK bit to positively indicate that expected data was not received (or was not properly decoded); for further clairification Gao disclose para. 31, For FDD, since the DL and UL are symmetric (DL=UL), each DL transmission in one DL subframe will be responded by an ACK/NAK in a known UL subframe with a certain delay. Further disclose, In the case of FDD operation then, there is one to one mapping between UL subframe for ACK/NAK transmission and DL subframe for data transmission.

Regarding **claim 7** Gao disclose **wherein in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back by the user equipment to the eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data** (para. 85);

in a situation that the data in the downlink sub-frame that transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the user equipment acquires the confirmation information corresponding to each codeword stream thereof (para. 31),

in a situation that any one or more pieces of confirmation information among the confirmation information acquired is the negative acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement (para. 81);

in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement (para. 36).

Regarding **claim 10** Gao disclose **a method for feeding back confirmation information on a physical uplink shared channel, wherein in a situation that a user equipment fails to detect a physical downlink control channel corresponding to transmitted data in a sub-frame transmitting data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as confirmation information of this downlink sub-frame** (para. 29, 30); Gao disclose (para. 30, In a HARQ scheme generally the UE sends an ACK message (as little as one bit) to confirm receipt of the DL data and the network recognizes that the absence of such an ACK message within a certain time constraint is a NAK, indicating the UE did not receive the transmitted data. Some systems have the UE send a NAK bit to positively indicate that expected data was not received (or was not properly decoded); for further clairification Gao disclose para. 31, For FDD, since the DL and UL are symmetric (DL=UL), each DL transmission in one DL subframe will be responded by an ACK/NAK in a known UL subframe with a certain delay. Further disclose, In the case of FDD operation then, there is one to one mapping between UL subframe for ACK/NAK transmission and DL subframe for data transmission;

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes data in this downlink sub-

frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information (para. 29, 30).

Regarding **claim 11** Gao disclose **wherein in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back by the user equipment to an eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data (para. 85);**

in a situation that the data in the downlink sub-frame which transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the user equipment acquires the confirmation information corresponding to each codeword stream thereof (para. 31),

in a situation that any one or more pieces of confirmation information among the confirmation information acquired is the negative acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement (para. 81);

in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement (para. 36).

Regarding **claim 13** Gao disclose **wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame (para. 29, 30);**

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information (para. 29, 30).

Regarding **claim 14** Gao disclose **wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame (para. 29, 30);**

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative

acknowledgement message is fed back as the confirmation information (para. 29, 30).

Regarding **claim 15** Gao disclose **wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame(para. 29, 30);**

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information (para. 29, 30).

Regarding **claim 16** Gao disclose **wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame (para. 29, 30);**

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds

back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information (para. 29, 30).

Claim Rejections – 35 USC § 103

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

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 8, 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gao et al. (U.S. Pub. 2009/0046649) in view of Torsner et al. (U.S. Pub. 2010/0074153).

Regarding **claim 8** Gao disclose **wherein in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame** (para. 31).

Torsner further disclose **in the situation that the number of codeword streams of the downlink sub-frames is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the number of the maximum codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value** (para. 52, 53)**;**

when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame (para. 77)**.**

Gao and Torsner are analogous because they pertain to the field of wireless communication networks.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Torsner in the system of Gao so the spreading rules can cover the different distributions of the sub-frames. The motivation for doing so would have been to be able to map all the feedback reports with their respective downlink sub-frames.

Regarding **claim 9** Torsner discloses **wherein in a situation that the downlink sub-frames sent by the eNodeB to the user equipment includes special sub-frames which cannot transmit data, the user equipment does not consider the special sub-frames when feeding back the confirmation information** (para. 83)**.**

Gao and Torsner are analogous because they pertain to the field of wireless communication networks.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Torsner in the system of Gao so the system recognizes different types of sub-frames. The motivation for doing so would have been optimizing the wireless communication transmission protocol.

Regarding **claim 12** Gao disclose **wherein in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the**

confirmation information of the codeword stream of a corresponding downlink sub-frame (para. 31)**.**

Torsner further disclose **in a situation that the number of the codeword streams of the downlink sub-frame is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the maximum number of the codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value** (para. 52, 53)**;**

when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame (para. 77,)**.**

Gao and Torsner are analogous because they pertain to the field of wireless communication networks.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Torsner in the system of Gao so the spreading rules can cover the different distributions of the sub-frames. The motivation for doing so would have been to be able to map all the feedback reports with their respective downlink sub-frames.

Conclusion

9. THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RAUL RIVAS whose telephone number is (571)270-5590. The examiner can normally be reached on Monday - Friday, from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on (571) 272-3179. 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.

/RR/

Examiner, Art Unit 2471

/CHI PHAM/

Supervisory Patent Examiner, Art Unit 2471

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	"12905299".rlan. or ("12".src. and "905299".ap.)	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2014/01/12 13:54
L2	448	"370/294".CCLS.	US-PGPUB; USPAT; USOCR	OR	ON	2014/01/12 13:54
L3	99	((BO) near2 (DAI)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2014/01/12 13:54
L4	44	((GUANGHUI) near2 (YU)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2014/01/12 13:54
L5	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or	US-PGPUB; USPAT	OR	ON	2014/01/12 13:54

		US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
L6	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-	US-PGPUB; USPAT	OR	ON	2014/01/12 13:54

		6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
L7	23	L6 and ((feedback ack acknowledgement) near2 confirmat$3)	US-PGPUB; USPAT	OR	ON	2014/01/12 13:54
L8	18	L7 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2014/01/12 13:54
L9	650	((feedback ack acknowledgement) near5 authorizat$3)	US-PGPUB; USPAT	OR	ON	2014/01/12 13:54
L10	456	L9 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2014/01/12 13:54
L11	166607	(370/335 370/329 455/561 607/31 455/517 455/436 455/450 370/328 455/562.1 455/522 375/267 370/330 607/32 370/322 370/331 455/442 370/252 714/749 455/422.1 370/332 455/450 370/329 455/62 370/347 455/562.1 455/63.1 370/331 370/328 455/509 370/322 370/341 455/464 455/67.13 455/504 455/505 370/317 455/501)".ccls"	US-PGPUB; USPAT	OR	ON	2014/01/12 13:54
L12	37	L10 and L11	US-PGPUB; USPAT	OR	ON	2014/01/12 13:54
L13	1	send$3 near5 (index amount) near2 sub$1frame with (feedback ack acknowledgement) with (downlink down$1link)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/01/12 13:54
L14	0	WO2009022295	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/01/12 13:54
L15	0	WO2009022295.PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/01/12 13:54
L16	3	"20090046649", .PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/01/12 13:54
L17	2	L16 AND (index amount feedback ack acknowledgement NACK downlink down$1link UPLINK)	US-PGPUB; USPAT; USOCR;	OR	ON	2014/01/12 13:54

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
L18	60	map$4 near3 code$1word near5 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/01/12 13:54
L19	5	L18 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2014/01/12 13:54
L20	35092	code$1word stream near3 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/01/12 13:54
L21	31306	code$1word stream near3 (feedback ack acknowledgement NACK) near down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/01/12 13:54
L22	5	(code$1word near stream) near3 (feedback ack acknowledgement NACK) near6 down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/01/12 13:54
L23	5	"101114868"	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2014/01/12 13:54
L24	3	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2014/01/12 13:54
L25	10	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/01/12 13:54
L26	414	(ZHUO near GAO).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/01/12 13:54
L27	22	(Feedback fed$1back) near2 codeword with down$1link	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2014/01/12 13:54

			EPO; JPO; DERWENT; IBM_TDB			
L28	102	((sub$1frame near2 data)(special near2 sub$1frame)) near5 feedback	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/01/12 13:54
L29	11	L28 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2014/01/12 13:54
L30	4	("20030169701" "20040224697").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/01/12 13:57
S1	1	"12905299".rlan. or ("12".src. and "905299".ap.)	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2013/06/07 23:41
S2	423	"370/294".CCLS.	US-PGPUB; USPAT; USOCR	OR	ON	2013/06/07 23:41
S3	70	((BO) near2 (DAI)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2013/06/07 23:41
S4	34	((GUANGHUI) near2 (YU)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2013/06/07 23:41
S5	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-	US-PGPUB; USPAT	OR	ON	2013/06/08 00:09

		6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
S6	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-	US-PGPUB; USPAT	OR	ON	2013/07/23 11:53

		6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
S7	23	S6 and ((feedback ack acknowledgement) near2 confirmat$3)	US-PGPUB; USPAT	OR	ON	2013/07/23 11:53
S8	18	S7 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2013/07/23 11:54
S11	612	((feedback ack acknowledgement) near5 authorizat$3)	US-PGPUB; USPAT	OR	ON	2013/07/23 12:03
S12	450	S11 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2013/07/23 12:03
S13	154605	(370/335 370/329 455/561 607/31 455/517 455/436 455/450 370/328 455/562.1 455/522 375/267 370/330 607/32 370/322 370/331 455/442 370/252 714/749 455/422.1 370/332 455/450 370/329 455/62 370/347 455/562.1 455/63.1 370/331 370/328 455/509 370/322 370/341 455/464 455/67.13 455/504 455/505 370/317 455/501)".ccls"	US-PGPUB; USPAT	OR	ON	2013/07/23 12:05
S14	36	S12 and S13	US-PGPUB; USPAT	OR	ON	2013/07/23 12:07
S15	1	send$3 near5 (index amount) near2 sub$1frame with (feedback ack acknowledgement) with (downlink down$1link)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 13:43
S16	0	WO2009022295	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 14:06
S17	0	WO2009022295.PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 14:06

S18	2	"20090046649", .PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 14:06
S19	2	S18 AND (index amount feedback ack acknowledgement NACK downlink down$1link UPLINK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 14:08
S20	42	map$4 near3 code$1word near5 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 15:37
S21	4	S20 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2013/07/23 15:38
S22	28647	code$1word stream near3 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 16:53
S23	25375	code$1word stream near3 (feedback ack acknowledgement NACK) near down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 16:54
S24	4	(code$1word near stream) near3 (feedback ack acknowledgement NACK) near6 down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 16:56
S25	4	"101114868"	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2013/07/23 17:29
S26	3	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2013/07/23 17:39
S27	3	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 17:39
S28	28	(ZHUO near GAO).in.	US-PGPUB;	OR	ON	2013/07/23

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			17:40
S29	13	(Feedback fed$1back) near2 codeword with down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 18:11
S30	68	((sub$1frame near2 data)(special near2 sub$1frame)) near5 feedback	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 18:33
S31	9	S30 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2013/07/23 18:34

EAST Search History (Interference)

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1/12/2014 2:00:25 PM
C:\Users\rrivas\Documents\EAST\Workspaces\2012\12905299 - Dai - FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL.wsp

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12905299	DAI ET AL.
	Examiner	Art Unit
	RAUL RIVAS	2471

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
370	Updated Text Search, see search history	1/12/2014	RR

SEARCH NOTES		
Search Notes	Date	Examiner
Inventorship search	1/12/2014	RR
Updated Internet search	1/12/2014	RR
Updated EAST search	1/12/2014	RR
Consulted with SPE Chi Pham	1/12/2014	RR

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

/R.R./ Examiner.Art Unit 2471	

Form PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY DOCKET NO. 6284.00013 / P34599ZTE	SERIAL NO. 12/905,299
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	APPLICANT: Bo DAI et al.	
	FILING DATE October 15, 2010	GROUP 2471

U.S. PATENT DOCUMENTS

Examiner Initial	Document No.	Date	Name	Class	Sub-Class	Filing Date
	US2003/0169701 A1	09/11/2003	Yun et al.	370	318	
	US2004/0224697 A1	11/11/2004	Hakkinen et al.	455	450	

FOREIGN PATENT DOCUMENTS

	Document No.	Date	Country	Class	Sub-Class	Transl.	
						Yes	No
	CN101114868A	01/30/2008	China	H04B	7/26	X	
	CN101267284A	09/17/2008	China	H04L	1/16	X	
	CN101267285A	09/17/2008	China	H04L	1/16	X	

OTHER DOCUMENTS (Incl. Author, Title, Date, Pertinent Pages, etc.)

Examiner /Raul Rivas/ (01/12/2014)	Date Considered

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

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

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12905299	DAI ET AL.
	Examiner	**Art Unit**
	RAUL RIVAS	2471

✓	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	07/23/2013	01/12/2014							
	1	✓	✓							
	2	✓	✓							
	3	✓	✓							
	4	✓	✓							
	5	✓	✓							
	6	✓	✓							
	7	✓	✓							
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	9	✓	✓							
	10	✓	✓							
	11	✓	✓							
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	15	✓	✓							
	16	✓	✓							

Form PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY DOCKET NO. 6284.00013 / P34599ZTE	SERIAL NO. 12/905,299
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	APPLICANT: Bo DAI et al.	
	FILING DATE October 15, 2010	GROUP 2471

U.S. PATENT DOCUMENTS

Examiner Initial	Document No.	Date	Name	Class	Sub-Class	Filing Date
	US2003/0169701 A1	09/11/2003	Yun et al.	370	318	
	US2004/0224697 A1	11/11/2004	Hakkinen et al.	455	450	

FOREIGN PATENT DOCUMENTS

	Document No.	Date	Country	Class	Sub-Class	Transl.	
						Yes	No
	CN101114868A	01/30/2008	China	H04B	7/26	X	
	CN101267284A	09/17/2008	China	H04L	1/16	X	
	CN101267285A	09/17/2008	China	H04L	1/16	X	

OTHER DOCUMENTS (Incl. Author, Title, Date, Pertinent Pages, etc.)

Examiner	Date Considered

Examiner: Initial if references 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.

Abstract of CN101114868 (A)

The invention discloses an instructional method and system to allocate the feedback channels, which can facilitate a terminal to know the position of the resources occupied by the feedback channels allocated to the terminal through carrying the instructional information of the feedback channels allocated to the terminal in the dispatching channels, thereby solving the problem that in the down direction of the current LTE technique, when the base station dispatches a plurality of terminals by using the same dispatching channel at the same time, a plurality of terminals send the feedback information by using the same dispatching channel at the same time to the base station and the problem that in the current HSUPA technique, when the feedback information of a plurality of channels is transmitted by copying to a feedback channel,; the complexity of realizing the base station and the terminal is high.

[19] 中华人民共和国国家知识产权局

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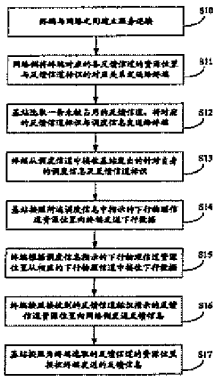
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反馈信道分配指示方法及系统

[57] 摘要

本发明公开了一种反馈信道分配指示方法及系统，通过在调度信道上携带分配给终端的反馈信道的指示信息，使终端能够知道分配给它的反馈信道占用的资源位置，从而解决了现有 LTE 技术下行方向中，当基站在同一时间使用同一条调度信道调度多个终端时，可能出现多个终端在相同时间使用相同的反馈信道向基站发送反馈信息的问题，以及现有 HSUPA 技术中，当将多个终端的反馈信息复用到一条反馈信道上传输时，基站和终端的实现复杂度较高的问题。



1、一种反馈信道分配指示方法，其特征在于，包括步骤：

A、网络侧将调度信息及反馈信道标识映射到调度信道中发送给终端，并按照所述调度信息指示的下行物理信道资源位置向终端发送下行数据；

B、终端根据调度信息指示的下行物理信道资源位置从相应的下行物理信道中接收下行数据，并按照反馈信道标识指示的反馈信道资源位置向网络侧发送反馈信息。

2、如权利要求 1 所述的方法，其特征在于，所述步骤 A 前还包括步骤：

网络侧在与终端建立服务连接时，为终端配置相应的反馈信道集合，并用反馈信道标识指示集合中各反馈信道的资源位置，将反馈信道标识与反馈信道资源位置的对应关系发送给终端。

3、如权利要求 2 所述的方法，其特征在于，网络侧从终端对应的反馈信道集合中选取一条未被占用的反馈信道，将该反馈信道对应的反馈信道标识与调度信息一同映射到调度信道中发送给终端。

4、如权利要求 1 所述的方法，其特征在于，所述步骤 A 前还包括步骤：

网络侧在与终端建立服务连接时，将预先配置的反馈信道资源位置与反馈信道标识的对应关系发送给终端。

5、如权利要求 4 所述的方法，其特征在于，网络侧从预先配置的反馈信道中选取一条未被占用的反馈信道，将该反馈信道对应的反馈信道标识与调度信息一同映射到调度信道中发送给终端。

6、如权利要求 1 所述的方法，其特征在于，所述步骤 B 后还包括步骤：

网络侧按照为终端选取的反馈信道的资源位置接收终端发送的反馈信息。

7、如权利要求 1 所述的方法，其特征在于，所述反馈信息中指示了终端接收的下行数据是否正确，以及承载该下行数据的下行物理信道的信道质量。

8、一种反馈信道分配指示系统，包括：

调度信息发送模块，设置在网络侧，用于将调度信息映射到调度信道中发

送给终端;

下行数据发送模块，设置在网络侧，用于按照调度信息中指示的下行物理信道资源位置向终端发送下行数据;

调度信息接收模块，设置在终端侧，用于从调度信道中接收网络侧发出的调度信息;

下行数据接收模块，设置在终端侧，用于根据调度信息中指示的下行物理信道资源位置从相应的下行物理信道中接收下行数据;

其特征在于，还包括:

反馈信道指示发送模块，设置在网络侧，用于为终端选择相应的反馈信道，并将该反馈信道对应的反馈信道标识映射到调度信道中发送给终端;

反馈信道指示接收模块，设置在终端侧，用于从调度信道中接收网络侧发出的反馈信道标识;

反馈信息发送模块，设置在终端侧，按照接收到的反馈信道标识指示的反馈信道资源位置向网络侧发送下行数据接收状况的反馈信息。

9、如权利要求 8 所述的系统，其特征在于，还包括:

反馈信息接收模块，设置在网络侧，按照为终端选取的反馈信道的资源位置接收终端发送的反馈信息。

10、如权利要求 8 所述的系统，其特征在于，还包括:

反馈信道配置模块，设置在网络侧，在与终端建立服务连接时，将预先配置的反馈信道资源位置与反馈信道标识的对应关系分别发送给反馈信息发送模块、反馈信息接收模块及反馈信道指示发送模块，或者为终端配置相应的反馈信道集合，将集合中各反馈信道资源位置与反馈信道标识的对应关系分别发送给反馈信息发送模块、反馈信息接收模块及反馈信道指示发送模块。

11、一种反馈信道分配指示方法，其特征在于，包括步骤:

A、网络侧将调度信息及反馈信道标识映射到调度信道中发送给终端;

B、终端按照所述调度信息指示的上行物理信道资源位置向网络侧发送上

行数据;

C、网络侧按照所述调度信息指示的资源位置从相应的上行物理信道中接收上行数据，按照反馈信道标识指示的反馈信道资源位置向终端发送反馈信息。

12、如权利要求 11 所述的方法，其特征在于，所述步骤 A 前还包括步骤:

网络侧与终端建立服务连接时，为终端配置相应的反馈信道集合，并用反馈信道标识指示集合中各反馈信道的资源位置，将反馈信道标识与反馈信道资源位置的对应关系发送给终端。

13、如权利要求 12 所述的方法，其特征在于，网络侧从终端对应的反馈信道集合中选取一条未被占用的反馈信道，将该反馈信道对应的反馈信道标识与调度信息一同映射到调度信道中发送给终端。

14、如权利要求 11 所述的方法，其特征在于，所述步骤 A 前还包括步骤:

网络侧与终端建立服务连接时，将预先配置的反馈信道资源位置与反馈信道标识的对应关系发送给终端。

15、如权利要求 14 所述的方法，其特征在于，网络侧从预先配置的反馈信道中选取一条未被占用的反馈信道，将该反馈信道对应的反馈信道标识与调度信息一同映射到调度信道中发送给终端。

16、如权利要求 11 所述的方法，其特征在于，所述步骤 C 具体包括步骤:

C1、网络侧按照调度信息指示的资源位置从相应的上行物理信道中接收上行数据，并根据终端发送的信号的来波方向对针对终端的反馈信息进行波束赋形，以及根据承载上行数据的上行物理信道的信道质量确定针对终端的反馈信息的发射功率;

C2、网络侧按照反馈信道标识指示的反馈信道资源位置及所述确定的发射功率向终端发送经过波束赋形的反馈信息。

17、若权利要求 16 所述的方法，其特征在于，网络侧根据上行数据的接收信噪比确定终端发送上行数据占用的上行物理信道的信道质量。

18、如权利要求 11 所述的方法，其特征在于，所述步骤 C 后还包括步骤：

终端根据所述反馈信道标识指示的反馈信道的资源位置接收网络侧发送的反馈信息。

19、如权利要求 11 所述的方法，其特征在于，所述反馈信息中指示了网络侧接收的上行数据是否正确。

20、一种反馈信道分配指示系统，包括：

调度信息发送模块，设置在网络侧，用于将调度信息映射到调度信道中发送给终端；

调度信息接收模块，设置在终端侧，用于从调度信道中接收网络侧发出的调度信息；

上行数据发送模块，设置在终端侧，用于按照调度信息中指示的上行物理信道资源位置向网络侧发送上行数据；

上行数据接收模块，设置在网络侧，用于根据调度信息中指示的上行物理信道资源位置从相应的上行物理信道中接收上行数据；

其特征在于，还包括：

反馈信道指示发送模块，设置在网络侧，用于将网络侧选用的反馈信道对应的反馈信道标识映射到调度信道中发送给终端；

反馈信道指示接收模块，设置在终端侧，用于从调度信道中接收网络侧发出的反馈信道标识；

反馈信息发送模块，设置在网络侧，按照反馈信道标识指示的反馈信道资源位置向终端发送反馈信息。

21、如权利要求 20 所述的系统，其特征在于，还包括：

反馈信息接收模块，设置在终端侧，按照反馈信道指示接收模块接收到的反馈信道标识指示的反馈信道的资源位置接收网络侧发送的反馈信息。

22、如权利要求 21 所述的系统，其特征在于，还包括：

反馈信道配置模块，设置在网络侧，在与终端建立服务连接时，将预先配

置的反馈信道资源位置与反馈信道标识的对应关系发送给反馈信息发送模块，反馈信息接收模块及反馈信道指示发送模块，或者为终端配置相应的反馈信道集合，将集合中各反馈信道资源位置与反馈信道标识的对应关系发送给反馈信息发送模块，反馈信息接收模块及反馈信道指示发送模块。

反馈信道分配指示方法及系统

技术领域

本发明涉及通信领域，尤其涉及一种反馈信道分配指示方法及系统。

背景技术

为了提高用户的峰值数据传输速率以及系统吞吐量，第三代移动通信系统在R5版本协议中引入了HSDPA（High Speed Downlink Packet Access，高速下行分组接入）技术，在R6版本协议中引入了HSUPA（High Speed Uplink Packet Access，高速上行分组接入）技术，分别用于上行传输增强和下行传输增强。

HSDPA技术和HSUPA技术的工作原理及采用的关键技术都比较类似，如都采用了AMC（Adaptive Modulation and Coding，自适应调制编码）、HARQ（Hybrid Automatic Repeat Request，混合自动请求重传请求）和快速调度等技术。在HSDPA技术和HSUPA技术中，基站都通过调度信道给用户分配资源，数据接收端都通过反馈信道向数据发送端反馈数据块是否被正确的接收，数据发送端根据反馈信道中承载的反馈信息进行相应的后续操作。

在HSDPA技术中，数据调度与传输都在基站完成，终端对数据进行接收和反馈。在TDD（Time Division Duplex，时分双工）模式下，基站进行调度的控制信道为HS-SCCH（Shared Control Channel for HS-DSCH，高速共享控制信道），每个HS-SCCH在一个TTI（Transmission Time Interval，传输时间间隔）中只能传输一个用户的调度信息，并且其所分配的资源的有效持续时间为一个TTI。基站通过HS-SCCH向终端发送调度信息，调度信息中指示了基站为终端分配的资源位置，经过一个预设时间间隔后，终端根据调度信息中指示的为终端分配的资源位置在相应的HS-PDSCH（High Speed Physical Downlink Shared Channel，高速物理下行共享信道）接收数据，经过另一个预设时间间隔后，

终端通过一个上行反馈信道 HS-SICH（Shared Information Channel for HS-DSCH，共享指示信道）向基站发送反馈信息，例如针对接收到的数据块正确与否反馈的 ACK（Acknowledgement，确认）信息或 NACK（Non-Acknowledgement，否认）信息，以及用于辅助基站进行调度的 CQI（Channel Quality Indicator，信道质量指示）信息，基站根据收到的反馈信息进行后续调度。在 HSDPA TDD 模式中，每个 HS-SCCH 都有一个预定义的 HS-SICH 与之关联，若基站在某个 TTI 采用某条 HS-SCCH 对一个终端进行了调度，那么该终端在预定的反馈时刻就通过与这条 HS-SCCH 关联的 HS-SICH 向基站发送反馈信息。

在 LTE（Long Term Evolution，长期演进）下行方向中，为了节约控制信道开销，系统允许基站在同一个 TTI 使用同一条调度信道调度多个终端，在这种情况下，若终端继续通过预先为每个调度信道定义与之相关联的反馈信道的方式来确定所使用的反馈信道，有可能出现多个终端在相同时间使用相同的反馈信道向基站发送反馈信息的问题。因此如何在 LTE 技术中为终端分配及指示其所使用的反馈信道，是 LTE 技术中亟待解决的问题。

在 HSUPA 技术中，数据调度在基站完成，数据传输由终端完成，作为数据的接收端，基站同样需要一个反馈信道通知终端数据块是否被正确接收。在 TDD 模式下，基站进行调度的控制信道为 E-AGCH（Enhanced-Absolute Grant Channel，增强型绝对许可信道），为了节约控制信道开销，系统允许在 E-AGCH 上配置 RDI 字段，如果配置了 RDI 字段，每次调度所分配的资源的有效持续时间可以是多个 TTI。基站发射 E-AGCH 后，经过一个预设时间间隔，终端根据调度信息中指示的为终端分配的资源位置在相应的 E-PUCH（Enhanced Uplink Physical Channel，增强型上行物理数据信道）上发送上行数据，经过另外一个预设时间间隔后，基站根据接收数据块的正确与否，通过一个下行反馈信道 E-HICH（E-DCH HARQ Acknowledgement Indicator Channel，E-DCH HARQ 反馈指示信道）向终端反馈 ACK/NACK 信息。由于在 E-AGCH 上配置

了 RDI 字段，因此基站在同一个 TTI 可以使用同一条 E-AGCH 调度多个终端，无法再通过这种关联关系确定应该使用的 E-HICH，这是因为在同一 TTI，可能使用同一条 E-AGCH 调度多个用户，在这种情况下，终端无法继续通过预先为每个调度信道定义与之相关联的反馈信道的方式来确定所使用的反馈信道。

现有 HSUPA 技术中通常采用将针对多个终端的反馈信息复用到一条反馈信道上传输的方式来解决上述问题，其原理为根据终端使用的资源位置区分不同终端的反馈信息。其具体实现过程为：根据终端可能使用的资源位置确定相同数目的正交码字，将该对应关系预存在基站及终端侧。在进行反馈信息（ACK 或 NACK）的复用时，首先确定当前需要发送反馈信息的每个终端传输对应数据时所使用的资源位置（可由时隙和码道编号标识），然后根据其资源位置找到与之对应的预定义的正交码字，再利用该对应的正交码字分别对针对各终端的反馈信息进行一次扩频，然后将扩频后的信号叠加在一起，使用反馈信道对应的 OVSF（Orthogonal Variable Spreading Factor，正交可变扩频因子）码对其进行二次扩频后发送给终端。终端接收到反馈信息后，首先使用反馈信道对应的 OVSF 码对信息进行解扩处理，然后利用与其传输数据使用的资源对应的正交码字对信息进行二次解扩处理，最后获得需要的反馈信息。

当采用上述将多个终端的反馈信息复用到一条反馈信道上传输的方式时，由于基站对每个终端的反馈信息都要经过二次扩频处理，这就增加了基站的实现复杂度，并且其与现有系统反馈信道的使用方法不同；而终端在解析反馈信息时，相应地要经过二次解扩处理，也增加了终端的实现复杂度和耗电量。

波束赋形和功率控制是数据传输过程中经常采用的用于降低系统干扰的技术，其中波束赋形技术的原理是将发送给一个终端的信息的大部分能量约束在一个较窄的波束覆盖范围内，相对于全向发送而言，可以降低对整个系统的干扰。而功率控制技术的原理则是根据终端的信道质量，尽可能分配给终端刚好能够满足接收质量要求的功率，从而达到降低发射功率和减少终端间干扰的目的。当采用上述将多个终端的反馈信息复用到一条反馈信道上传输的方式

时，基站无法根据某个终端的来波方向进行波束赋形。并且由于一条反馈信道上同时携带了针对多个终端的反馈信息，一般只能按照信道质量最差的终端分配反馈信道的发射功率，从而会增大对系统的干扰。

发明内容

本发明提供一种反馈信道分配指示方法及系统，用以解决 LTE 技术下行方向中，当基站在同一时间使用同一条调度信道调度多个终端时，可能出现多个终端在相同时间使用相同的反馈信道向基站发送反馈信息的问题，以及现有 HSUPA 技术中，当将多个终端的反馈信息复用到一条反馈信道上传输时，基站和终端的实现复杂度较高的问题。

本发明技术方案包括:

一种反馈信道分配指示方法，包括步骤:

A、网络侧将调度信息及反馈信道标识映射到调度信道中发送给终端，并按照所述调度信息指示的下行物理信道资源位置向终端发送下行数据;

B、终端根据调度信息指示的下行物理信道资源位置从相应的下行物理信道中接收下行数据，并按照反馈信道标识指示的反馈信道资源位置向网络侧发送反馈信息。

较佳地，所述步骤 A 前还包括步骤:

网络侧在与终端建立服务连接时，为终端配置相应的反馈信道集合，并用反馈信道标识指示集合中各反馈信道的资源位置，将反馈信道标识与反馈信道资源位置的对应关系发送给终端。

较佳地，网络侧从终端对应的反馈信道集合中选取一条未被占用的反馈信道，将该反馈信道对应的反馈信道标识与调度信息一同映射到调度信道中发送给终端。

较佳地，所述步骤 A 前还包括步骤:

网络侧在与终端建立服务连接时，将预先配置的反馈信道资源位置与反馈

信道标识的对应关系发送给终端。

较佳地，网络侧从预先配置的反馈信道中选取一条未被占用的反馈信道，将该反馈信道对应的反馈信道标识与调度信息一同映射到调度信道中发送给终端。

较佳地，所述步骤B后还包括步骤：

网络侧按照为终端选取的反馈信道的资源位置接收终端发送的反馈信息。

较佳地，所述反馈信息中指示了终端接收的下行数据是否正确，以及承载该下行数据的下行物理信道的信道质量。

一种反馈信道分配指示系统，包括：

调度信息发送模块，设置在网络侧，用于将调度信息映射到调度信道中发送给终端；

下行数据发送模块，设置在网络侧，用于按照调度信息中指示的下行物理信道资源位置向终端发送下行数据；

调度信息接收模块，设置在终端侧，用于从调度信道中接收网络侧发出的调度信息；

下行数据接收模块，设置在终端侧，用于根据调度信息中指示的下行物理信道资源位置从相应的下行物理信道中接收下行数据；

还包括：

反馈信道指示发送模块，设置在网络侧，用于为终端选择相应的反馈信道，并将该反馈信道对应的反馈信道标识映射到调度信道中发送给终端；

反馈信道指示接收模块，设置在终端侧，用于从调度信道中接收网络侧发出的反馈信道标识；

反馈信息发送模块，设置在终端侧，按照接收到的反馈信道标识指示的反馈信道资源位置向网络侧发送下行数据接收状况的反馈信息。

较佳地，还包括：

反馈信息接收模块，设置在网络侧，按照为终端选取的反馈信道的资源位

置接收终端发送的反馈信息。

较佳地，还包括：

反馈信道配置模块，设置在网络侧，在与终端建立服务连接时，将预先配置的反馈信道资源位置与反馈信道标识的对应关系分别发送给反馈信息发送模块、反馈信息接收模块及反馈信道指示发送模块，或者为终端配置相应的反馈信道集合，将集合中各反馈信道资源位置与反馈信道标识的对应关系分别发送给反馈信息发送模块、反馈信息接收模块及反馈信道指示发送模块。

一种反馈信道分配指示方法，包括步骤：

A、网络侧将调度信息及反馈信道标识映射到调度信道中发送给终端；

B、终端按照所述调度信息指示的上行物理信道资源位置向网络侧发送上行数据；

C、网络侧按照所述调度信息指示的资源位置从相应的上行物理信道中接收上行数据，按照反馈信道标识指示的反馈信道资源位置向终端发送反馈信息。

较佳地，所述步骤 A 前还包括步骤：

网络侧与终端建立服务连接时，为终端配置相应的反馈信道集合，并用反馈信道标识指示集合中各反馈信道的资源位置，将反馈信道标识与反馈信道资源位置的对应关系发送给终端。

较佳地，网络侧从终端对应的反馈信道集合中选取一条未被占用的反馈信道，将该反馈信道对应的反馈信道标识与调度信息一同映射到调度信道中发送给终端。

较佳地，所述步骤 A 前还包括步骤：

网络侧与终端建立服务连接时，将预先配置的反馈信道资源位置与反馈信道标识的对应关系发送给终端。

较佳地，网络侧从预先配置的反馈信道中选取一条未被占用的反馈信道，将该反馈信道对应的反馈信道标识与调度信息一同映射到调度信道中发送给

终端。

较佳地，所述步骤 C 具体包括步骤：

C1、网络侧按照调度信息指示的资源位置从相应的上行物理信道中接收上行数据，并根据终端发送的信号的来波方向对针对终端的反馈信息进行波束赋形，以及根据承载上行数据的上行物理信道的信道质量确定针对终端的反馈信息的发射功率；

C2、网络侧按照反馈信道标识指示的反馈信道资源位置及所述确定的发射功率向终端发送经过波束赋形的反馈信息。

较佳地，网络侧根据上行数据的接收信噪比确定终端发送上行数据占用的上行物理信道的信道质量。

较佳地，所述步骤 C 后还包括步骤：

终端根据所述反馈信道标识指示的反馈信道的资源位置接收网络侧发送的反馈信息。

较佳地，所述反馈信息中指示了网络侧接收的上行数据是否正确。

一种反馈信道分配指示系统，包括：

调度信息发送模块，设置在网络侧，用于将调度信息映射到调度信道中发送给终端；

调度信息接收模块，设置在终端侧，用于从调度信道中接收网络侧发出的调度信息；

上行数据发送模块，设置在终端侧，用于按照调度信息中指示的上行物理信道资源位置向网络侧发送上行数据；

上行数据接收模块，设置在网络侧，用于根据调度信息中指示的上行物理信道资源位置从相应的上行物理信道中接收上行数据；

还包括：

反馈信道指示发送模块，设置在网络侧，用于将网络侧选用的反馈信道对应的反馈信道标识映射到调度信道中发送给终端；

反馈信道指示接收模块，设置在终端侧，用于从调度信道中接收网络侧发出的反馈信道标识；

反馈信息发送模块，设置在网络侧，按照反馈信道标识指示的反馈信道资源位置向终端发送反馈信息。

较佳地，还包括：

反馈信息接收模块，设置在终端侧，按照反馈信道指示接收模块接收到的反馈信道标识指示的反馈信道的资源位置接收网络侧发送的反馈信息。

较佳地，还包括：

反馈信道配置模块，设置在网络侧，在与终端建立服务连接时，将预先配置的反馈信道资源位置与反馈信道标识的对应关系发送给反馈信息发送模块，反馈信息接收模块及反馈信道指示发送模块，或者为终端配置相应的反馈信道集合，将集合中各反馈信道资源位置与反馈信道标识的对应关系发送给反馈信息发送模块，反馈信息接收模块及反馈信道指示发送模块。

本发明有益效果如下：

本发明用于 LTE 技术中下行方向的反馈信道分配指示方法中，网络侧将分配给终端的反馈信道标识通过调度信道发送给终端，使终端能够知道分配给它的反馈信道占用的资源位置，使得终端能够按照接收到的反馈信道标识指示的反馈信道资源位置向网络侧发送反馈信息，从而解决了现有 LTE 技术中当基站在同一个 TTI 使用同一条调度信道调度多个终端时，可能出现的反馈信道冲突问题。

本发明用于 HSUPA 及 LTE 技术中上行方向的反馈信道分配指示方法中，网络侧将针对终端的反馈信道标识通过调度信道发送给终端，并且按照其选取的反馈信道资源位置向终端发送反馈信息，由于针对每个终端的反馈信息都使用单独的调度信道携带，因此网络侧只需要进行一次扩频处理，从而降低了实现复杂度，并且与现有系统反馈信道的使用方法一致，保证了设备兼容性；另外终端解析反馈信息时，也只需要进行一次解扩，降低了实现复杂度和耗电量。

进一步，网络侧可根据终端发送的信号的来波方向对针对终端的反馈信息进行波束赋形，以及根据承载上行数据的上行物理信道的信道质量确定针对终端的反馈信息的发射功率，使得网络侧能够按照其选取的反馈信道资源位置及所述确定的发射功率向终端发送经过波束赋形的反馈信息。从而解决了现有HSUPA技术中将针对多个终端的反馈信息复用到一条反馈信道上传输时，无法针对每个终端进行波束赋形及功率控制的问题。

附图说明

图 1 为本发明用于 LTE 技术中下行方向的反馈信道分配指示方法的流程图；

图2为本发明用于LTE技术中下行方向的反馈信道分配指示系统的组成结构框图；

图 3 为本发明用于 HSUPA 技术中的反馈信道分配指示方法的流程图；

图 4 为本发明用于 LTE 技术中上行方向的反馈信道分配指示方法的流程图；

图5为本发明用于HSUPA 及LTE技术中上行方向的反馈信道分配指示系统的组成结构框图。

具体实施方式

本发明技术方案通过在调度信道上携带分配给终端的反馈信道的指示信息，使终端能够知道分配给它的反馈信道占用的资源位置，从而解决了现有LTE 或者 HSUPA 技术中当网络侧在同一个 TTI 使用同一条调度信道调度多个终端时，可能出现的反馈信道冲突问题。

下面将结合各个附图对本发明技术方案的主要实现原理、具体实施方式及其对应能够达到的有益效果进行详细的阐述。

请参阅图 1，该图为本发明用于 LTE 技术中下行方向的反馈信道分配指示

方法的流程图，其主要实现过程为：

步骤 S10、网络与终端之间建立服务连接。

步骤 S11、网络侧将终端对应的反馈信道集合中的各反馈信道的资源位置与反馈信道标识的对应关系发送给终端；

在 LTE 技术中，反馈信道的资源位置为反馈信道占用的子载波。

本实施例中可采用两种方式为终端配置相应的反馈信道集合，下面分别予以说明：

第一种方式为：基站为各终端配置相应的反馈信道集合，并用反馈信道标识指示集合中各反馈信道的资源位置，将反馈信道标识与反馈信道资源位置的对应关系表发送给终端。在这种配置方式下，不同终端的反馈信道标识与反馈信道资源位置的对应关系表可以是不同的。

为终端配置的反馈信道集合中反馈信道的数目可以小于或者等于反馈信道标识能指示的最大数目，下表为基站为终端配置了三条反馈信道的情况下，反馈信道标识与反馈信道资源位置的对应关系表：

反馈信道标识(2 bit)	反馈信道占用的资源位置
00	第一条反馈信道占用的子载波
01	第二条反馈信道占用的子载波
10	第三条反馈信道占用的子载波
11	无效指示

第二种方式为：基站预先配置有统一的反馈信道集合，在建立服务连接时，基站将所述预先配置的反馈信道集合中各反馈信道的资源位置与反馈信道标识的对应关系表发送给终端。这种配置方式下，每个终端得到的反馈信道标识与反馈信道资源位置的对应关系表是相同的。

步骤 S12、基站选取一条未被占用的反馈信道，将该反馈信道对应的反馈信道标识与调度信息一同映射到调度信道中发送给终端；

当基站采用上述步骤 S11 中第一种方式为终端配置相应的反馈信道集合时，基站从终端对应的反馈信道集合中选取一条未被占用的反馈信道，将该反

馈信道对应的反馈信道标识与调度信息一同映射到调度信道中发送给终端;

当基站采用上述步骤 S11 中第二种方式为终端配置相应的反馈信道集合时，基站从预先配置的反馈信道集合中选取一条未被占用的反馈信道，将该反馈信道对应的反馈信道标识与调度信息一同映射到调度信道中发送给终端;

所述基站在同一TTI可将针对多个终端的调度信息及反馈信道指示映射到同一条调度信道上发送出去。

步骤 S13、终端从调度信道中接收基站发出的针对自身的调度信息及反馈信道标识。

步骤 S14、基站在发出调度信息后，经过第一预设时间间隔，按照所述调度信息中指示的下行物理信道资源位置向终端发送下行数据。

步骤 S15、终端根据调度信息指示的下行物理信道资源位置从相应的下行物理信道中接收下行数据。

步骤 S16、在终端开始接收下行数据后，经过第二预设时间间隔，终端按照接收到的反馈信道标识指示的反馈信道资源位置向网络侧发送反馈信息，所述反馈信息中指示了终端接收的下行数据是否正确，以及承载该下行数据的下行物理信道的信道质量。

步骤 S17、基站按照为终端选取的反馈信道的资源位置接收终端发送的反馈信息，并根据接收到的反馈信息进行后续调度。

本发明上述用于 LTE 技术下行方向的反馈信道分配指示方法中，基站将分配给终端的反馈信道标识通过调度信道发送给终端，使终端能够知道分配给它的反馈信道占用的资源位置，使得终端能够按照接收到的反馈信道标识指示的反馈信道资源位置向网络侧发送反馈信息，从而解决了现有技术中当基站在同一个TTI使用同一条调度信道调度多个终端时，可能出现的反馈信道冲突问题。

相应于本发明上述用于 LTE 技术下行方向的反馈信道分配指示方法，本发明这里还进而提出了一种用于 LTE 技术下行方向的反馈信道分配指示系统，请参阅图 2，该图为本发明用于 LTE 技术下行方向的反馈信道分配指示系统的组

成结构框图，其主要包括反馈信道配置模块 20、调度信息发送模块 21、反馈信道指示发送模块 22、调度信息接收模块 23、反馈信道指示接收模块 24、下行数据发送模块 25、下行数据接收模块 26、反馈信息发送模块 27 及反馈信息接收模块 28，其中各个组成模块的具体作用如下：

反馈信道配置模块 20，设置在基站侧，分别连接所述反馈信息发送模块 27、反馈信息接收模块 28 及反馈信道指示发送模块 22，在终端与网络之间建立服务连接时，将预先配置的反馈信道资源位置与反馈信道标识的对应关系分别发送给反馈信息发送模块 27、反馈信息接收模块 28 及反馈信道指示发送模块 22，或者为终端配置相应的反馈信道集合，将集合中各反馈信道资源位置与反馈信道标识的对应关系发送给反馈信息发送模块 27、反馈信息接收模块 28 及反馈信道指示发送模块 22；

调度信息发送模块 21，设置在基站侧，用于将调度信息映射到调度信道中发送给终端；

反馈信道指示发送模块 22，设置在基站侧，连接所述反馈信道配置模块 20，用于为终端选择相应的反馈信道，并将该反馈信道对应的反馈信道标识映射到调度信道中发送给终端；

调度信息接收模块 23，设置在终端侧，连接所述调度信息发送模块 21，用于从调度信道中接收基站侧发出的调度信息；

反馈信道指示接收模块 24，设置在终端侧，连接所述反馈信道指示发送模块 22，用于从调度信道中接收基站侧发出的反馈信道标识；

下行数据发送模块 25，设置在基站侧，连接所述调度信息发送模块 21，用于按照调度信息中指示的下行物理信道资源位置向终端发送下行数据；

下行数据接收模块 26，设置在终端侧，连接所述下行数据发送模块 25、调度信息接收模块 23 及反馈信息发送模块 27，用于根据调度信息中指示的下行物理信道资源位置从相应的下行物理信道中接收下行数据；

反馈信息发送模块 27，设置在终端侧，连接所述反馈信道指示接收模块

24、反馈信道配置模块 20 及下行数据接收模块 26，按照接收到的反馈信道标识指示的反馈信道资源位置向基站侧发送下行数据接收状况的反馈信息；

反馈信息接收模块 28，设置在网络侧，连接所述反馈信道配置模块 20、反馈信息发送模块 27 及反馈信道指示发送模块 22，按照为终端选取的反馈信道的资源位置接收终端发送的反馈信息。

本发明上述提出的用于 LTE 技术下行方向中的反馈信道分配指示系统的其他具体相关技术实现细节请参照本发明上述用于 LTE 技术中的反馈信道分配指示方法中的相关技术实现细节的具体描述，这里不再给以过多赘述。

请参阅图 3，该图为本发明用于 HSUPA 技术中的反馈信道分配指示方法的流程图，其主要实现过程为：

步骤 S30、网络侧与终端之间建立服务连接。

步骤 S31、基站确定终端使用的 E-HICH 集合，并确定终端对应的 E-HICH 集合中的各 E-HICH 的资源位置与 E-HICH 标识的对应关系，然后发送给 RNC（Radio Networ Controller，无线网络控制器），由 RNC 通知终端，或者由 RNC 确定终端使用的 E-HICH 集合以及集合中的各 E-HICH 的资源位置与 E-HICH 标识的对应关系，并分别发送给基站和终端。

在 HSUPA 技术中，E-HICH 的资源位置为 E-HICH 占用的时隙和码道。

本实施例中可采用两种方式为终端配置相应的反馈信道集合，下面分别予以说明：

第一种方式为：基站为该终端配置相应的 E-HICH 集合，并用 E-HICH 标识指示集合中各 E-HICH 的资源位置，将 E-HICH 标识与 E-HICH 资源位置的对应关系表发送给 RNC，由 RNC 通过高层信令将该对应关系表发送给终端；或者由 RNC 为该终端配置相应的 E-HICH 集合，并用 E-HICH 标识指示集合中各 E-HICH 的资源位置，将 E-HICH 标识与 E-HICH 资源位置的对应关系表分别发送给基站和终端；

其中为终端配置的 E-HICH 集合中 E-HICH 的数目可以小于或者等于

E-HICH 标识能指示的最大数目。

第二种方式为：基站中预先配置有统一的 E-HICH 集合，在建立服务连接时，基站将所述预先配置的 E-HICH 集合中各 E-HICH 的资源位置与 E-HICH 标识的对应关系表发送给 RNC，由 RNC 通过高层信令将该对应关系表发送给终端；或者 RNC 中预先配置有统一的 E-HICH 集合，建立服务连接时，由 RNC 将所述预先配置的 E-HICH 集合中各 E-HICH 的资源位置与 E-HICH 标识的对应关系表分别发送给基站和终端。

步骤 S32、基站从所述 E-HICH 集合中选取一条未被占用的 E-HICH，将该E-HICH对应的E-HICH标识与调度信息一同映射到E-AGCH中发送给终端；

当采用上述步骤 S31 中第一种方式为终端配置相应的 E-HICH 集合时，基站从终端对应的 E-HICH 集合中选取一条未被占用的 E-HICH，将该 E-HICH 对应的 E-HICH 标识与调度信息一同映射到 E-AGCH 中发送给终端；

当采用上述步骤 S31 中第二种方式为终端配置相应的 E-HICH 集合时，基站从预先配置的 E-HICH 集合中选取一条未被占用的 E-HICH，将该 E-HICH 对应的 E-HICH 标识与调度信息一同映射到 E-AGCH 中发送给终端；

所述基站在同一 TTI 可将针对多个终端的调度信息及 E-HICH 指示映射到同一条调度信道上发送出去。

步骤 S33、终端从 E-AGCH 中接收基站发出的针对自身的调度信息及 E-HICH 标识。

步骤 S34、在基站发出调度信息后，经过第三预设时间间隔，终端按照所述调度信息指示的 E-PUCH 的资源位置向基站发送上行数据。

步骤 S35、基站按照调度信息指示的资源位置从相应的 E-PUCH 中接收上行数据。

步骤 S36、基站根据终端发送的信号的来波方向对针对终端的反馈信息进行波束赋形，以及根据上行数据的接收信噪比确定终端发送上行数据占用的 E-PUCH 的信道质量，以此确定针对终端的反馈信息的发射功率。

步骤 S37、在终端开始发送上行数据后，经过第四预设时间间隔，基站按照其选取的 E-HICH 资源位置及所述确定的发射功率向终端发送经过波束赋形的反馈信息，所述反馈信息中指示了基站接收的上行数据是否正确。

步骤 S38、终端根据所述 E-HICH 标识指示的 E-HICH 的资源位置接收基站发送的反馈信息。

在 LTE 技术上行方向中，对反馈信道进行分配及指示的过程与上述在 HSUPA 技术中的反馈信道分配及指示过程类似，请参阅图 4，该图为本发明用于 LTE 上行方向中的反馈信道分配指示方法的流程图，其主要实现过程为：

步骤 S40、网络侧与终端建立服务连接。

步骤 S41、网络侧确定终端使用的反馈信道集合以及映射关系表，将终端对应的反馈信道集合中的各反馈信道的资源位置与反馈信道标识的对应关系发送给终端。

在 LTE 技术上行方向，反馈信道的资源位置为反馈信道占用的子载波。

本实施例中可采用两种方式为终端配置相应的反馈信道集合，下面分别予以说明：

第一种方式为：基站为各终端配置相应的反馈信道集合，并用反馈信道标识指示集合中各反馈信道的资源位置，将反馈信道标识与反馈信道资源位置的对应关系表发送给终端；

其中为终端配置的反馈信道集合中反馈信道的数目可以小于或者等于反馈信道标识能指示的最大数目。

第二种方式为：基站中预先配置有统一的反馈信道集合，在建立服务连接时，基站将所述预先配置的反馈信道集合中各反馈信道的资源位置与反馈信道标识的对应关系表发送给终端。

步骤 S42、基站从所述反馈信道集合中选取一条未被占用的反馈信道，将该反馈信道对应的反馈信道标识与调度信息一同映射到调度信道中发送给终端；

当采用上述步骤 S41 中第一种方式为终端配置相应的反馈信道集合时，基站从终端对应的反馈信道集合中选取一条未被占用的反馈信道，将该反馈信道对应的反馈信道标识与调度信息一同映射到调度信道中发送给终端；

当采用上述步骤 S41 中第二种方式为终端配置相应的反馈信道集合时，基站从预先配置的反馈信道集合中选取一条未被占用的反馈信道，将该反馈信道对应的反馈信道标识与调度信息一同映射到调度信道中发送给终端。

所述基站在同一 TTI 可将针对多个终端的调度信息及反馈信道指示映射到同一条调度信道上发送出去。

步骤 S43、终端从调度信道中接收基站发出的针对自身的调度信息及反馈信道标识。

步骤 S44、在基站发出调度信息后，经过第五预设时间间隔，终端按照所述调度信息指示的上行物理信道的资源位置向网络侧发送上行数据。

步骤 S45、基站按照调度信息指示的资源位置从相应的上行物理信道中接收上行数据。

步骤 S46、基站根据终端发送的信号的来波方向对针对终端的反馈信息进行波束赋形，以及根据上行数据的接收信噪比确定终端发送上行数据占用的上行物理信道的信道质量，以此确定针对终端的反馈信息的发射功率。

步骤 S47、在终端开始发送上行数据后，经过第六预设时间间隔，基站按照其选取的反馈信道资源位置及所述确定的发射功率向终端发送经过波束赋形的反馈信息，所述反馈信息中指示了基站接收的上行数据是否正确。

步骤 S48、终端根据所述反馈信道标识指示的反馈信道的资源位置接收网络侧发送的反馈信息。

本发明用于 HSUPA 及 LTE 技术中上行方向的反馈信道分配指示方法中，网络侧将针对终端的反馈信道标识通过调度信道发送给终端，并且按照其选取的反馈信道资源位置向终端发送反馈信息，由于针对每个终端的反馈信息都使用单独的调度信道携带，因此网络侧只需要进行一次扩频处理，从而降低了实

现复杂度，并且与现有系统反馈信道的使用方法一致，保证了设备兼容性；另外终端解析反馈信息时，也只需要进行一次解扩，降低了实现复杂度和耗电量。

相应于本发明上述用于 HSUPA 及 LTE 上行方向的反馈信道分配指示方法，本发明这里还进而提出了一种用于 HSUPA 及 LTE 上行方向的反馈信道分配指示系统，请参阅图 5，该图为本发明用于 HSUPA 及 LTE 上行方向的反馈信道分配指示系统的组成结构框图，其主要包括反馈信道配置模块 50、调度信息发送模块 51、反馈信道指示发送模块 52、调度信息接收模块 53、反馈信道指示接收模块 54、上行数据发送模块 55、上行数据接收模块 56、反馈信息发送模块 57 及反馈信息接收模块 58，其中各组成模块的主要作用为：

反馈信道配置模块 50，设置在网络侧，分别连接所述反馈信息发送模块 57、反馈信息接收模块 58 及反馈信息指示发送模块 52，在终端与网络之间建立服务连接时，将预先配置的反馈信道资源位置与反馈信道标识的对应关系分别发送给反馈信息发送模块 57、反馈信息接收模块 58 及反馈信息指示发送模块 52，或者为终端配置相应的反馈信道集合，将集合中各反馈信道资源位置与反馈信道标识的对应关系分别发送给反馈信息发送模块 57、反馈信息接收模块 58 及反馈信息指示发送模块 52；

调度信息发送模块 51，设置在网络侧，用于将调度信息映射到调度信道中发送给终端；

反馈信道指示发送模块 52，设置在网络侧，连接所述反馈信道配置模块 50，用于将网络侧选用的反馈信道对应的反馈信道标识映射到调度信道中发送给终端；

调度信息接收模块 53，设置在终端侧，连接所述调度信息发送模块 51 及上行数据发送模块 55，用于从调度信道中接收网络侧发出的调度信息；

反馈信道指示接收模块 54，设置在终端侧，连接所述反馈信道指示发送模块 52 及反馈信息接收模块 58，用于从调度信道中接收网络侧发出的反馈信道标识；

上行数据发送模块 55，设置在终端侧，连接所述调度信息接收模块 53，用于按照调度信息中指示的上行物理信道资源位置向网络侧发送上行数据；

上行数据接收模块 56，设置在网络侧，连接所述上行数据发送模块 55、调度信息发送模块 51 及反馈信息发送模块 57，用于根据调度信息中指示的上行物理信道资源位置从相应的上行物理信道中接收上行数据；

反馈信息发送模块 57，设置在网络侧，连接所述反馈信道配置模块 50、反馈信道指示发送模块 52 及上行数据接收模块 56，用于按照反馈信道标识指示的反馈信道资源位置向终端发送经过波束赋形及功率控制处理的上行数据接收状况的反馈信息；

反馈信息接收模块 58，设置在终端侧，连接所述反馈信道配置模块 50、反馈信息发送模块 57 及反馈信道指示接收模块 54，按照反馈信道指示接收模块接收到的反馈信道标识指示的反馈信道的资源位置接收网络侧发送的反馈信息。

本发明上述提出的用于 HSUPA 及 LTE 上行方向的反馈信道分配指示系统的其他具体相关技术实现细节请参照本发明上述用于 HSUPA 及 LTE 上行方向的反馈信道分配指示方法中的相关技术实现细节的具体描述，这里不再给以过多赘述。

显然，本领域的技术人员可以对本发明进行各种改动和变型而不脱离本发明的精神和范围。这样，倘若本发明的这些修改和变型属于本发明权利要求及其等同技术的范围之内，则本发明也意图包含这些改动和变型在内。

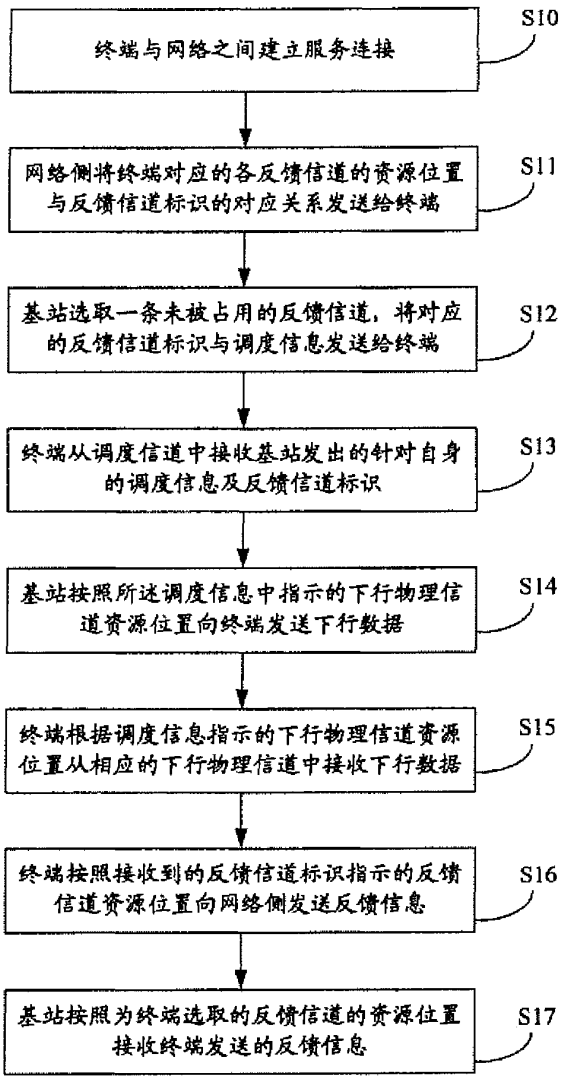

S10
终端与网络之间建立服务连接
S11
网络侧将终端对应的各反馈信道的资源位置与反馈信道标识的对应关系发送给终端
S12
基站选取一条未被占用的反馈信道，将对应的反馈信道标识与调度信息发送给终端
S13
终端从调度信道中接收基站发出的针对自身的调度信息及反馈信道标识
S14
基站按照所述调度信息中指示的下行物理信道资源位置向终端发送下行数据
S15
终端根据调度信息指示的下行物理信道资源位置从相应的下行物理信道中接收下行数据
S16
终端按照接收到的反馈信道标识指示的反馈信道资源位置向网络侧发送反馈信息
S17
基站按照为终端选取的反馈信道的资源位置接收终端发送的反馈信息

图 1

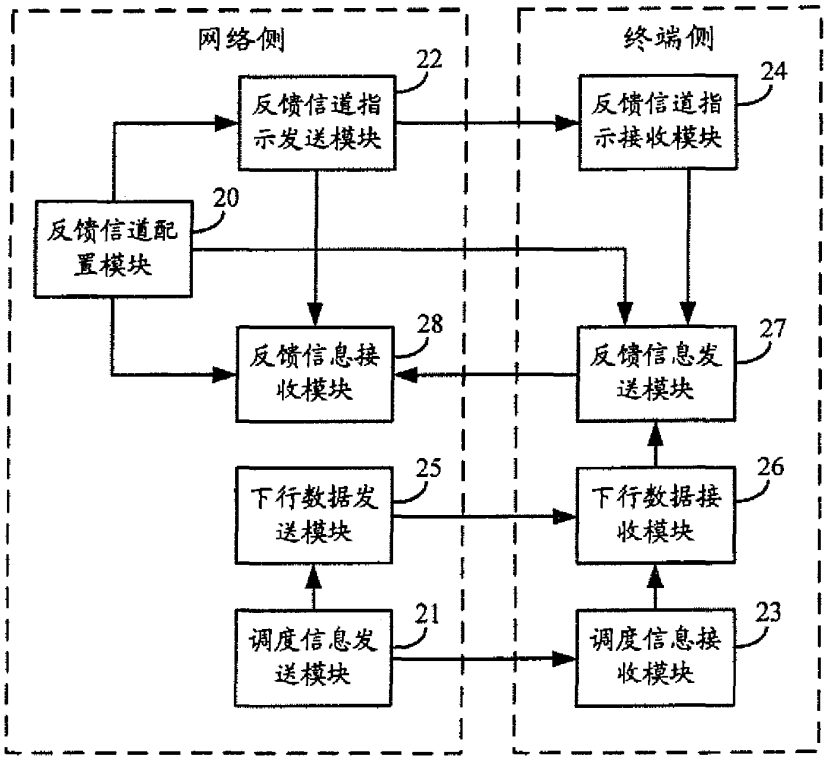

网络侧
终端侧
22
反馈信道指示发送模块
24
反馈信道指示接收模块
20
反馈信道配置模块
28
反馈信息接收模块
27
反馈信息发送模块
25
下行数据发送模块
26
下行数据接收模块
21
调度信息发送模块
23
调度信息接收模块

图 2

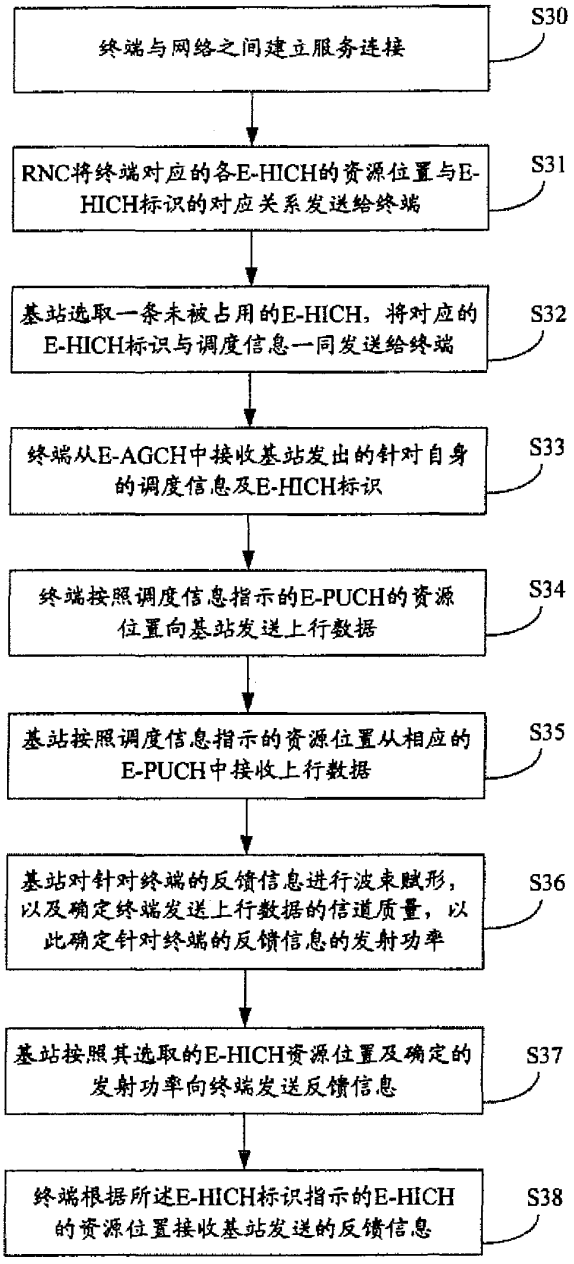

终端与网络之间建立服务连接
S30
RNC将终端对应的各E-HICH的资源位置与E-HICH标识的对应关系发送给终端
S31
基站选取一条未被占用的E-HICH，将对应的E-HICH标识与调度信息一同发送给终端
S32
终端从E-AGCH中接收基站发出的针对自身的调度信息及E-HICH标识
S33
终端按照调度信息指示的E-PUCH的资源位置向基站发送上行数据
S34
基站按照调度信息指示的资源位置从相应的E-PUCH中接收上行数据
S35
基站对针对终端的反馈信息进行波束赋形，以及确定终端发送上行数据的信道质量，以此确定针对终端的反馈信息的发射功率
S36
基站按照其选取的E-HICH资源位置及确定的发射功率向终端发送反馈信息
S37
终端根据所述E-HICH标识指示的E-HICH的资源位置接收基站发送的反馈信息
S38

图 3

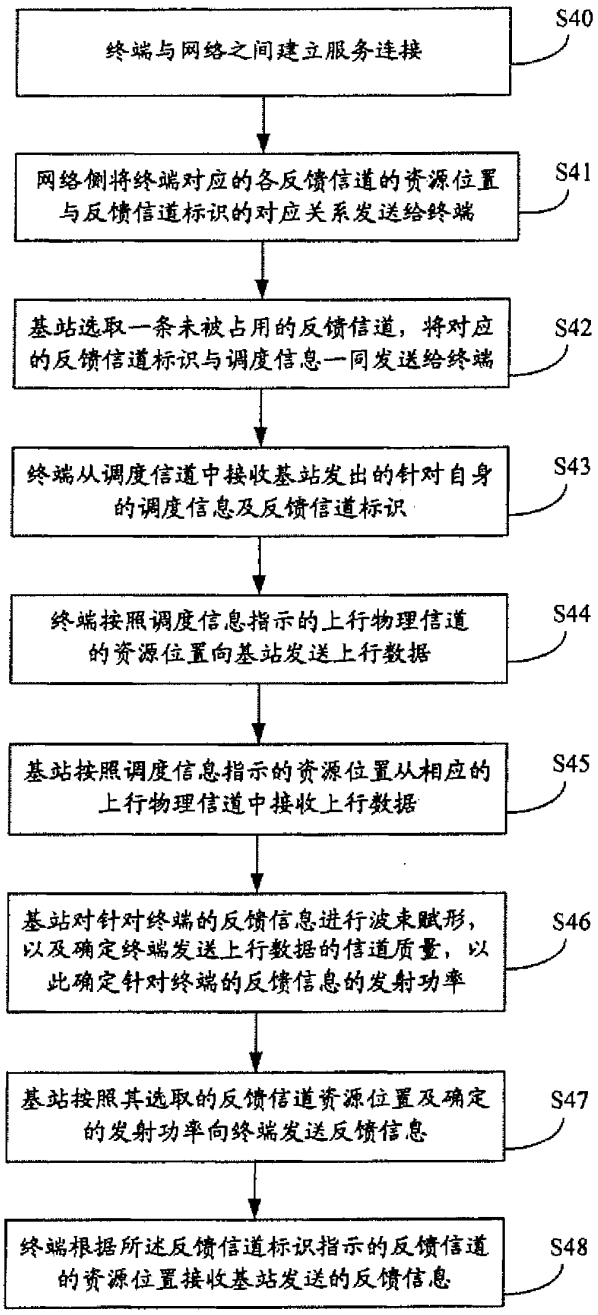

S40
终端与网络之间建立服务连接
S41
网络侧将终端对应的各反馈信道的资源位置与反馈信道标识的对应关系发送给终端
S42
基站选取一条未被占用的反馈信道，将对应的反馈信道标识与调度信息一同发送给终端
S43
终端从调度信道中接收基站发出的针对自身的调度信息及反馈信道标识
S44
终端按照调度信息指示的上行物理信道的资源位置向基站发送上行数据
S45
基站按照调度信息指示的资源位置从相应的上行物理信道中接收上行数据
S46
基站对针对终端的反馈信息进行波束赋形，以及确定终端发送上行数据的信道质量，以此确定针对终端的反馈信息的发射功率
S47
基站按照其选取的反馈信道资源位置及确定的发射功率向终端发送反馈信息
S48
终端根据所述反馈信道标识指示的反馈信道的资源位置接收基站发送的反馈信息

图 4

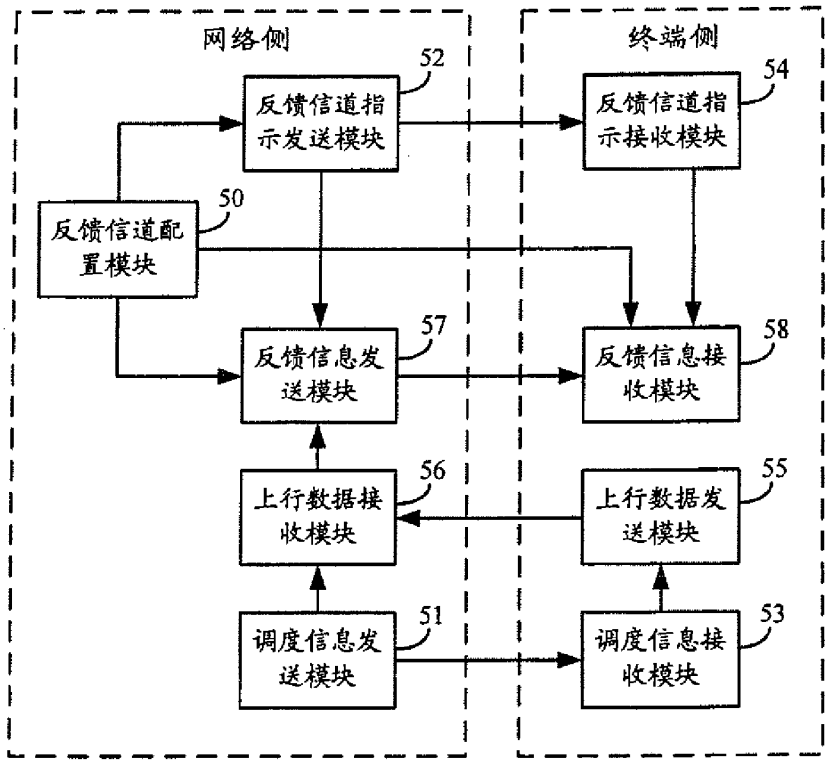

网络侧
终端侧
52
反馈信道指示发送模块
54
反馈信道指示接收模块
50
反馈信道配置模块
57
反馈信息发送模块
58
反馈信息接收模块
56
上行数据接收模块
55
上行数据发送模块
51
调度信息发送模块
53
调度信息接收模块

图 5

Abstract of CN101267284 (A)

The present invention discloses a method for executing confirmation information feedback in the physical ascending shearing channel. The method comprises the following procedures: carrying a value of a descending sub-frame corresponding with a confirmation information fed back by an ascending sub-frame in the descending control information by a base station, and transmitting data in a plurality of descending sub-frames which are continuous after the sub-frame bearing the descending control information, wherein, the number of the descending sub-frame for transmitting data is equal to the number of the descending sub-frame corresponding with the confirmation information fed back by an ascending sub-frame; ; and when the user facility receives the descending sub-frame which bears the descending control information, receiving data from the descending sub-frame for transmitting data after the descending sub-frame, and feeding back the received confirmation information by the ascending sub-frame through the physical ascending shearing channel. Through the using of the invention, the feedback efficiency and operation efficiency of the system can be increased. The characteristic of the ascending single carrier can be guaranteed and the problem of descending data loss can be settled. The time delay is reduced and the capability of the system can be guaranteed.

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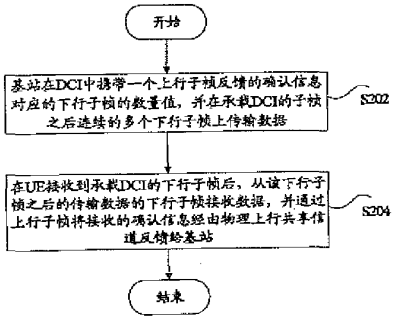
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权利要求书 3 页 说明书 12 页 附图 2 页

[54] 发明名称

在物理上行共享信道进行确认信息反馈的方法

[57] 摘要

本发明公开了一种在物理上行共享信道进行确认信息反馈的方法，包括：基站在下行控制信息中携带一个上行子帧反馈的确认信息对应的下行子帧的数量值，并在承载该下行控制信息的子帧之后连续的多个下行子帧上传输数据，其中，传输数据的下行子帧的数量等于一个上行子帧反馈的确认信息对应的下行子帧的数量；在用户设备接收到承载下行控制信息的下行子帧后，从该下行子帧之后的传输数据的下行子帧接收数据，并通过上行子帧将接收的确认信息经由物理上行共享信道反馈给基站。通过使用本发明，能够提高反馈效率和系统工作效率，保证上行单载波的特性解决下行数据丢失的问题，减少时延，保证系统的性能。



1. 一种在物理上行共享信道进行确认信息反馈的方法，用于在时分双工系统中下行子帧的数量大于上行子帧的数量的情况下使用户设备向基站反馈是否正确接收所述下行子帧的数据，其特征在于，所述方法包括：

所述基站在下行控制信息中携带一个上行子帧反馈的确认信息对应的下行子帧的数量值，并在承载所述下行控制信息的子帧之后连续的多个下行子帧上传输数据，其中，所述传输数据的下行子帧的数量等于所述一个上行子帧反馈的确认信息对应的下行子帧的数量；

在所述用户设备接收到所述承载下行控制信息的下行子帧后，从该下行子帧之后的所述传输数据的下行子帧接收数据，并通过上行子帧将接收的确认信息经由物理上行共享信道反馈给所述基站。

2. 根据权利要求 1 所述的方法，其特征在于，所述基站利用所述下行控制信息中用于在下行子帧的数量小于上行子帧的数量的情况下表示传输上行数据所在的上行子帧索引的信令携带所述一个上行子帧反馈的确认信息对应的下行子帧的数量。

3. 根据权利要求 1 所述的方法，其特征在于，所述基站根据当前下行/上行子帧数配置模式确定所述一个上行子帧反馈的信息对应的全部下行子帧的数量值的集合，并根据实际需要的传输数据量从所述集合中选择相应的数量值携带在所述下行控制信息中。

4. 根据权利要求 1 所述的方法，其特征在于，所述基站将与所述物理上行共享信道分配相关的控制信令在所述上行子帧反馈的确认信息对应的下行子帧中的第一个下行子帧上发送。

5. 根据权利要求 1 所述的方法，其特征在于，在反馈给所述基站的上行子帧中，所述用户设备以接收的所述传输数据的下行子帧的编号的顺序对每个所述传输数据的下行子帧进行接收并反馈相应的确认信息。

6. 根据权利要求 1 至 5 中任一项所述的方法，其特征在于，在所述用户设备未从所述传输数据的子帧中检测到与传输的数据对应的物理下行控制信道、或未接收到其中的数据的情况下，所述用户设备反馈错误应答消息作为该下行子帧的确认信息；在所述用户设备从所述传输数据的子帧中检测到与传输的数据对应的物理下行控制信道的情况下，所述用户设备解析该下行子帧中的数据，并在成功解析的情况下反馈正确应答消息作为确认信息，否则反馈错误应答消息作为确认信息。

7. 根据权利要求 6 所述的方法，其特征在于，

在所述传输数据的下行子帧中的数据为单码字流发送的情况下，所述用户设备向所述基站反馈的所述上行子帧中的每个确认信息对应于一个传输数据的下行子帧的码字流；

在所述传输数据的下行子帧中的数据为多码字流发送的情况下，对于一个传输数据的下行子帧，所述用户设备获取对应于其中的每个码字流的确认信息，在获取的所述确认信息中的任意一个或多个确认信息为错误应答消息的情况下，所述用户设备将该下行子帧的确认信息置为错误应答；在获取的所述确认信息均为正确应答消息的情况下，所述用户设备将该下行子帧的确认信息置为正确应答。

8. 根据权利要求 6 所述的方法，其特征在于，

在所述用户设备反馈多组确认信息的情况下，每组反馈的确认信息数量等于该下行子帧中的最大码字流数，且每个组中的各确认信息与对应下行子帧的码字流的确认信息一一对应；

在下行子帧的码字流数小于所述下行子帧中的最大码字流数的情况下，用户反馈最大码字流数的确认信息，其中，将无对应码字流的确认信息设置为预设的固定值；

在所述用户设备未从所述传输数据的子帧中检测到与传输的数据对应的物理下行控制信道，所述用户设备反馈错误应答消息作为该下行子帧对应组内每个码字流的确认信息。

9. 根据权利要求 1 所述的方法，其特征在于，在所述基站发送给所述用户设备的下行子帧中包括不能够传输数据的特殊子帧的情况下，所述用户设备反馈确认信息时不考虑所述特殊子帧。

在物理上行共享信道进行确认信息反馈的方法

技术领域

本发明涉及通信领域，并且特别地，涉及一种在物理上行共享信道（Physical Uplink Shared Channel，PUSCH）进行确认信息反馈的方法。

背景技术

图 1 示出了长期演进（Long Term Evolution，LTE）系统时分双工（Time Division Duplex，TDD）模式的帧结构。如图 1 所示，在这种帧结构中，一个 10ms 的无线帧（radio frame）被分成两个半帧（half frame），每个半帧分成 10 个长度为 0.5ms 时隙，相邻两个时隙组成一个长度为 1ms 的子帧。一个半帧中包含 5 个子帧。对于标准循环前缀（Normal Cyclic Prefix，Normal CP），一个时隙包含 7 个长度为 66.7us 的符号，其中第一个符号的 CP 长度为 5.21us，其余 6 个符号的 CP 长度为 4.69us；对于扩展（Extended）CP，一个时隙包含 6 个符号，所有符号的 CP 长度均为 16.67us。在这种帧结构中，子帧的配制特点为：

（1）为了减少上下行子帧数的配置数目，LTE TDD 规定了 7 种上下行子帧数在一个无线帧中的配置方案，见表 1。所有子帧都分成三类，一是下行子帧；一是特殊子帧；一是上行子帧；如配置 1 时，子帧 2，3，7，8 用于上行传输，子帧 0，4，5，9 用于下行传输，同时子帧 1，6 为特殊子帧。

（2）特殊子帧包含 3 个特殊时隙，分别是下行导频时隙（Downlink Pilot Time Slot，DwPTS）、保护间隔（Guard Period，GP）及上行导频时隙（Uplink Pilot Time Slot，UpPTS），其中：DwPTS 用于下行，最少一个符号用于传输 P-SCH（Primary-Synchronization Channel，主同步信道）；GP 为保护时间，不传输任何数据；以及 UpPTS 用于上行，可以用于传输随机接入信道（Random Access Channel， RACH）、探测（sounding）导频等信号；及

（3）特殊子帧的前一个子帧固定用于下行传输；特殊子帧的后一个子帧固定用于上行传输。

DL/UL 比例配置	转换点周期	子帧号									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	10 ms	D	S	U	U	U	D	S	U	U	D

表 1

表 1 示出了 LTE TDD 上下行比例配置，其中，D 表示下行子帧，U 表示上行子帧，S 表示特殊子帧。

DL/UL 比例配置	转换点周期	子帧号									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	-	-	1	-	1	-	-	1	-	1
1		-	-	2	1	-	-	-	2	1	-
2		-	-	4	-	-	-	-	4	-	-
3	10 ms	-	-	3	2	2	-	-	-	-	-
4		-	-	4	4	-	-	-	-	-	-
5		-	-	9	-	-	-	-	-	-	-
6		-	-	1	1	1	-	-	1	1	-

表 2

表 2 示出了上行子帧反馈确认信息时对应的下行子帧数目。

在 LTE TDD 中，UE 应在子帧 n + k（k>3）的上行子帧物理上行控制信道（Physical Uplink Control Channel，PUCCH）中进行反馈对下行子帧 n 中的物理下行共享信道（Physical Downlink Shared Channel，PDSCH）数据的正确应答/错误应答消息（ACK/NACK）。也可以在该上行子帧中用于上行数据传输的物理上行共享信道中进行反馈该确认信息 ACK/NACK。其中，上行子帧 PUCCH 的索引通过发送下行数据的子帧序号和其对应的物理下行控制信道（Physical Downlink Control Channel，PDCCH）所在的最小控制信道单元（Control Channel Element，CCE）序号隐含指示；

下行控制信息（Downlink Control Information，DCI）格式 0（format 0）用于传输和 PUSCH 相关的控制信息；

在 LTE TDD 的某些上下行子帧数的配置下，下行分配的子帧数目会大于上行分配的子帧数目，即一个上行子帧需要反馈多个 PDSCH 子帧的 ACK/NACK 信息（表 2 示出了在表 1 的不同配置时，上行子帧反馈下行 PDSCH 对应的 ACK/NACK 数目）。由于 LTE 上行需要满足单载波特性，因此一个必需要解决的问题是如何在一个

上行子帧中反馈多个下行 PDSCH 子帧的 ACK/NACK 信息。一种方法就是将多个下行子帧的 ACK/NACK 信息和上行数据一起在物理上行共享信道（Physical Uplink Shared Channel，PUSCH）中进行传输。

当采用上述方法时，如果没有正确检测到下行数据对应的控制信道时，用户设备（User Equipment，UE）就不会反馈 ACK/NACK 信息，即，出现断续传输（Discontinuous Transmission，DTX）的情况，那么该下行数据对应的确认信息就不能和其他下行数据对应的确认信息一起在 PUSCH 上发送，由于基站不知道发送的下行数据是否发生 DTX，以及哪个下行数据发生 DTX，仍然，按照所有下行数据全部接收到来处理，这样很容易把本应该反馈 NACK 的确认信息（DTX 应该视为 NACK）误以 ACK 作为确认信息进行反馈，更有可能由于反馈的确认信息的数量不一致，导致其他下行数据的确认信息检测错误，结果就会出现该下行子帧数据丢失的情况，UE 就不能正确的获取接收到的数据块所传递的信息，需要更高层来进行重传处理，这就增加了额外的延时。

然而，目前尚未提出能够解决这种下行数据丢失的问题的技术方案。

发明内容

考虑到上述问题而做出本发明，为此，本发明的主要目的在于提供一种物理上行共享信道进行消息反馈的方案，以解决相关技术中存在的下行数据丢失的问题。

根据本发明的实施例，提供了一种在物理上行共享信道进行确认信息反馈的方法，用于在时分双工系统中下行子帧的数量大于上

行子帧的数量的情况下使用户设备向基站反馈是否正确接收下行子帧的数据。

该方法包括：基站在下行控制信息中携带一个上行子帧反馈的确认信息对应的下行子帧的数量值，并在承载下行控制信息的子帧之后连续的多个下行子帧上传输数据，其中，传输数据的下行子帧的数量等于一个上行子帧反馈的确认信息对应的下行子帧的数量；在用户设备接收到承载该下行控制信息的下行子帧后，从该下行子帧之后的传输数据的下行子帧上接收数据，并通过上行子帧将接收的确认信息经由物理上行共享信道反馈给基站。

其中，基站利用下行控制信息中用于在下行子帧的数量小于上行子帧的数量的情况下表示传输上行数据所在的上行子帧索引的信令携带一个上行子帧反馈的确认信息对应的下行子帧的数量。

另外，基站根据当前下行/上行子帧数配置模式确定一个上行子帧反馈的信息对应的全部下行子帧的数量值的集合，并根据实际需要的传输数据量从集合中选择相应的数量值携带在下行控制信息中。

优选地，基站将与物理上行共享信道分配相关的控制信令在上行子帧反馈的确认信息对应的下行子帧中的第一个下行子帧上发送。

并且，在反馈给基站的上行子帧中，用户设备以接收的传输数据的下行子帧的编号的顺序对每个传输数据的下行子帧进行接收并反馈相应的接收确认信息。

优选地，在用户设备未从传输数据的子帧中检测到与传输的数据对应的物理下行控制信道、或未接收到其中的数据的情况下，用户设备反馈错误应答消息作为该下行子帧的确认信息；在用户设备

从传输数据的子帧中检测到与传输的数据对应的物理下行控制信道的情况下，用户设备解析该下行子帧中的数据，并在成功解析的情况下反馈正确应答消息作为确认信息，否则反馈错误应答消息作为确认信息。

其中，一方面，在传输数据的下行子帧中的数据为单码字流发送的情况下，用户设备向基站反馈的上行子帧中的每个确认信息对应于一个传输数据的下行子帧的码字流；在传输数据的下行子帧中的数据为多码字流发送的情况下，对于一个传输数据的下行子帧，UE 获取对应于其中的每个码字流的确认信息，在获取的确认信息中的任意一个或多个确认信息为错误应答消息的情况下，用户设备将该下行子帧的确认信息置为错误应答；在获取的确认信息均为正确应答消息的情况下，用户设备将该下行子帧的确认信息置为正确应答。

另一方面，在用户设备反馈多组确认信息的情况下，每组反馈的确认信息数量等于该下行子帧中的最大码字流数，且每个组中的各确认信息与对应下行子帧的码字流的确认信息一一对应；在下行子帧的码字流数小于下行子帧中的最大码字流数的情况下，用户反馈最大码字流数的确认信息，其中，将无对应码字流的确认信息设置为预设的固定值；在用户设备未从传输数据的子帧中检测到与传输的数据对应的物理下行控制信道，用户设备反馈错误应答消息作为该下行子帧对应组内每个码字流的确认信息。

此外，在基站发送给用户设备的下行子帧中包括不能够传输数据的特殊子帧的情况下，用户设备反馈确认信息时不考虑特殊子帧。

通过本发明的上述技术方案，能够提高反馈效率和系统工作效率，保证上行单载波的特性解决下行数据丢失的问题，减少时延，保证系统的性能。

附图说明

此处所说明的附图用来提供对本发明的进一步理解，构成本申请的一部分，本发明的示意性实施例及其说明用于解释本发明，并不构成对本发明的不当限定。在附图中：

图 1 是根据相关技术的 LTE 系统在 TDD 模式下的帧结构的示意图；

图 2 是根据本发明实施例的在 PUSCH 进行确认信息反馈的方法的流程图；

图 3 是根据本发明实施例的方法的处理实例中进行反馈时上下行子帧的对应关系的示意图。

具体实施方式

在本发明实施例中，提供了一种在 PUSCH 进行确认信息反馈的方法，用于在时分双工系统中下行子帧的数量大于上行子帧的数量的情况下使 UE 向基站反馈是否正确接收下行子帧的数据。

如图 2 所示，根据本发明实施例的在物理上行共享信道进行确认信息反馈的方法包括：步骤 S202，基站在下行控制信息（DCI）中携带一个上行子帧反馈的确认信息对应的下行子帧的数量值，并在承载 DCI 的子帧之后连续的多个下行子帧上传输数据，其中，传输数据的下行子帧的数量等于一个上行子帧反馈的确认信息对应的下行子帧的数量；步骤 S204，在 UE 接收到承载 DCI 的下行子帧后，从该下行子帧之后的传输数据的下行子帧接收数据，并通过上行子帧将接收的确认信息经由物理上行共享信道反馈给基站。

其中，基站利用 DCI 中用于在下行子帧的数量小于上行子帧的数量的情况下表示传输上行数据所在的上行子帧索引的信令携带一个上行子帧反馈的确认信息对应的下行子帧的数量。

在 DCI format 0 中发送表示在一个上行子帧中反馈的确认信息对应的下行子帧数量（k）的信令；

也就是说，在 DCI format 0 中用 TDD 系统中表示传输上行数据所在的上行子帧索引的信令，在下行子帧数量大于上行子帧的数量时，可以复用表示在一个上行子帧中反馈的确认信息对应的下行子帧数的信令。且该信令还可以表示从承载 DCI format 0 的下行子帧开始，连续 k 个下行子帧都发送有目标 UE 的数据；k 是 H 集合中的一个元素，由用作 TDD 系统中表示传输上行数据所在的上行子帧索引的信令来指示 k 的取值。

另外，基站根据当前下行/上行子帧数配置模式确定一个上行子帧反馈的信息对应的全部下行子帧的数量值的集合，并根据实际需要的传输数据量从集合中选择相应的数量值携带在 DCI 中。

也就是说，上述 k 的取值范围（集合 H）根据上下行比例配置来选择，例如，针对 5ms 周期转换点，根据配置模式的选择如下：

配置 1，H 是集合 M 的任意非空子集，其中 M = {1, 2}；推荐 H={1，2}；

配置 2，H 是集合 M 的任意非空子集，其中 M = {1, 2, 3, 4}；推荐 H={1, 2, 3, 4}；

针对 10ms 周期转换点，选择如下：

配置 3，H 是集合 M 的任意非空子集，其中 M = {1, 2, 3}；推荐 H={1, 2, 3}；

配置 4，H 是集合 M 的任意非空子集，其中 M = {1, 2, 3, 4};推荐 H={1, 2, 3, 4}；

配置 5，H 是集合 M 的任意非空子集，其中 M = {1, 2, 3, 4, 5, 6, 7, 8, 9}；推荐 H={1, 2, 3, 4}、或者 H={1, 3, 6, 9} 。

并且，在反馈给基站的上行子帧中，UE 以接收的传输数据的下行子帧的编号的顺序对每个传输数据的下行子帧进行接收并反馈相应的确认信息。

此外，在该方法中，在 UE 未从传输数据的子帧中检测到与传输的数据对应的物理下行控制信道、或未接收到其中的数据的情况下，UE 反馈 NACK 消息作为该下行子帧的确认信息；在 UE 从传输数据的子帧中检测到与传输的数据对应的物理下行控制信道的情况下，UE 解析该下行子帧中的数据，并在成功解析的情况下反馈 ACK 消息作为确认信息，否则反馈 NACK 消息作为确认信息。

也就是说，从发送上行数据相关的控制信令的下行子帧开始，按照下行子帧序号依次反馈 ACK/NACK，反馈 ACK/NACK 顺序与 ACK/NACK 所在下行子帧顺序相对应；当 UE 在应该传输数据的下行子帧上没有检测到相应的 PDCCH 时，该下行子帧反馈的确认信息为 NACK；如果检测到相应的 PDCCH，就解数据并反馈相应的 ACK/NACK。

此外，在传输数据的下行子帧中的数据为单码字流发送的情况下，UE 向基站反馈的上行子帧中的每个确认信息对应于一个传输数据的下行子帧的码字流；在传输数据的下行子帧中的数据为多码字流发送的情况下，对于一个传输数据的下行子帧，用户设备获取

对应于其中的每个码字流的确认信息，在获取的确认信息中的任意一个或多个确认信息为 NACK 消息的情况下，UE 将该下行子帧的确认信息置为 NACK；在获取的确认信息均为 ACK 消息的情况下，UE 将该下行子帧的确认信息置为 ACK。

也就是说，假设有 k 个下行子帧的 ACK/NACK 信息在一个上行子帧上反馈，当 k>1 时，每个下行子帧反馈一个 ACK/NACK 信息，当下行数据为单码字流发送时，每个发送单码字流的下行子帧反馈一个 ACK/NACK；当下行数据为多码字流发送时，每个发送多码字流的下行子帧，先将所有码字流对应的 ACK/NACK 进行‘与’操作，然后，将与操作的结果反馈给基站；

而当 k=1 时，多码字流不需要进行与操作，直接将各码字流对应的 ACK/NACK，按照码字流序号的顺序反馈对应的 ACK/NACK。

另一方面，在用户设备反馈多组确认信息的情况下，每组反馈的确认信息数量等于该下行子帧中的最大码字流数，且每个组中的各确认信息与对应下行子帧的码字流的确认信息一一对应；在下行子帧的码字流数小于下行子帧中的最大码字流数的情况下，用户反馈最大码字流数的确认信息，其中，将无对应码字流的确认信息设置为预设的固定值；在用户设备未从传输数据的子帧中检测到与传输的数据对应的物理下行控制信道，用户设备反馈错误应答消息作为该下行子帧对应组内每个码字流的确认信息。

也就是说，在 k 个下行子帧的 ACK/NACK 信息在一个上行子帧上反馈，下行子帧的最大码字流数为 m 的情况下，UE 反馈 k 组 ACK/NACK 信息，每一个组对应一个下行子帧，每组包含 m 个 ACK/NACK 信息，组中每一个 ACK/NACK 信对应该组对应的下行子帧中的一个码字流的 ACK/NACK 信息，当单码字流时，其他码字流的 ACK/NACK 信息为默认值，该默认值为 NACK 信息。

在基站发送给用户设备的下行子帧中包括不能够传输数据的特殊子帧的情况下，用户设备反馈确认信息时不考虑特殊子帧。即，当特殊子帧不能发送下行数据时，特殊子帧不包括在上述连续下行子帧内，基站计算和 UE 接收时可以不把特殊子帧包括进来，此时，特殊子帧不需要反馈 ACK/NACK 信息。

此外，在该方法中，优选地，DCI format 0 会在该上行子帧反馈的确认信息对应的下行子帧中的第一个下行子帧上发送。

此外，还可以将这些反馈的 ACK/NACK 信息和上行数据一起在 PUSCH 上发送。

下面将结合具体实例描述本发明。

以 LTE TDD 系统为例，假设存在连续 20 个子帧，上下行比例配置为上述表 1 的配置 4 时，子帧 0、子帧 1、子帧 4、子帧 5、子帧 6、子帧 7、子帧 8、子帧 9、子帧 10、子帧 11、子帧 14、子帧 15、子帧 16、子帧 17、子帧 18、子帧 19 为下行子帧，子帧 2、子帧 3、子帧 12、子帧 13 为上行子帧，根据下行定时关系，子帧 0、1、4、5 的 ACK/NACK 在子帧 12 反馈，子帧 6、7、8、9 的 ACK/NACK 在子帧 13 反馈，如图 3 所示；

显然，此时 H={1，2，3，4}；

假设基站在下行子帧 6、7、8、9 上发送数据给目标 UE，目标 UE 在子帧 13 传输上行数据和相应的下行子帧的 ACK/NACK 信息；

目标 UE 的 DCI format 0 的信令信息在下行子帧 6 上发送，并且，利用 DCI format 0 中专门用于 TDD 系统中指示该上行数据所在上行子帧索引的信令来表示用于承载基站发送给目标 UE 的数据的下行子帧的数量；

目标 UE 在下行子帧 6 上检测到 DCI format 0 的信息，获知下行子帧 6、7、8、9 有数据发送，目标 UE 在下行子帧 6、7、8、9 上检测相应的下行控制信道，根据下行控制信道找到相应下行数据的位置，进行解码，如果译码正确反馈 ACK，如果译码不正确反馈 NACK，当在目标下行子帧上没有检测到相应下行控制信道时候，该下行子帧反馈 NACK;

最后，将这些按照下行子帧序号依次排好的反馈信息和上行数据一起在 PUSCH 上发送;

如果承载基站发送给目标 UE 数据的下行子帧的数量为 1，该下行子帧上为多码字流传输，则每个码字流反馈一个确认信息，如果译码正确反馈 ACK，如果译码不正确反馈 NACK，最后，将这些按照码字流序号排序的确认信息和上行数据一起在 PUSCH 上发送;

如果承载基站发送给目标 UE 数据的下行子帧的数量大于 1，下行子帧中有多码字流传输，则多码字流传输的下行子帧需要将多个码字流的确认信息合并为一个确认信息，作为该子帧的确认信息，最后，将这些按照下行子帧编号排序的确认信息和上行数据一起在 PUSCH 上发送。

综上所述，本发明实现了在上行 PUSCH 上发送多个下行子帧 ACK/NACK 的目的，借助于本发明的技术方案，可以有效提高反馈效率和系统工作效率，保证上行单载波的特性解决下行数据丢失的问题，减少时延，保证系统的性能。

以上所述仅为本发明的优选实施例而已，并不用于限制本发明，对于本领域的技术人员来说，本发明可以有各种更改和变化。凡在本发明的精神和原则之内，所作的任何修改、等同替换、改进等，均应包含在本发明的保护范围之内。

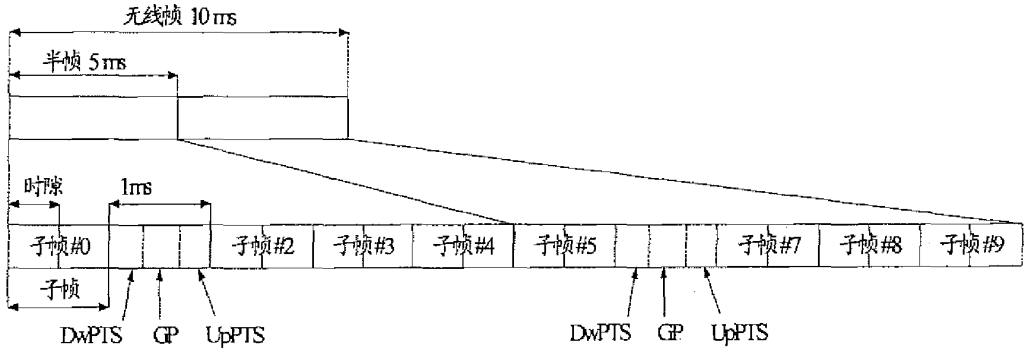

无线帧 10ms
半帧 5ms
时隙
1ms
子帧#0
子帧#2
子帧#3
子帧#4
子帧#5
子帧#7
子帧#8
子帧#9
子帧
DwPTS
GP
UpPTS
DwPTS
GP
UpPTS

图 1

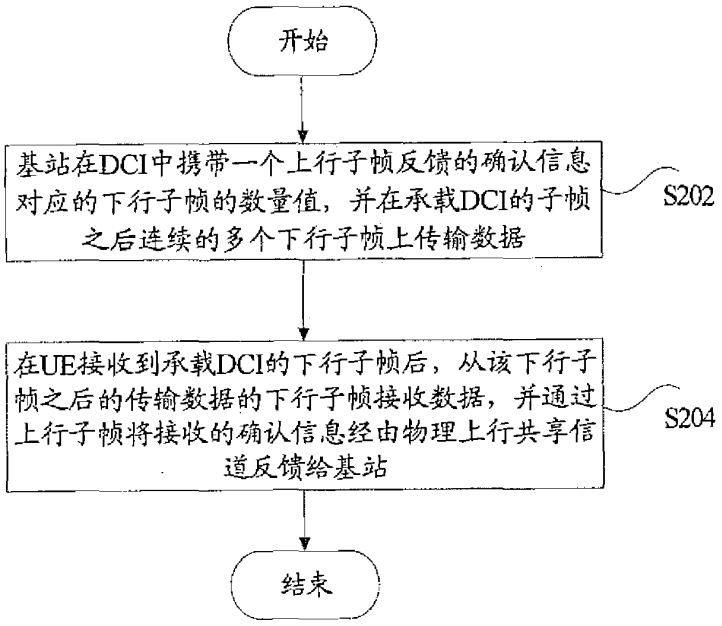

开始
基站在DCI中携带一个上行子帧反馈的确认信息对应的下行子帧的数量值，并在承载DCI的子帧之后连续的多个下行子帧上传输数据
S202
在UE接收到承载DCI的下行子帧后，从该下行子帧之后的传输数据的下行子帧接收数据，并通过上行子帧将接收的确认信息经由物理上行共享信道反馈给基站
S204
结束

图 2

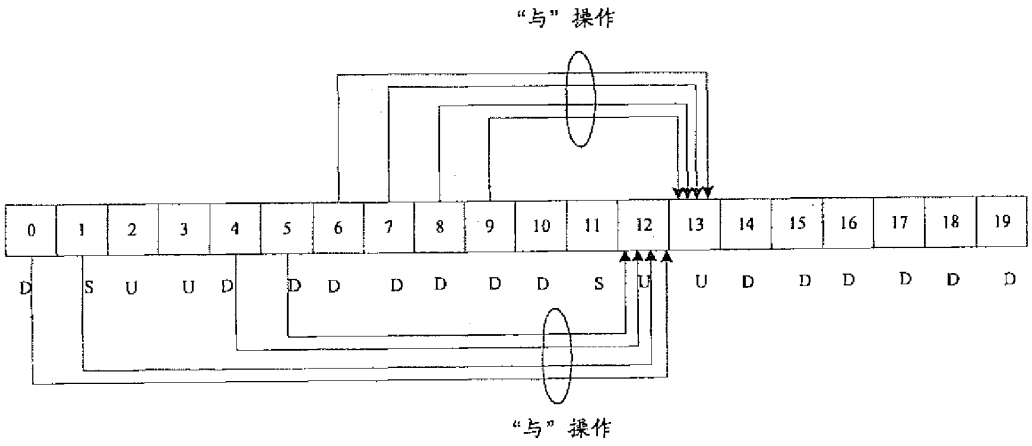

"与"操作
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
D S U U D D D D D D D S U U D D D D D D
"与"操作

图 3

Abstract of CN101267285 (A)

The present invention presents a confirmation information feedback method. The method comprises the following procedures: dividing a plurality of descending sub-frames into two descending sub-frame groups, and informing two divided descending sub-frame groups and the sequence numbers of the descending sub-frames which are included in each descending sub-frame group to a base station and a terminal, wherein, a plurality of descending sub-frames feed back the confirmation information in a same ascending sub-frame, and each descending sub-frame group at least comprises a descending sub-frame; and feeding back the data of the descending sub-frame group by the terminal with the indication field in the ascending physical control channel corresponding with two descending sub-frame groups. Through the invention, the transmission time delay of the system is reduced and the capability of the system is increased.

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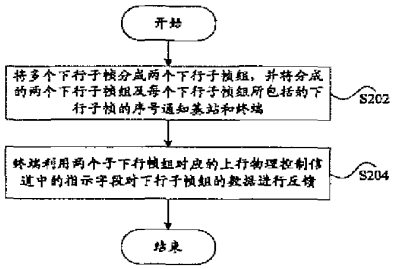
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权利要求书 5 页 说明书 18 页 附图 3 页

[54] 发明名称

确认信息反馈方法

[57] 摘要

本发明提出了一种确认信息反馈方法该方法包括：将多个下行子帧分成两个下行子帧组，并将分成的两个下行子帧组及每个下行子帧组所包括的下行子帧的序号通知基站和终端，其中，所述多个下行子帧在同一个上行子帧反馈确认信息，每个下行子帧组至少包括一个下行子帧；所述终端利用所述两个下行子帧组对应的上行物理控制信道中的指示字段对所述下行子帧组的数据进行反馈。 通过本发明，减少了系统的传输时延，提高了系统的性能。



1. 一种确认信息反馈方法，其特征在于，包括：

将多个下行子帧分成两个下行子帧组，并将分成的两个下行子帧组及每个下行子帧组所包括的下行子帧的序号通知基站和终端，其中，所述多个下行子帧在同一个上行子帧反馈确认信息，每个下行子帧组至少包括一个下行子帧；

所述终端利用所述两个下行子帧组对应的上行物理控制信道中的指示字段对所述下行子帧组的数据进行反馈。

2. 根据权利要求 1 所述的方法，其特征在于，所述指示字段占用 2 比特，其中，对于每个下行子帧组，分别使用 1 比特来表示其确认信息，如果所述终端对下行子帧组发送的至少一个数据解码错误，则使用 1 比特进行错误应答；如果所述终端对下行子帧组发送的所有数据解码正确，则使用 1 比特进行正确应答。

3. 根据权利要求 1 或 2 所述的方法，其特征在于，进一步包括：

响应于所述错误应答，所述基站对所述错误应答对应的所述下行子帧组内的所有数据进行重传。

4. 根据权利要求 1 中，其特征在于，所述利用所述两个下行子帧组对应的上行物理控制信道中的指示字段对所述下行子帧组的数据进行反馈具体操作为：

选择所述两个下行子帧组中的任一下行子帧作为参考下行子帧；

将所述参考下行子帧所对应的物理下行控制信道所在的最小控制信道单元所指示的上行物理控制信道设置为所述下行子帧组对应的上行物理控制信道。

5. 根据权利要求 4 所述的方法，其特征在于，所述参考下行子帧为以下之一：在所述两个下行子帧组中，所述终端接收到的第一个下行子帧、所述终端接收到的最后一个下行子帧。

6. 一种确认信息反馈方法，其特征在于，包括：

将多个下行子帧分成若干个下行子帧组，所述多个下行子帧在同一个上行子帧反馈确认信息，并将分成的若干个下行子帧组及每个下行子帧组所包括的下行子帧的序号通知基站和终端，其中，每个下行子帧组包括一个下行子帧或者两个下行子帧；

设置用于表示所述子帧组中传输给所述终端数据的下行子帧的个数的第一指示字段；

所述基站使用所述下行子帧组向所述终端发送数据，并在所述终端对应的下行物理控制信道的下行控制信令中包括所述第一指示字段；

所述终端利用所述两个下行子帧组对应的上行物理控制信道中的第二指示字段对所述下行子帧组的数据进行反馈。

7. 根据权利要求 6 所述的方法，其特征在于，所述基站同时使用一个或两个所述下行子帧组向所述终端发送数据。

8. 根据权利要求 6 或 7 中任一项所述的方法，其特征在于，所述第一指示字段占用 1 比特。

9. 根据权利要求 6 所述的方法，其特征在于，所述第二指示字段占用 2 比特，其中，对于每个下行子帧组，分别使用 1 比特来表示其确认信息，如果所述终端对下行子帧组发送的至少一个数据解码错误，则使用 1 比特进行错误应答；如果所述终端对下行子帧组发送的所有数据解码正确，则使用 1 比特进行正确应答。

10. 根据权利要求 9 所述的方法，其特征在于，如果所述下行子帧组内两个下行子帧中的都有数据发送给所述终端，但所述终端只接收到其中一个下行子帧发送的数据，则该下行子帧组对应的 1bit 确认信息为错误应答。

11. 根据权利要求 9 所述的方法，其特征在于，所述两个下行子帧组对应的确认信息的默认值为错误指示；如果所述终端仅在一个下行子帧组对应的下行子帧上收到数据，则另一个下行子帧组对应的 1bit 确认信息为错误应答。

12. 根据权利要求 6 所述的方法，其特征在于，进一步包括：

响应于所述错误应答，所述基站对所述错误应答对应的所述下行子帧组内的所有数据进行重传。

13. 根据权利要求 6 所述的方法，其特征在于，所述利用所述两个子帧组对应的上行物理控制信道中的第二指示字段对所述子帧组的数据进行反馈具体操作为：

选择所述两个下行子帧组中的任一下行子帧作为参考下行子帧；

将所述参考下行子帧所对应的物理下行控制信道所在的最小控制信道单元所指示的上行物理控制信道设置为所述下行子帧组对应的上行物理控制信道。

14. 根据权利要求 13 所述的方法，其特征在于，所述参考下行子帧为以下之一：在所述两个下行子帧组中，所述终端接收到的第一个下行子帧、所述终端接收到的最后一个下行子帧。

15. 根据权利要求 6 所述的方法，其特征在于，所述将多个下行子帧分成若干个下行子帧组，所述多个下行子帧利用同一个上行子帧反馈确认信息具体操作为：

最多有两个下行子帧利用同一个上行子帧反馈确认信息时，将所述两个下行子帧分成两个下行子帧组，每个下行子帧组各包含一个下行子帧；

最多有三个下行子帧用同一个上行子帧反馈确认信息时，将所述两个下行子帧分成两个下行子帧组，第一个下行子帧组含两个下行子帧，第二个下行子帧组含一个下行子帧，或者第一个下行子帧组含一个下行子帧，第二个下行子帧组含两个下行子帧；

最多有四个下行子帧的确认信息在一个上行子帧上发送时，分成两个下行子帧组，每个下行子帧组各含两个下行子帧。

16. 根据权利要求 6 所述的方法，其特征在于，所述将多个下行子帧分成若干个子帧组，所述多个下行子帧利用同一个上行子帧反馈确认信息具体操作为：

最多有九个下行子帧的确认信息在一个上行子帧上发送时，从第一个下行子帧开始，每三个连续下行子帧作为一个大组，将所述下行子帧划分为三个大组；

每个大组再划分为两个下行子帧小组，第一下行子帧小组含两个下行子帧，第二下行子帧小组含一个下行子帧，或者第一下行子帧小组含一个下行子帧，第二下行子帧小组含两个下行子帧；

在一个上行子帧对应的下行子帧中，基站为每个终端最多在上述一个大组中对应的两个下行子帧小组内的下行子帧上分配资源。

确认信息反馈方法

技术领域

本发明涉及通信领域，尤其涉及一种确认信息反馈方法。

背景技术

图 1 示出了长期演进（Long Term Evolution，简称为 LTE）系统时分双工（Time Division Duplex，简称为 TDD）模式的帧结构，在这种帧结构中，一个 10ms 的无线帧（radio frame）被分成两个半帧（half frame），每个半帧分成 10 个长度为 0.5ms 时隙，相邻两个时隙组成一个长度为 1ms 的子帧。一个半帧中包含 5 个子帧。对于标准循环前缀（Normal Cyclic Prefix，简称为 Normal CP），一个时隙包含 7 个长度为 66.7us 的符号，其中第一个符号的 CP 长度为 5.21us，其余 6 个符号的 CP 长度为 4.69us；对于 Extended（Extended，扩展）CP，一个时隙包含 6 个符号，所有符号的 CP 长度均为 16.67us。在这种帧结构中，子帧的配制特点为：

（1）为了减少上下行子帧数的配置数目，LTE TDD 规定了 7 种上下行子帧数在一个无线帧中的配置方案，如表 1 所示，为不同网络配置模式下，无线帧中上下行子帧的配置方案。所有子帧都分为三类，下行子帧、特殊子帧和上行子帧，其中，D 表示下行子帧，U 表示上行子帧，S 表示特殊子帧。例如配置模式为 1 时，子帧 2，3，7，8 为上行子帧，子帧 0，4，5，9 为下行子帧，子帧 1，6 为特殊子帧。

（2）特殊子帧包含 3 个特殊时隙，分别是下行导频时隙（Downlink Pilot Time Slot，简称为 DwPTS）、保护间隔（Guard Period，简称为 GP）及上行导频时隙（Uplink Pilot Time Slot，简称为 UpPTS）。其中，DwPTS 用于下行，最少一个符号用于传输主同步信道（Primary-Synchronization Channel，简称为 P-SCH）；GP 为保护时间，不传输任何数据；UpPTS 用于上行，可以用于传输随机接入信道（Random Access Channel，简称为 RACH）、探测导频等信号。

（3）特殊子帧的前一个子帧固定为下行子帧，特殊子帧的后一个子帧固定位上行子帧。

表 1 LTE TDD 上下行比例配置

DL/UL 比例配置	转换点周期	子帧号									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	10 ms	D	S	U	U	U	D	S	U	U	D

在 LTE TDD 中，用户设备（User Equipment，简称为 UE）可以在子帧 n + k（k>3）的上行子帧的物理上行控制信道（Physical Uplink Control Channel，简称为 PUCCH）中，对下行子帧 n 中的物理下行共享信道（Physical Downlink Shared Channel，简称为 PDSCH）传输的数据反馈确认信息，进行正确应答（ACK）/错误应答（NACK）；也可以在该上行子帧中用于上行数据传输的物理上行共享信道（Physical Uplink Shared Channel，简称为 PUSCH）中 0 反馈确认信息。其中，上行子帧 PUCCH 的索引通过发送下行数据的子帧序号和其对应的物理下行控制信道（Physical Downlink

Control Channel，简称为 PDCCH）所在的最小控制信道单元（Control Channel Element，简称为 CCE）序号隐含指示；

在 LTE TDD 中，下行分配的子帧数目会大于上行分配的子帧数目，即一个上行子帧需要反馈多个 PDSCH 子帧的确认信息信息，表 2 示出了在表 1 的不同配置下，上行子帧反馈下行 PDSCH 所对应的下行子帧数目。由于 LTE 上行需要满足单载波特性，需要在一个上行子帧中的 PUCCH 中反馈多个下行 PDSCH 子帧的 ACK/NACK 信息。

现有技术的方案为将多个下行子帧的 ACK/NACK 信息进行“与”操作，即只要有一个下行子帧的 PDSCH 对应的确认消息为 NACK，则结果就为 NACK，只有所有下行子帧的 PDSCH 对应的确认消息都为 ACK，结果才为 ACK，表示所有下行子帧的 PDSCH 接收正确。如果确认信息为 NACK，则基站需要重新发送该用户所有下行子帧的 PDSCH 数据。

表 2 上行子帧反馈确认信息时对应的下行子帧数目

DL/UL 比例配置	转换点周期	子帧号									
		0	1	2	3	4	5	6	7	8	9
0		-	-	**1**	-	**1**	-	-	**1**	-	**1**
1	5 ms	-	-	2	1	-	-	-	2	1	-
2		-	-	4	-	-	-	-	4	-	-
3		-	-	3	2	2	-	-	-	-	-
4	10 ms	-	-	4	4	-	-	-	-	-	-
5		-	-	9	-	-	-	-	-	-	-
6		-	-	1	1	1	-	-	1	1	-

当采用上述方法时，如果 UE 没有正确检测到属于它的下行子帧对应的控制信道 PDCCH 时，用户设备就不会反馈 ACK/NACK 信息，出现断续发射（Disontinuous Transmission，简称为 DTX）的情况，那么在该下行子帧中传输的数据对应的确认信息就不能参与到“与”操作过程中，这样很容易把本应该反馈 NACK 的确认信息

（DTX 应该视为 NACK）误以 ACK 进行反馈，会出现 UE 在该下行子帧数据丢失的情况，UE 不能正确的获取接收到的数据块所传递的信息，需要更高层来进行重传处理，这就增加了额外的延时。

发明内容

考虑到相关技术中存在的终端反馈多个下行子帧的确认信息时，系统的传输时延增加，导致系统性能变差的问题而提出本发明，为此，本发明的主要目的在于提供一种确认信息反馈方法，以解决上述问题。

根据本发明的一个方面，提供了一种确认信息反馈方法。

根据本发明实施例的确认信息反馈方法包括：将多个下行子帧分成两个下行子帧组，并将分成的两个下行子帧组及每个下行子帧组所包括的下行子帧的序号通知基站和终端，其中，多个下行子帧在同一个上行子帧反馈确认信息，每个下行子帧组至少包括一个下行子帧；终端利用两个下行子帧组对应的上行物理控制信道中的指示字段对下行子帧组的数据进行反馈。

其中，上述指示字段占用 2 比特，其中，对于每个下行子帧组，分别使用 1 比特来表示其确认信息，如果终端对下行子帧组发送的至少一个数据解码错误，则使用 1 比特进行错误应答；如果终端对下行子帧组发送的所有数据解码正确，则使用 1 比特进行正确应答。

进一步地，该方法还包括：响应于错误应答，基站对错误应答对应的下行子帧组内的所有数据进行重传。

优选地，上述利用两个下行子帧组对应的上行物理控制信道中的指示字段对下行子帧组的数据进行反馈具体操作为：选择两个下行子帧组中的任一下行子帧作为参考下行子帧；将参考下行子帧所

对应的物理下行控制信道所在的最小控制信道单元所指示的上行物理控制信道设置为下行子帧组对应的上行物理控制信道。

其中，上述参考下行子帧为以下之一：在两个下行子帧组中，终端接收到的第一个下行子帧、终端接收到的最后一个下行子帧。

根据本发明的另一个方面，提供了一种确认信息反馈方法。

根据本发明实施例的确认信息反馈方法包括：将多个下行子帧分成若干个下行子帧组，多个下行子帧在同一个上行子帧反馈确认信息，并将分成的若干个下行子帧组及每个下行子帧组所包括的下行子帧的序号通知基站和终端，其中，每个下行子帧组包括一个下行子帧或者两个下行子帧；设置用于表示子帧组中传输给终端数据的下行子帧的个数的第一指示字段；基站使用下行子帧组向终端发送数据，并在终端对应的下行物理控制信道的下行控制信令中包括第一指示字段；终端利用两个下行子帧组对应的上行物理控制信道中的第二指示字段对下行子帧组的数据进行反馈。

优选地，上述基站同时使用一个或两个下行子帧组向终端发送数据。

优选地，上述第一指示字段占用 1 比特。

优选地，上述第二指示字段占用 2 比特，其中，对于每个下行子帧组，分别使用 1 比特来表示其确认信息，如果终端对下行子帧组发送的至少一个数据解码错误，则使用 1 比特进行错误应答；如果终端对下行子帧组发送的所有数据解码正确，则使用 1 比特进行正确应答。

其中，如果上述下行子帧组内两个下行子帧中的都有数据发送给终端，但终端只接收到其中一个下行子帧发送的数据，则该下行子帧组对应的 1bit 确认信息为错误应答。

其中，上述两个下行子帧组对应的确认信息的默认值为错误指示；如果终端仅在一个下行子帧组对应的下行子帧上收到数据，则另一个下行子帧组对应的 1bit 确认信息为错误应答。

进一步地，该方法包括：响应于错误应答，基站对错误应答对应的下行子帧组内的所有数据进行重传。

利用两个子帧组对应的上行物理控制信道中的第二指示字段对子帧组的数据进行反馈具体操作为：选择两个下行子帧组中的任一下行子帧作为参考下行子帧；将参考下行子帧所对应的物理下行控制信道所在的最小控制信道单元所指示的上行物理控制信道设置为下行子帧组对应的上行物理控制信道。

优选地，上述参考下行子帧为以下之一：在两个下行子帧组中，终端接收到的第一个下行子帧、终端接收到的最后一个下行子帧。

优选地，上述将多个下行子帧分成若干个下行子帧组，多个下行子帧利用同一个上行子帧反馈确认信息具体操作为：最多有两个下行子帧利用同一个上行子帧反馈确认信息时，将两个下行子帧分成两个下行子帧组，每个下行子帧组各包含一个下行子帧；最多有三个下行子帧用同一个上行子帧反馈确认信息时，将两个下行子帧分成两个下行子帧组，第一个下行子帧组含两个下行子帧，第二个下行子帧组含一个下行子帧，或者第一个下行子帧组含一个下行子帧，第二个下行子帧组含两个下行子帧；最多有四个下行子帧的确认信息在一个上行子帧上发送时，分成两个下行子帧组，每个下行子帧组各含两个下行子帧。

优选地，上述将多个下行子帧分成若干个子帧组，多个下行子帧利用同一个上行子帧反馈确认信息具体操作为：最多有九个下行子帧的确认信息在一个上行子帧上发送时，从第一个下行子帧开始，每三个连续下行子帧作为一个大组，将下行子帧划分为三个大组；每个大组再划分为两个下行子帧小组，第一下行子帧小组含两个下行子帧，第二下行子帧小组含一个下行子帧，或者第一下行子帧小组含一个下行子帧，第二下行子帧小组含两个下行子帧；在一个上行子帧对应的下行子帧中，基站为每个终端最多在上述一个大组中对应的两个下行子帧小组内的下行子帧上分配资源。

通过本发明的上述至少一个技术方案，减少了系统的传输时延，提高了系统的性能。

附图说明

附图用来提供对本发明的进一步理解，并且构成说明书的一部分，与本发明的实施例一起用于解释本发明，并不构成对本发明的限制。在附图中：

图 1 是根据相关技术的长期演进系统时分双工模式的帧结构示意图；

图 2 是根据本发明方法实施例一的确认信息反馈方法的流程图；

图 3 是根据本发明方法实施例一的网络配置模式为 4 时的下行子帧所对应的上行子帧的示意图；

图 4 是根据本发明方法实施例一的多个下行子帧利用同一上行子帧反馈确认信息示意图；

图 5 是根据本发明方法实施例二的确认信息反馈方法的流程图;

图 6 是根据本发明方法实施例二的多个下行子帧利用同一上行子帧反馈确认信息的示意图。

具体实施方式

在 LTE 上行 PUCCH 信道中定义了一种格式 format 1b，它采用 QPSK 的调制方式，能同时传送 2bit 的 ACK/NACK 信息，在目前 LTE 中规定此格式中的 2bit 分别用于表示 SU-MIMO（Single User-Multiple Input Multiple Output，单用户多输入多输出）中的两个数据流对应的确认信息。

下面将结合附图详细描述本发明。

方法实施例一

根据本发明实施例，提供了一种确认信息反馈方法。

图 2 是根据本发明实施例的确认信息反馈方法的流程图，如图 2 所示，该方法包括以下步骤:

步骤 S202，将多个下行子帧分成两个下行子帧组，并将分成的两个下行子帧组及每个下行子帧组所包括的下行子帧的序号通知基站和终端，其中，多个下行子帧在同一个上行子帧反馈确认信息，每个下行子帧组至少包括一个下行子帧;

步骤 S204，终端利用两个下行子帧组对应的上行物理控制信道中的指示字段对下行子帧组的数据进行反馈。

通过本发明实施例提供的技术方案，减少了系统的传输时延，提高了系统的性能。

优选地，在步骤 S202 中，指示字段可以占用 2 比特，其中，对于每个下行子帧组，分别使用 1 比特来表示其确认信息，如果终端对下行子帧组发送的至少一个数据解码错误，则使用 1 比特进行错误应答；如果终端对下行子帧组发送的所有数据解码正确，则使用 1 比特进行正确应答。

优选地，在步骤 S204 中，响应于错误应答，基站对错误应答对应的下行子帧组内的所有数据进行重传。

优选地，在步骤 S202 中，利用两个下行子帧组对应的上行物理控制信道中的指示字段对下行子帧组的数据进行反馈具体操作为：选择两个下行子帧组中的任一下行子帧作为参考下行子帧；将参考下行子帧所对应的物理下行控制信道所在的最小控制信道单元所指示的上行物理控制信道设置为下行子帧组对应的上行物理控制信道。

其中，上述参考下行子帧为以下之一：在两个下行子帧组中，终端接收到的第一个下行子帧、终端接收到的最后一个下行子帧。

实施例一

不考虑DTX时在一个上行子帧的PUCCH上发送多个下行子帧对应的确认信息。

LTE TDD 中，如果多个下行子帧利用同一个上行子帧反馈确认信息，则将上述多个下行子帧分成两组，分组情况需要基站和 UE 两端事先协商好；

UE根据分组约定，用2bit（即上文所述的指示字段）分别表示两个子帧组内下行子帧PDSCH数据对应的确认信息，该2bit信息可以使用LTE PUCCH的format 1b格式发送，UE发送该确认消息时使用事先约定好的某个下行子帧对应PDCCH所在的最小CCE所指示的PUCCH。其中，每个子帧组的确认信息用1bit表示，可以用“1”表示正确应答（ACK），“0”表示错误应答（NACK），或者反过来，“1”表示错误应答（NACK），“0”表示正确应答（NACK）；组内该用户的各下行子帧PDSCH数据对应的确认信息使用“与”操作合并（如有SU-MIMO，各流也参与“与”操作），如果该子帧组内有一个下行子帧传输的数据的确认信息为NACK，则该子帧组的确认信息即为NACK，基站需要将该子帧组内传输的所有数据重新发送。

其中，对于把多个下行子帧分成两组的具体操作为：

当最多有两个下行子帧利用同一个上行子帧反馈确认信息时，分成两个子帧组，每个子帧组中各包含一个下行子帧；

当最多有三个下行子帧利用同一个上行子帧反馈确认信息时，分成两个子帧组中，可以第一子帧组包含两个下行子帧，第二子帧组包含一个下行子帧，或者，第一子帧组包含一个下行子帧，第二子帧组包含两个下行子帧；

当最多有四个下行子帧利用同一个上行子帧反馈确认信息时，分成两个子帧组，可以每个子帧组中各包含两个下行子帧；或者，第一子帧组包含一个下行子帧，第二子帧组包含三个下行子帧；或者，第一子帧组包含三个下行子帧，第二子帧组包含一个下行子帧；

当最多有九个下行子帧利用同一个上行子帧反馈确认信息时，分成两个子帧组，可以第一子帧子帧组包含5个下行子帧，第二子

帧组包含 4 个下行子帧，或者反过来；可以第一子帧组包含 6 个下行子帧，第二子帧组包含 3 个下行子帧，或者反过来；可以第一子帧组包含 7 个下行子帧，第二子帧组包含 2 个下行子帧，或者反过来；可以第一子帧组包含 8 个下行子帧，第二子帧组包含 1 个下行子帧，或者反过来。

如图 3 示出了网络配置模式为 4 时的下行子帧所对应的上行子帧。如图 3 所示，以 LTE TDD 系统为例，假设连续 20 个子帧，上下行比例配置为上述表 1 的配置 4 时，子帧 0、子帧 1、子帧 4、子帧 5、子帧 6、子帧 7、子帧 8、子帧 9、子帧 10、子帧 11、子帧 14、子帧 15、子帧 16、子帧 17、子帧 18、子帧 19 为下行子帧，子帧 2、子帧 3、子帧 12、子帧 13 为上行子帧，根据上下行定时关系，下行子帧 0、1、4、5 的确认信息（ACK/NACK）在上行子帧 12 上进行反馈，下行子帧 6、7、8、9 的 ACK/NACK 在上行子帧 13 上进行反馈。

图 4 示出了多个下行子帧利用同一上行子帧反馈确认信息示意图。如图 4 所示，事先约定子帧 6，子帧 7 为第一子帧组，子帧 8，子帧 9 为第二子帧组。假设用户在子帧 6，子帧 7，子帧 8，子帧 9 上都有属于该用户的 PDSCH，且每个子帧上的 PDSCH 数据都是两个数据流（SU-MIMO），则首先把子帧 6，子帧 7 上每个流的确认信息（一共 4bit）通过“与”操作合并成 1bit，同样把子帧 8，子帧 9 上每个流的确认信息（一共 4bit）通过“与”操作合并成 1bit，最后把以上得到的 2bit 使用 QPSK 调制，把调制后的一个调制符号承载在事先确定的上行子帧 12 的一个 PUCCH 上发送（LTE PUCCH 的 format 1b 方式）。

方法实施例二

根据本发明实施例，提供了一种确认信息反馈方法。

图 5 是根据本发明实施例的确认信息反馈方法的流程图，如图 5 所示，该方法包括以下步骤：

步骤 S502，将多个下行子帧分成若干个下行子帧组，多个下行子帧在同一个上行子帧反馈确认信息，并将分成的若干个下行子帧组及每个下行子帧组所包括的下行子帧的序号通知基站和终端，其中，每个下行子帧组包括一个下行子帧或者两个下行子帧；

步骤 S504，设置用于表示子帧组中传输给终端数据的下行子帧的个数的第一指示字段；

步骤 S506，基站使用下行子帧组向终端发送数据，并在终端对应的下行物理控制信道的下行控制信令中包括第一指示字段；

步骤 S508，终端利用两个下行子帧组对应的上行物理控制信道中的第二指示字段对下行子帧组的数据进行反馈。

通过本发明实施例提供的技术方案，解决下行数据丢失的问题，从而减少时延，保证系统的性能。能有效提高反馈效率和系统工作效率。

优选地，在步骤 S502 中，上述基站可以同时使用一个或两个下行子帧组向终端发送数据。

优选地，在步骤 S502 中，上述第一指示字段占用 1 比特。

优选地，在步骤 S502 中，上述第二指示字段可以占用 2 比特，其中，对于每个下行子帧组，分别使用 1 比特来表示其确认信息，如果终端对下行子帧组发送的至少一个数据解码错误，则使用 1 比特进行错误应答；如果终端对下行子帧组发送的所有数据解码正确，则使用 1 比特进行正确应答。

其中，如果上述下行子帧组内两个下行子帧中的都有数据发送给终端，但终端只接收到其中一个下行子帧发送的数据，则该下行子帧组对应的 1bit 确认信息为错误应答。

优选地，上述两个下行子帧组对应的确认信息的默认值为错误指示；如果终端仅在一个下行子帧组对应的下行子帧上收到数据，则另一个下行子帧组对应的 1bit 确认信息为错误应答。

优选地，在步骤 S508 中，响应于错误应答，基站对错误应答对应的下行子帧组内的所有数据进行重传。

优选地，在步骤 S508 中，利用两个子帧组对应的上行物理控制信道中的第二指示字段对子帧组的数据进行反馈具体操作为：选择两个下行子帧组中的任一下行子帧作为参考下行子帧；将参考下行子帧所对应的物理下行控制信道所在的最小控制信道单元所指示的上行物理控制信道设置为下行子帧组对应的上行物理控制信道。

其中，上述参考下行子帧为以下之一：在两个下行子帧组中，终端接收到的第一个下行子帧、终端接收到的最后一个下行子帧。

优选地，上述将多个下行子帧分成若干个下行子帧组，多个下行子帧利用同一个上行子帧反馈确认信息具体操作为：

最多有两个下行子帧利用同一个上行子帧反馈确认信息时，将两个下行子帧分成两个下行子帧组，每个下行子帧组各包含一个下行子帧；

最多有三个下行子帧用同一个上行子帧反馈确认信息时，将两个下行子帧分成两个下行子帧组，第一个下行子帧组含两个下行子帧，第二个下行子帧组含一个下行子帧，或者第一个下行子帧组含一个下行子帧，第二个下行子帧组含两个下行子帧；最多有四个下

行子帧的确认信息在一个上行子帧上发送时，分成两个下行子帧组，每个下行子帧组各含两个下行子帧。

优选地，上述将多个下行子帧分成若干个子帧组，多个下行子帧利用同一个上行子帧反馈确认信息具体操作为：最多有九个下行子帧的确认信息在一个上行子帧上发送时，从第一个下行子帧开始，每三个连续下行子帧作为一个大组，将下行子帧划分为三个大组；每个大组再划分为两个下行子帧小组，第一下行子帧小组含两个下行子帧，第二下行子帧小组含一个下行子帧，或者第一下行子帧小组含一个下行子帧，第二下行子帧小组含两个下行子帧；在一个上行子帧对应的下行子帧中，基站为每个终端最多在上述一个大组中对应的两个下行子帧小组内的下行子帧上分配资源。

实施例二

考虑发生 DTX 时，在一个上行子帧的 PUCCH 上发送多个下行子帧对应的确认信息：

为了防止 UE 没有接收到组内某个下行子帧的 PDCCH，可以规定：LTE TDD 中，将利用同一个上行子帧反馈确认信息的多个下行子帧分成若干子帧组，其中，每子帧组最多两个下行子帧，分组情况需要基站与 UE 事先协商好。

在 UE 所分配到的下行子帧的 PDCCH 中增加 1bit 信息（即上文所述的第一指示字段），该 1bit 信息表示子帧组内的两个下行子帧是否都分配了数据给该 UE。例如：可以用“1”表示子帧组中两个下行子帧都分配了数据给该 UE，“0”表示子帧组中一个下行子帧分配了数据给该 UE，如果 UE 接收到子帧组内的两个下行子帧都分配了数据给该 UE，则 PDCCH 会将“1”发送给 UE，此时如果发生了 DTX 情况，UE 只接收到了其中一个下行子帧分配的数据，但 UE

根据接收到的“1”，获知发生了错误，即发生 DTX，对 DTX 应该视为 NACK，会向基站反馈 NACK，基站将该子帧内传输的所有数据重新进行发送。

上述两个下行子帧组对应的确认信息的默认值为错误指示；如果终端仅在一个下行子帧组对应的下行子帧上收到数据，则另一个下行子帧组对应的 1bit 确认信息为错误应答。

另外，UE 可以使用 2bit（即上文所述的第二指示字段）分别表示两子帧组内下行子帧 PDSCH 数据对应的确认信息。子帧组内该用户的各下行子帧 PDSCH 数据对应的确认信息使用“与”操作合并（如有 SU-MIMO，各流也参与“与”操作），UE 使用 LTE PUCCH 的 format 1b 格式发送；UE 发送该确认消息时使用事先约定好的某个下行子帧 PDCCH 所在的最小 CCE 所对应的 PUCCH。此方法在实施例一已经详细说明，这里不再详细描述。

对于把多个下行子帧分成若干子帧组，每子帧组最多两个下行子帧的具体操作为：

当最多有两个下行子帧利用同一个上行子帧反馈确认信息时，分成两子帧组，每子帧组各包含一个下行子帧；

当最多有三个下行子帧利用同一个上行子帧反馈确认信息时，分成两子帧组，第一子帧组包含两个下行子帧，第二子帧组包含一个下行子帧，或者第一子帧组包含一个下行子帧，第二子帧组包含两个下行子帧；

当最多有四个下行子帧利用同一个上行子帧反馈确认信息时，分成两子帧组，每子帧组各包含两个下行子帧；或者分成三个子帧组，其中一个子帧组包含两个下行子帧，其余两个子帧组各包含一

个下行子帧；或者分成四个子帧组，每个子帧组各包含有一个下行子帧；

当最多有九个下行子帧利用同一个上行子帧反馈确认信息时，分成五个子帧组，其中有一个子帧组包含有一个下行子帧，其余四个子帧组各包含有两个下行子帧；或者分成六个子帧组，其中有三个子帧组各包含有一个下行子帧，另外三个子帧组各包含有两个下行子帧；或者分成七个子帧组，其中有五个子帧组各包含有一个下行子帧，另两个子帧组各包含有两个下行子帧；或者分成八个子帧组，其中有七个子帧组各包含有一个下行子帧，另外一个子帧组包含有两个下行子帧；或者分成九个子帧组，每个子帧组各包含有一个下行子帧；或者，

当最多有九个下行子帧利用同一个上行子帧反馈确认信息时，从第一个下行子帧开始，每三个连续下行子帧作为一个大组，将所述下行子帧划分为三个大组；

每个大组再划分为两个下行子帧小组，第一下行子帧小组含两个下行子帧，第二下行子帧小组含一个下行子帧，或者第一下行子帧小组含一个下行子帧，第二下行子帧小组含两个下行子帧；

在一个上行子帧对应的下行子帧中，基站为每个终端最多在上述一个大组中对应的两个下行子帧小组内的下行子帧上分配资源。

例如，事先约定子帧 6，子帧 7 为第一个子帧组，子帧 8，子帧 9 为第二个子帧组。假设用户在子帧 6，子帧 7 都有属于该用户的 PDSCH，子帧 8 也有属于该用户的 PDSCH，但子帧 9 上没有属于该用户的 PDSCH，在子帧 6，子帧 7，子帧 8 上的 PDSCH 数据都是单个数据流。在上述假设条件下，在子帧 6，子帧 7 中对应该用户的 PDCCH 中增加 1bit，设置成 1 表示在第一子帧组中的两个子帧都有 PDSCH 属于该用户；在子帧 8 中对应该用户的 PDSCH 中增

加 1bit,设置成 0 表示在第二子帧组中只有该子帧有 PDSCH 属于该用户。

图 6 示出了多个下行子帧利用同一上行子帧反馈确认信息示意图。如图 6 所示，如果 UE 检测到子帧 6 内的属于它的 PDCCH，但没有检测到子帧 7 内的属于它的 PDCCH，由于子帧 6 内的属于它的 PDCCH 包含有 1bit 指示信息标志该子帧组内的两个子帧（子帧 6 和子帧 7）都应该有属于该 UE 的 PDCCH，所以此时 UE 使用“与”操作后应该生成 1bit NACK（DTX 等同于 NACK）信息；UE 对第二子帧组子帧进行检测，如果正确检测到子帧 8 内属于该 UE 的 PDCCH，则尽管没有检测出子帧 9 上是否存在属于该 UE 的 PDCCH，因为子帧 8 上的属于该 UE 的 PDCCH 上包含有 1bit 指示信息标志在该子帧组内只有一个子帧内包含有该 UE 的 PDCCH，此时 UE 不会因为没有收到子帧 9 上的 PDCCH 而认为 DTX，从而生成 1bit NACK 信息，而是根据子帧 8 上的数据是否接收正确来生成 1bit ACK 或 NACK。最后把以上得到的 2bit 使用 QPSK 调制，把调制后的一个调制符号承载在事先确定的上行子帧 12 的一个 PUCCH 上发送（LTE PUCCH 的 format 1b 方式）。

如上所述，借助于本发明提供的确认信息反馈方法，提供了一种利用 LTE 中的上行物理控制信道格式 format 1b 在 LTE TDD 一个上行物理控制信道中发送多个下行子帧对应的确认信息的方案，该方法可以解决下行数据丢失的问题，从而减少时延，保证系统的性能。能有效提高反馈效率和系统工作效率。

当然，本发明还可有其他多种实施例，在不背离本发明精神及其实质的情况下，熟悉本领域的技术人员当可根据本发明作出各种相应的改变和变形，但这些相应的改变和变形都应属于本发明所附的权利要求的保护范围。

以上所述仅为本发明的优选实施例而已，并不用于限制本发明，对于本领域的技术人员来说，本发明可以有各种更改和变化。凡在本发明的精神和原则之内，所作的任何修改、等同替换、改进等，均应包含在本发明的保护范围之内。

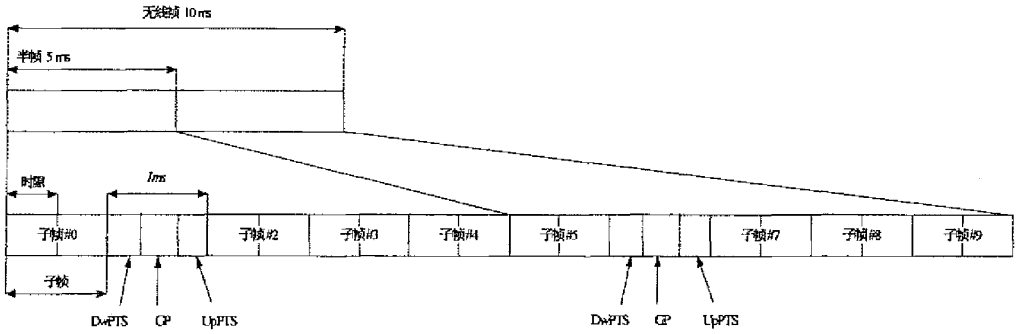

无线帧 10 ms
半帧 5 ms
时隙
1ms
子帧#0
子帧#2
子帧#3
子帧#4
子帧#5
子帧#7
子帧#8
子帧#9
子帧
DwPTS
GP
UpPTS
DwPTS
GP
UpPTS

图 1

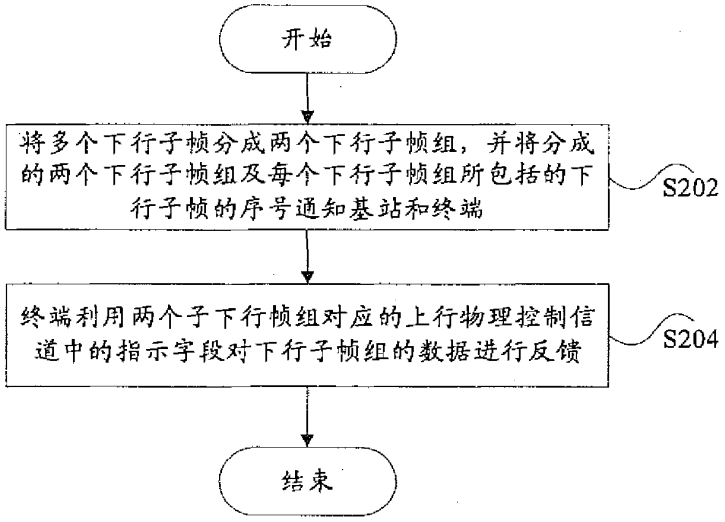

开始
将多个下行子帧分成两个下行子帧组，并将分成的两个下行子帧组及每个下行子帧组所包括的下行子帧的序号通知基站和终端
S202
终端利用两个子下行帧组对应的上行物理控制信道中的指示字段对下行子帧组的数据进行反馈
S204
结束

图 2

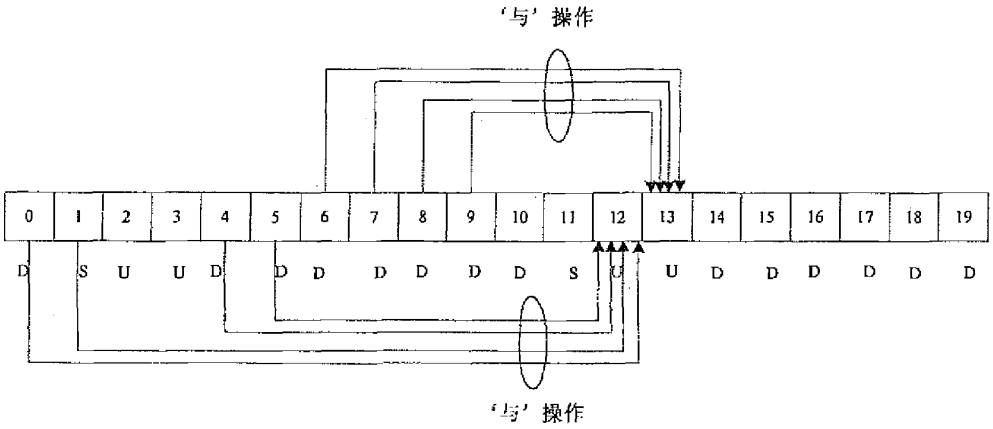

'与'操作
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
D S U U D D D D D D D S U U D D D D D D
'与'操作

图 3

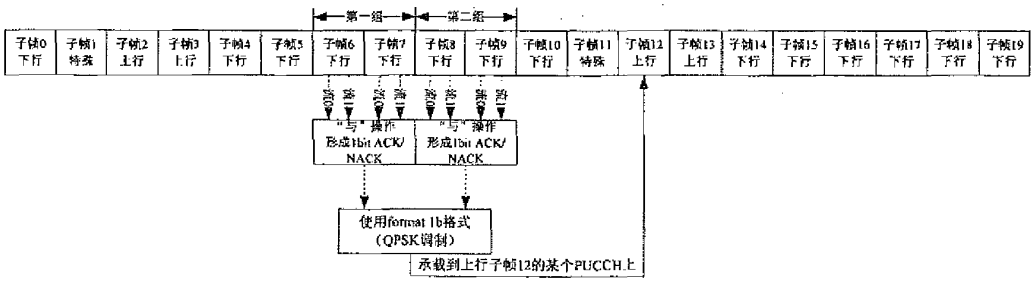

第一组
第二组
子帧0 下行
子帧1 特殊
子帧2 上行
子帧3 上行
子帧4 下行
子帧5 下行
子帧6 下行
子帧7 下行
子帧8 下行
子帧9 下行
子帧10 下行
子帧11 特殊
子帧12 上行
子帧13 上行
子帧14 下行
子帧15 下行
子帧16 下行
子帧17 下行
子帧18 下行
子帧19 下行
"与"操作 形成1bit ACK/NACK
"与"操作 形成1bit ACK/NACK
使用format 1b格式 (QPSK调制)
承载到上行子帧12的某个PUCCH上

图 4

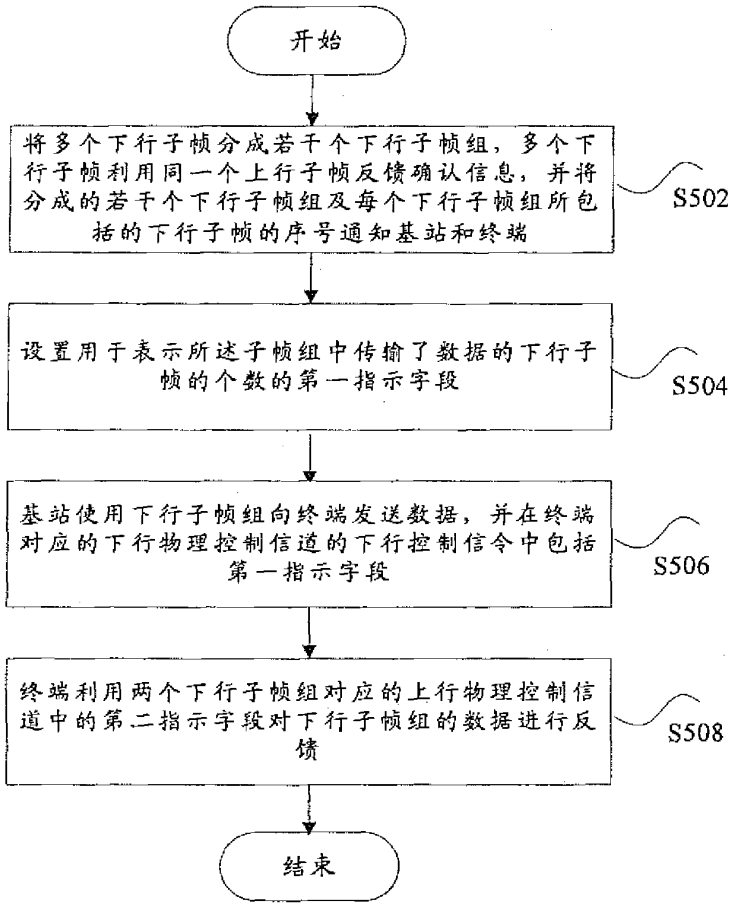

开始
将多个下行子帧分成若干个下行子帧组，多个下行子帧利用同一个上行子帧反馈确认信息，并将分成的若干个下行子帧组及每个下行子帧组所包括的下行子帧的序号通知基站和终端
S502
设置用于表示所述子帧组中传输了数据的下行子帧的个数的第一指示字段
S504
基站使用下行子帧组向终端发送数据，并在终端对应的下行物理控制信道的下行控制信令中包括第一指示字段
S506
终端利用两个下行子帧组对应的上行物理控制信道中的第二指示字段对下行子帧组的数据进行反馈
S508
结束

图 5

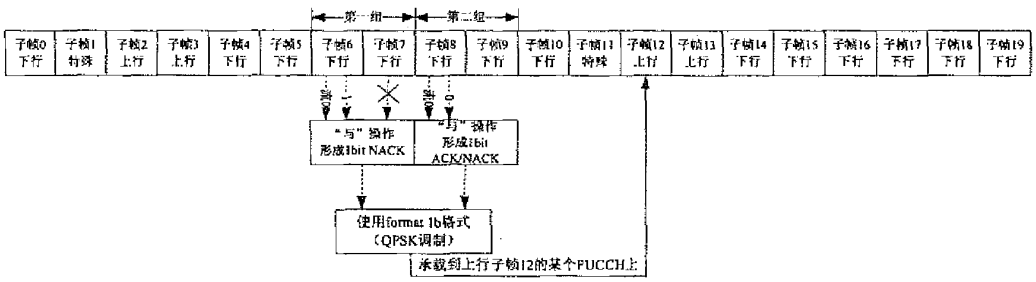

第一组
第二组
子帧0 下行
子帧1 特殊
子帧2 上行
子帧3 上行
子帧4 下行
子帧5 下行
子帧6 下行
子帧7 下行
子帧8 下行
子帧9 下行
子帧10 下行
子帧11 特殊
子帧12 上行
子帧13 上行
子帧14 下行
子帧15 下行
子帧16 下行
子帧17 下行
子帧18 下行
子帧19 下行
"与"操作 形成1bit NACK
"与"操作 形成2bit ACK/NACK
使用format 1b格式（QPSK调制）
承载到上行子帧12的某个PUCCH上

图 6

Electronic Patent Application Fee Transmittal	
Application Number:	12905299
Filing Date:	15-Oct-2010
Title of Invention:	METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
First Named Inventor/Applicant Name:	Bo Dai
Filer:	Christopher P. Maiorana/Mary Donna Berkley
Attorney Docket Number:	6284.00013/P34599ZTE
Filed as Large Entity	

Utility under 35 USC 111(a) Filing Fees

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

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
		Total in USD ($)		**180**

Electronic Acknowledgement Receipt	
EFS ID:	17205999
Application Number:	12905299
International Application Number:	
Confirmation Number:	7676
Title of Invention:	METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
First Named Inventor/Applicant Name:	Bo Dai
Customer Number:	21615
Filer:	Christopher P. Maiorana/Mary Donna Berkley
Filer Authorized By:	Christopher P. Maiorana
Attorney Docket Number:	6284.00013/P34599ZTE
Receipt Date:	23-OCT-2013
Filing Date:	15-OCT-2010
Time Stamp:	14:23:31
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$180
RAM confirmation Number	728
Deposit Account	
Authorized User	

File Listing:

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

1	Amendment/Req. Reconsideration-After Non-Final Reject	12905299_amendment_102313.pdf	787476 49f20593f7e0f666a562f6874a775f8d8a6943b2	no	24
Warnings:					
Information:					
2		12905299_ids_102313.pdf	1360316 b72aed89debe239c48739d37218b1d84ec0d591d	yes	79
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	1	
	Information Disclosure Statement (IDS) Form (SB08)		2	2	
	Foreign Reference		3	79	
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30689 b0ce8dc2d6e6f4fba35d269161c352c22ac8f32e	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	2178481		

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

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Bo DAI et al.
Serial No.:	12/905,299
Title:	METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
Filed:	October 15, 2010
Attorney Docket No.:	6284.00013 / P34599ZTE
Examiner:	Rivas, Raul
Art Unit:	2471
In Response To:	Office Action mailed July 26, 2013

RESPONSE

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

Sir:

In response to the Office Action mailed July 26, 2013, please amend the above-identified application as follows:

IN THE SPECIFICATION

Please replace the Abstract, with the amended paragraph as below:

A method for feeding back confirmation information on a physical uplink shared channel, this method includes: an eNodeB carries, in downlink control information, a number value of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame, and transmits data on a plurality of continuous downlink sub-frames after the sub-frame carrying the downlink control information ~~(S202)~~, wherein the number of the downlink sub-frames which transmit the data is equal to an number of the downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame; after the user equipment receives the downlink sub-frame which carries the downlink control information, the data is received from the downlink sub-frame which transmits the data after this downlink sub-frame, and the confirmation information received is fed back to the eNodeB through a physical uplink shared channel through an uplink sub-frame ~~(S204)~~. ~~By the present invention, the feedback efficiency and the system work efficiency can be improved, the characteristic of the uplink single carrier is ensured, the problem of the lost of downlink data is solved, the delay is reduced, and the capability of the system is ensured.~~

CLAIMS IN CURRENT FORM

1. (ORIGINAL) A method for feeding back confirmation information on a physical uplink shared channel, which is used for enabling a user equipment to feed back to an eNodeB whether data of a downlink sub-frame is correctly received in a situation that a number of the downlink sub-frames is greater than a number of uplink sub-frames in a time division duplex system, wherein the method comprises:

the eNodeB carries, in downlink control information, a number value of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame, and transmits data on a plurality of continuous downlink sub-frames after the sub-frame carrying the downlink control information, wherein the number of the downlink sub-frames which transmit the data is equal to an number of the downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame;

after the user equipment receives the downlink sub-frame which carries the downlink control information, the data is received from the downlink sub-frame which transmits the data after this downlink sub-frame, and the confirmation information received is fed back to the eNodeB through a physical uplink shared channel through an uplink sub-frame.

2. (ORIGINAL) The method according to Claim 1, wherein the eNodeB uses a signaling in the downlink control information for representing an index of the uplink sub-frame for transmitting uplink data in the situation that the number of the downlink sub-frames is smaller than the number of the uplink sub-frames to carry the number of the downlink sub-frames corresponding to the confirmation information which is fed back by the one uplink sub-frame.

3. (ORIGINAL) The method according to Claim 1, wherein the eNodeB determines a set of number values of all the downlink sub-frames corresponding to information which is fed back by the one uplink sub-frame according to a configuration pattern for the current number of downlink/uplink sub-frames, and selects corresponding number values from the set according to an amount of the data actually required to be transmitted to be carried in the downlink control information.

4. (ORIGINAL) The method according to Claim 1, wherein the eNodeB sends a control signaling associated with the allocation of the physical uplink shared channel on a first downlink sub-frame in the downlink sub-frames corresponding to the confirmation information fed back by the uplink sub-frame.

5. (ORIGINAL) The method according to Claim 1, wherein in the uplink sub-frames fed back to the eNodeB, the user equipment, according to the order of serial numbers of the received downlink sub-frames which transmit the data, receives each downlink sub-frame which transmits the data and feeds back corresponding confirmation information.

6. (ORIGINAL) The method according to Claim 1, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

7. (ORIGINAL) The method according to Claim 6, wherein

in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back by the user equipment to the eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data;

in a situation that the data in the downlink sub-frame that transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the user equipment acquires the confirmation information corresponding to each codeword stream thereof, in a situation that any one or more pieces of confirmation information among the confirmation information acquired is the negative acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement; in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement.

8. (ORIGINAL) The method according to Claim 6, wherein

in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and

respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame;

in the situation that the number of codeword streams of the downlink sub-frames is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the number of the maximum codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value;

when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame.

9. (ORIGINAL) The method according to Claim 1, wherein in a situation that the downlink sub-frames sent by the eNodeB to the user equipment includes special sub-frames which cannot transmit data, the user equipment does not consider the special sub-frames when feeding back the confirmation information.

10. (ORIGINAL) A method for feeding back confirmation information on a physical uplink shared channel, wherein in a

situation that a user equipment fails to detect a physical downlink control channel corresponding to transmitted data in a sub-frame transmitting data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

11. (ORIGINAL) The method according to Claim 10, wherein

in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back by the user equipment to an eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data;

in a situation that the data in the downlink sub-frame which transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the user equipment acquires the confirmation information corresponding to each

codeword stream thereof, in a situation that any one or more pieces of confirmation information among the confirmation information acquired is the negative acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement; in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement.

12. (ORIGINAL) The method according to Claim 10, wherein

in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame;

in a situation that the number of the codeword streams of the downlink sub-frame is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the maximum number of the codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value;

when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame.

13. (ORIGINAL) The method according to Claim 2, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

14. (ORIGINAL) The method according to Claim 3, wherein in a situation that the user equipment fails to detect a physical

downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

15. (ORIGINAL) The method according to Claim 4, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a

situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

16. (ORIGINAL) The method according to Claim 5, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

R E M A R K S

Careful review and examination of the subject application are noted and appreciated.

STATUS OF CLAIMS

The pending claims are claims 1-16, in which claims 1 and 10 are independent claims.

AS PER SPECIFICATION

The Abstract has been amended in due length and of proper language and format. On the basis of such amendment, it is requested that the objection of the Abstract be withdrawn.

REJECTIONS UNDER 35 U.S.C.§102

Claims 1-7, 10, 11 and 13-16 were rejected under 35 U.S.C. 102(b) as being anticipated by *Gao* et al. (U.S. Pub. 2009/0046649).

Such rejections are respectfully traversed for at least the following reasons:

Regarding Claim 1,

Firstly, *Gao* at least fails to disclose or teach "physical uplink shared channel", on which both data and ACK/NACK are transmitted in PUSCH, while *Gao* focuses on how to feedback ACK/NACK separately and merely discloses "The ACK for the ith DL

group is sent through the ith UL ACK **PRB**" (See Paragraph [0061] of *Gao*), wherein UL ACK Physical Resource Block (PRB) is completely different from "physical uplink shared channel" in Claim 1 as the type of information carried thereon are different.

Secondly, *Gao* fails to disclose or teach "downlink control information", which is the downlink control information for PUSCH, in other words, is the dispatch information for uplink data transmission, while *Gao* merely discloses "grants" (See Paragraph [0036] of *Gao*), which is the grant information for downlink data. It is noted that "grants" in Gao is different from "downlink control information" as required by Claim 1.

Thirdly, *Gao* merely discloses "mapping all of the multiple acknowledgements received in the single uplink subframe to the downlink subframes of the group that maps to the single uplink subframe according to the predetermined grouping for the corresponding **ratio**" (See Paragraph [0036] of *Gao*), none of the cited paragraphs or anywhere in *Gao* discloses any dedicated signaling indicating the number of downlink subframe transmitted in the ACK/NACK group, in other words *Gao* fails to disclose "the eNodeB carries, in downlink control information, **a number value** of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame, and transmits data on a plurality of continuous downlink sub-frames after the sub-frame carrying the downlink control information,

wherein **the number** of the downlink sub-frames which transmit the data is equal to **an number** of the downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame" as required by the Claim 1.

Fourthly, *Gao* targets different technical problem and involves different technical solution from the present application, thus *Gao* cannot anticipate the present application. Specifically, *Gao* discloses how to feed back ACK/NACK according to the predetermined grouping for the corresponding ratio between uplink subframes and downlink subframes, while the present application deals with the problem that ACK/NACK is mistakenly fed back due to downlink data loss (See the first paragraph of Page 4 of the present application). Taking the figure accompanying the Abstract also Fig. 7 of *Gao* for example, DL subframes are put into a first group and a second group to feed back ACK/NACK. The ACK/NACK will be fed back upon receipt of the downlink data by UE, in other words, there will be no ACK/NACK feedback if no downlink data is received, while the present invention is proposed with considering the aforementioned problem of the downlink data loss and provides a solution for feeding back messages indicating the number of downlink subframes on the physical uplink shared channel, so as to help UE identify any downlink data loss (See the third paragraph of Page 4 of the present application). As the technology involved is different between *Gao* and the present application, it is impossible

for one skilled in the art to modify the disclosure of *Gao* in order to incorporate the other related techniques to arrive at the present application as such other related techniques do not exist.

On the basis that Claim 1 is patentable over *Gao*, also for at least the reasons set forth above, claims 2-9 and 13-16, which are dependent from Claim 1, is patentable over *Gao*.

Regarding Claim 2,

On the basis that *Gao* fails to disclose or teach all limitations of claim 1, Gao further fails to disclose or teach "the eNodeB uses a signaling in the downlink control information for representing an index of the uplink sub-frame for transmitting uplink data in the situation that the number of the downlink sub-frames is smaller than the number of the uplink sub-frames to carry the number of the downlink sub-frames corresponding to the confirmation information which is fed back by the one uplink sub-frame" as required by Claim 2 as *Gao* fails to disclose feeding back messages indicating the number of downlink subframes, nor the dispatch information for uplink data transmission.

Regarding Claim 3,

On the basis that claims 1 is patentable over *Gao*, the applicant further respectfully submits that none of the cited paragraphs [0061] and [0062] or anywhere in *Gao* discloses "the eNodeB determines a set of number values of all the downlink sub-frames corresponding to information which is fed back by the one

uplink sub-frame according to a configuration pattern for the current number of downlink/uplink sub-frames, and selects corresponding number values from the set according to an amount of the data actually required to be transmitted to be carried in the downlink control information" as required by claim 3 of the present application. Since *Gao* merely discloses how to feed back ACK/NACK according to the predetermined grouping (specifically Paragraphs [0061] and [0062] of *Gao* disclose how to group) for the corresponding ratio between uplink subframes and downlink subframes, while the present application deals with the problem that ACK/NACK is mistakenly fed back due to downlink data loss.

Regarding Claim 4,

Paragraph [0064] of *Gao* as particularly cited by the Examiner, merely discloses "The division indication is sent in the first DL subframe or sent via upper layer signaling", which is completely different from "the eNodeB sends a control signaling associated with the allocation of the physical uplink shared channel on a first downlink sub-frame in the downlink sub-frames corresponding to the confirmation information fed back by the uplink sub-frame" as required by Claim 4 of the present application. Because the control signaling of the present application is carried in the UL Grant while the division indication of *Gao* is carried in DL Grant, and the control signaling

does not deal with division or division indication, *Gao* cannot anticipate Claim 4 of the present application.

Regarding Claim 6,

Paragraphs [0029] and [0030] of *Gao* merely discloses the instances where DL<UL or DL=UL while the present application deals with the situation where DL>UL as Claim 6 is dependent on Claim 1 and "the situation that a number of the downlink sub-frames is greater than a number of uplink sub-frames" is clearly required in Claim 1.

Regarding Claim 7,

Paragraphs [0085], [0031], [0081] and [0036] of *Gao* merely discloses how to feed back the ACK/NACK of multiple downlink subframes via uplink subframes, in other words, Gao targets on the correspondence between downlink subframes and uplink subframes. *Gao* fails to disclose "single or multiple codeword streams", and how to feed back according to data sent in single or multiple codeword streams as required by Claim 7, thus Gao cannot anticipate "in a situation that the data in the downlink sub-frame that transmits the data is sent as a **single codeword stream**, each piece of confirmation information in the uplink sub-frame fed back by the user equipment to the eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data; in a situation that the data in the downlink sub-frame that transmits the data is sent as **multiple codeword streams**, for one downlink sub-frame that

transmits the data, the user equipment acquires the confirmation information corresponding to each codeword stream thereof, in a situation that any one or more pieces of confirmation information among the confirmation information acquired is the negative acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement; in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement" as required by Claim 7 of the present application.

Regarding Claim 10,

At least for the reasons set forth regarding Claim 6, claim 10 is patentable over *Gao*.

On the basis that Claim 10 is patentable over *Gao*, also for at least the reasons set forth above, claims 11 and 12, which are dependent from Claim 10, are patentable over *Gao*.

Regarding Claims 13-16,

For at least the reasons set forth regarding Claim 6, claims 13-16 are also patentable over *Gao*.

Accordingly, it is respectfully requested that the rejection of Claims 1-7, 10, 11 and 13-16 under 35 U.S.C. 102(b) be withdrawn.

REJECTIONS UNDER 35 U.S.C.§103

Claims 8, 9 and 12 were rejected under 35 U.S.C. 103(a) as being unpatentable over *Gao* et al. (U.S. Pub. 2009/0046649) in view of *Torsner* et al. (U.S. Pub. 2010/0074153).

Such rejections are respectfully traversed for at least the following reasons:

Regarding Claim 8,

As mentioned above, on the basis that Claim 1 is patentable over *Gao*, also for at least the same reasons, claims 8 and 9, which are dependent from Claim 1, are patentable over *Gao*. It is to be noted that the grouping is different between Gao and the present invention. Specifically, the grouping according to the present application targets the situation that multiple ACK/NACK fed back per one downlink subframe, thus such grouping is proposed to correspond a group to each downlink subframe and to feed back according to single or multiple codeword streams, while the grouping according to *Gao* is to group multiple downlink subframes and to feed back according to the predetermined grouping for the corresponding ratio between uplink subframes and downlink subframes.

Torsner merely discloses how the feedback reports (ACK/NACK) of downlink data are spread or distributed in uplink subframes (See Paragraph [0052] of *Torsner*, "The feedback reports are then spread or distributed according to a predetermined

spreading rule"), which is different from the present application in that a dedicated signaling indicating the number of downlink subframe is transmitted in the ACK/NACK group, in other words *Torsner* fails to disclose "the eNodeB carries, in downlink control information, **a number value** of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame, and transmits data on a plurality of continuous downlink sub-frames after the sub-frame carrying the downlink control information, wherein **the number** of the downlink sub-frames which transmit the data is equal to **an number** of the downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame" as required by the Claim 1. Further, *Torsner* fails to disclose or teach feedback according to "the maximum number of codeword streams" and how to feed back ACK/NACK without a corresponding codeword stream" as in the context "in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to **a maximum number of codeword** streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame; in the situation that the number of codeword streams of the downlink sub-frames is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment

feeds back the confirmation information of the number of the maximum codeword streams, **wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value**; when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame" as required by Claim 8 of the present application.

Regarding Claim 9,

Paragraph [0083] of *Torsner* merely discloses the actually used subframes are determined dynamically during initial synchronization or at hand-over. Torsner fails to disclose or teach "special subframes" in the context of "in a situation that the downlink sub-frames sent by the eNodeB to the user equipment includes special sub-frames which cannot transmit data, the user equipment does not consider the special sub-frames when feeding back the confirmation information" If the data receiving party is a terminal, at least some of the allocation parameters can be received from a base station" as required by Claim 9 of the present application.

For at least the reasons set forth above, *Gao* and *Torsner*, alone or in combination, fail to disclose or teach all

limitations of Claim 1, thus claim 1 as well as the dependent claims 8 and 9 are patentable over *Gao* in view of *Torsner*.

Regarding Claim 12,

For at least the reasons set forth regarding Claim 8, claim 12 is also patentable over *Gao* in view of *Torsner*.

Accordingly, it is respectfully requested that the rejection of Claims 8, 9 and 12 under 35 U.S.C. 103(a) be withdrawn.

By responding in the foregoing remarks only to particular positions asserted by the Examiner, Applicants do not necessarily acquiesce in other positions that have not been explicitly addressed. In addition, Applicants' arguments for the patentability of a claim should not be understood as implying that no other reasons for the patentability of that claim exist.

In light of the above remarks, the Applicants respectfully request that the Examiner reconsider this application with a view towards allowance. The undersigned will be happy to discuss any aspect of the Application by telephone at the Examiner's convenience.

Accordingly, the present application is in condition for allowance. Early and favorable action by the Examiner is respectfully solicited.

The Examiner is respectfully invited to call the Applicant's representative between the hours of 9 a.m. and 5 p.m.

ET at 586-498-0670 should it be deemed beneficial to further advance prosecution of the application.

Respectfully submitted,

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Dated: October 23, 2013

Docket No.: 6284.00013

Attorney's Docket No. 6284.00013 / P34599ZTE **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Bo DAI et al.		
Serial No.:	12/905,299	Art Unit:	2471
Filed:	July 26, 2013	Examiner:	Rivas, Raul
For:	METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL		

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

TRANSMITTAL OF INFORMATION DISCLOSURE STATEMENT BEFORE MAILING DATE OF EITHER A FINAL ACTION OR NOTICE OF ALLOWANCE (37 CFR 1.97(c))

IDENTIFICATION OF TIME OF FILING THE ACCOMPANYING INFORMATION DISCLOSURE STATEMENT

The information disclosure statement transmitted herewith is being filed **after** three months of the filing date of this national application or the date of entry of the national state as set forth in § 1.491 in an international application or after the mailing date of the first Office action on the merits, whichever event occurred last but **before** the mailing date of either:

(1) a final action under § 1.113 or
(2) a notice of allowance under § 1.311, whichever occurs first.

METHOD OF PAYMENT OF FEE

Accompanying this transmittal is the fee set forth in 37 CFR 1.17(p) for submission of an information disclosure statement under § 1.97(c). ($180.00)

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Dated: October 23, 2013

Docket No.: 6284.00013 / P34599ZTE

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/905,299	Filing Date 10/15/2010	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT **10/23/2013**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 16	Minus	** 20	= 0	X $80 =	0
Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $420 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	0

AMENDMENT

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

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/WANDA MEREDITH/

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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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/905,299	10/15/2010	Bo Dai	6284.00013/P34599ZTE	7676

21615 7590 07/26/2013
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EXAMINER	
RIVAS, RAUL	
ART UNIT	**PAPER NUMBER**
2471	
MAIL DATE	**DELIVERY MODE**
07/26/2013	PAPER

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

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

Office Action Summary	Application No. 12/905,299	Applicant(s) DAI ET AL.	
	Examiner RAUL RIVAS	Art Unit 2471	AIA (First Inventor to File) Status No

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

Period for Reply

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

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

Status

1)☒ Responsive to communication(s) filed on *15 October 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) *1-16* 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) *1-16* 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 *15 October 2010* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

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

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

Priority under 35 U.S.C. § 119

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

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.

Interim copies:

a)☐ All b)☐ Some c)☐ None of the: Interim copies of the priority documents have been received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

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

4) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the application filed on October 15, 2010.

Specification

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract is objected because of its undue length.

Claim Rejections – 35 USC § 102

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

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1–7, 10, 11 and 13–16 are rejected under 35 U.S.C. 102(b) as being anticipated by Gao et al. (U.S. Pub. 2009/0046649).

Regarding **claim 1** Gao disclose **a method for feeding back confirmation information on a physical uplink shared channel, which is used for enabling a user equipment to feed back to an eNodeB whether data of a downlink sub-frame is correctly received in a situation that a number of the downlink sub-frames is greater than a number of uplink sub-frames in a time division duplex system, wherein the method comprises** (para. 34, Fig. 1)**:**

the eNodeB carries, in downlink control information, a number value of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame, and transmits data on a plurality of continuous

downlink sub-frames after the sub-frame carrying the downlink control information, wherein the number of the downlink sub-frames which transmit the data is equal to an number of the downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame (para. 36, Fig. 1)**;**

after the user equipment receives the downlink sub-frame which carries the downlink control information, the data is received from the downlink sub-frame which transmits the data after this downlink sub-frame, and the confirmation information received is fed back to the eNodeB through a physical uplink shared channel through an uplink sub-frame (para. 61)**.**

Regarding **claim 2** Gao disclose **wherein the eNodeB uses a signaling in the downlink control information for representing an index of the uplink sub-frame for transmitting uplink data in the situation that the number of the downlink sub-frames is smaller than the number of the uplink sub-frames to carry the number of the downlink sub-frames corresponding to the confirmation information which is fed back by the one uplink sub-frame** (para. 30, 31)**.**

Regarding **claim 3** Gao disclose **wherein the eNodeB determines a set of number values of all the downlink sub-frames corresponding to information which is fed back by the one uplink sub-frame according to a configuration pattern for the current number of downlink/uplink sub-frames, and selects corresponding number values from the set according to an amount of the data**

actually required to be transmitted to be carried in the downlink control information (para. 61, 62)**.**

Regarding **claim 4** Gao disclose **wherein the eNodeB sends a control signaling associated with the allocation of the physical uplink shared channel on a first downlink sub-frame in the downlink sub-frames corresponding to the confirmation information fed back by the uplink sub-frame** (para. 64)**.**

Regarding **claim 5** Gao disclose **wherein in the uplink sub-frames fed back to the eNodeB, the user equipment, according to the order of serial numbers of the received downlink sub-frames which transmit the data, receives each downlink sub-frame which transmits the data and feeds back corresponding confirmation information** (para. 61)**.**

Regarding **claim 6** Gao disclose **wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame** (para. 29, 30)**;**

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation

that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information (para. 29, 30)**.**

Regarding **claim 7** Gao disclose **wherein in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back by the user equipment to the eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data** (para. 85)**;**

in a situation that the data in the downlink sub-frame that transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the user equipment acquires the confirmation information corresponding to each codeword stream thereof (para. 31)**,**

in a situation that any one or more pieces of confirmation information among the confirmation information acquired is the negative acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement (para. 81)**;**

in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement (para. 36).

Regarding **claim 10** Gao disclose **a method for feeding back confirmation information on a physical uplink shared channel, wherein in a situation that a user equipment fails to detect a physical downlink control channel corresponding**

to transmitted data in a sub-frame transmitting data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as confirmation information of this downlink sub-frame (para. 29, 30);

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information (para. 29, 30).

Regarding **claim 11** Gao disclose **wherein in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back by the user equipment to an eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data (para. 85);**

in a situation that the data in the downlink sub-frame which transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the user equipment acquires the confirmation information corresponding to each codeword stream thereof (para. 31),

in a situation that any one or more pieces of confirmation information among the confirmation information acquired is the negative acknowledgement

message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement (para. 81);

in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement (para. 36).

Regarding **claim 13** Gao disclose **wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame (para. 29, 30);**

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information (para. 29, 30).

Regarding **claim 14** Gao disclose **wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame (para. 29, 30);**

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information (para. 29, 30).

Regarding **claim 15** Gao disclose **wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame(para. 29, 30);**

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information (para. 29, 30).

Regarding **claim 16** Gao disclose **wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data**

thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame (para. 29, 30);

in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information (para. 29, 30).

Claim Rejections – 35 USC § 103

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

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 8, 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gao et al. (U.S. Pub. 2009/0046649) in view of Torsner et al. (U.S. Pub. 2010/0074153).

Regarding **claim 8** Gao disclose **wherein in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame** (para. 31).

Torsner further disclose **in the situation that the number of codeword streams of the downlink sub-frames is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the number of the maximum codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value** (para. 52, 53);

when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame (para. 77)**.**

Gao and Torsner are analogous because they pertain to the field of wireless communication networks.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Torsner in the system of Gao so the spreading rules can cover the different distributions of the sub-frames. The motivation for doing so would have been to be able to map all the feedback reports with their respective downlink sub-frames.

Regarding **claim 9** Torsner discloses **wherein in a situation that the downlink sub-frames sent by the eNodeB to the user equipment includes special sub-frames which cannot transmit data, the user equipment does not consider the special sub-frames when feeding back the confirmation information** (para. 83)**.**

Gao and Torsner are analogous because they pertain to the field of wireless communication networks.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Torsner in the system of Gao so the system recognizes different types of sub-frames. The motivation for doing so would have been optimizing the wireless communication transmission protocol.

Regarding **claim 12** Gao disclose **wherein in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame** (para. 31)**.**

Torsner further disclose **in a situation that the number of the codeword streams of the downlink sub-frame is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the maximum number of the codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value** (para. 52, 53)**;**

when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame (para. 77,)**.**

Gao and Torsner are analogous because they pertain to the field of wireless communication networks.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Torsner in the system of Gao so the spreading rules can cover the different distributions of the sub-frames. The motivation for doing so would have been to be able to map all the feedback reports with their respective downlink sub-frames.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RAUL RIVAS whose telephone number is (571)270–5590. The examiner can normally be reached on Monday – Friday, from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on (571) 272–3179. 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.

/RR/

Examiner, Art Unit 2471

/Chi H Pham/

Supervisory Patent Examiner, Art Unit 2471

Notice of References Cited	Application/Control No. 12/905,299	Applicant(s)/Patent Under Reexamination DAI ET AL.	
	Examiner RAUL RIVAS	Art Unit 2471	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2009/0046649	02-2009	Gao et al.	370/329
*	B	US-2010/0074153	03-2010	Torsner et al.	370/280
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

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

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

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"12905299".rlan. or ("12".src. and "905299".ap.)	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2013/06/07 23:41
S2	423	"370/294".CCLS.	US-PGPUB; USPAT; USOCR	OR	ON	2013/06/07 23:41
S3	70	((BO) near2 (DAI)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2013/06/07 23:41
S4	34	((GUANGHUI) near2 (YU)).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2013/06/07 23:41
S5	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or	US-PGPUB; USPAT	OR	ON	2013/06/08 00:09

		US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-6195532-$ or US-6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
S6	97	(US-20090262854-$ or US-20100118825-$ or US-20110026444-$ or US-20130012218-$ or US-20130070704-$ or US-20030108013-$ or US-20040203973-$ or US-20050053041-$ or US-20050192018-$ or US-20050250540-$ or US-20050277419-$ or US-20060146762-$ or US-20060159061-$ or US-20060176862-$ or US-20060184854-$ or US-20060240830-$ or US-20070155339-$ or US-20080039145-$ or US-20080198796-$ or US-20090245186-$ or US-20090305735-$ or US-20100115369-$ or US-20100120430-$ or US-20100272268-$ or US-20100284535-$ or US-20110026495-$).did. or (US-20110105107-$ or US-20110194500-$ or US-20110249629-$ or US-20110286414-$ or US-20120033579-$ or US-20120039249-$ or US-20130051371-$ or US-20090029706-$ or US-20110038354-$ or US-20130064170-$ or US-20100157949-$).did. or (US-5636223-$ or US-8315324-$ or US-6044301-$ or US-6070102-$ or US-6091958-$ or US-6216038-$ or US-6370433-$ or US-6450172-$ or US-7079856-$ or US-7444169-$ or US-7574226-$ or US-7623448-$ or US-7725796-$ or US-7808953-$ or US-7853852-$ or US-7937111-$ or US-8086259-$ or US-8223702-$ or US-8228866-$ or US-5883882-$ or US-6101385-$ or US-4858225-$ or US-5436905-$ or US-6016123-$ or US-6118794-$ or US-6138020-$).did. or (US-5347521-$ or US-5488611-$ or US-5629942-$ or US-5640395-$ or US-5845198-$ or US-5884181-$ or US-5903834-$ or US-5956620-$ or US-5960354-$ or US-5991282-$ or US-5995495-$ or US-6031827-$ or US-6038450-$ or US-6088341-$ or US-6137789-$ or US-6185440-$ or US-	US-PGPUB; USPAT	OR	ON	2013/07/23 11:53

		6198737-$ or US-6205157-$ or US-8224385-$ or US-5519404-$ or US-5549654-$ or US-5584046-$ or US-5661724-$ or US-5681008-$ or US-5689525-$ or US-5726978-$).did. or (US-5740166-$ or US-5754961-$ or US-5778324-$ or US-5822311-$ or US-5848361-$ or US-5860056-$ or US-5889771-$).did.				
S7	23	S6 and ((feedback ack acknowledgement) near2 confirmat$3)	US-PGPUB; USPAT	OR	ON	2013/07/23 11:53
S8	18	S7 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2013/07/23 11:54
S11	612	((feedback ack acknowledgement) near5 authorizat$3)	US-PGPUB; USPAT	OR	ON	2013/07/23 12:03
S12	450	S11 and (@ay <"2010")	US-PGPUB; USPAT	OR	ON	2013/07/23 12:03
S13	154605	(370/335 370/329 455/561 607/31 455/517 455/436 455/450 370/328 455/562.1 455/522 375/267 370/330 607/32 370/322 370/331 455/442 370/252 714/749 455/422.1 370/332 455/450 370/329 455/62 370/347 455/562.1 455/63.1 370/331 370/328 455/509 370/322 370/341 455/464 455/67.13 455/504 455/505 370/317 455/501)".ccls"	US-PGPUB; USPAT	OR	ON	2013/07/23 12:05
S14	36	S12 and S13	US-PGPUB; USPAT	OR	ON	2013/07/23 12:07
S15	1	send$3 near5 (index amount) near2 sub$1frame with (feedback ack acknowledgement) with (downlink down$1link)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 13:43
S16	0	WO2009022295	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 14:06
S17	0	WO2009022295.PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 14:06
S18	2	"20090046649", .PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 14:06
S19	2	S18 AND (index amount feedback ack acknowledgement NACK downlink down$1link UPLINK)	US-PGPUB; USPAT; USOCR;	OR	ON	2013/07/23 14:08

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S20	42	map$4 near3 code$1word near5 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 15:37
S21	4	S20 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2013/07/23 15:38
S22	28647	code$1word stream near3 (feedback ack acknowledgement NACK)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 16:53
S23	25375	code$1word stream near3 (feedback ack acknowledgement NACK) near down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 16:54
S24	4	(code$1word near stream) near3 (feedback ack acknowledgement NACK) near6 down$1link	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 16:56
S25	4	"101114868"	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2013/07/23 17:29
S26	3	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; DERWENT	OR	ON	2013/07/23 17:39
S27	3	Feedback adj channel adj distribution	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 17:39
S28	28	(ZHUO near GAO).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 17:40
S29	13	(Feedback fed$1back) near2 codeword with down$1link	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2013/07/23 18:11

			EPO; JPO; DERWENT; IBM_TDB			
S30	68	((sub$1frame near2 data)(special near2 sub$1frame)) near5 feedback	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/07/23 18:33
S31	9	S30 and (@ay <"2009")	US-PGPUB; USPAT	OR	ON	2013/07/23 18:34

EAST Search History (Interference)

< This search history is empty>

7/23/2013 9:38:27 PM
C:\Users\rrivas\Documents\EAST\Workspaces\12905299 - Dai - FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL.wsp

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CONFIRMATION NO. 7676

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/905,299	10/15/2010	370	2471	6284.00013/P34599ZTE

APPLICANTS

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Shuqiang Xia, Shenzhen, CHINA;
Peng Hao, Shenzhen, CHINA;
Chunli Liang, Shenzhen, CHINA;

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

This application is a CON of PCT/CN2009/071008 03/25/2009

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

CHINA 200810096053.2 04/25/2008

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

10/23/2010

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /RAUL RIVAS/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		CHINA	2	16	2

ADDRESS

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UNITED STATES

TITLE

METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL

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

BIB (Rev. 05/07).

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12905299	DAI ET AL.
	Examiner	**Art Unit**
	RAUL RIVAS	2471

✓	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	07/23/2013								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
	9	✓								
	10	✓								
	11	✓								
	12	✓								
	13	✓								
	14	✓								
	15	✓								
	16	✓								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12905299	DAI ET AL.
	Examiner	Art Unit
	RAUL RIVAS	2471

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
370	Text Search, see search history	7/23/2013	RR

SEARCH NOTES		
Search Notes	Date	Examiner
Inventorship search	7/23/2013	RR
Internet search	7/23/2013	RR
EAST search	7/23/2013	RR
Consulted with SPE Chi Pham	7/23/2013	RR

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

/R.R./ Examiner.Art Unit 2471	

PLUS Search Results for S/N 12905299, Searched Thu May 16 08:34:36 EDT 2013

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/905,299	10/15/2010	Bo Dai	6284.00013/P34599ZTE

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21615
CHRISTOPHER P. MAIORANA, P.C.
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PUBLICATION NOTICE

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Title:METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL

Publication No.US-2011-0026444-A1
Publication Date:02/03/2011

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/905,299	10/15/2010		1090	6284.00013/P34599ZTE	16	2

CONFIRMATION NO. 7676

21615
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FILING RECEIPT

OC000000044169383

Date Mailed: 10/26/2010

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

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Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of PCT/CN2009/071008 03/25/2009

Foreign Applications

CHINA 200810096053.2 04/25/2008

If Required, Foreign Filing License Granted: 10/23/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/905,299**

Projected Publication Date: 02/03/2011

Non-Publication Request: No

Early Publication Request: No

Title

METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL

Preliminary Class

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Utility Patent Application Transmittal

MAIL STOP PATENT APPLICATION
COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450

Case Docket No. 6284.00013/P34599ZTE
Date: October 15, 2010

Sir:

Transmitted herewith for filing is a patent application of:

Inventor(s): Bo DAI, Guanghui YU, Shuqiang XIA, Peng HAO and Chunli LIANG

For: A METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL

Correspondence Address:

Customer Number or Bar Code Label: 21615

Respectfully submitted,

By _____

Date: October 15, 2010

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Attorney Docket No.: 6284.00013

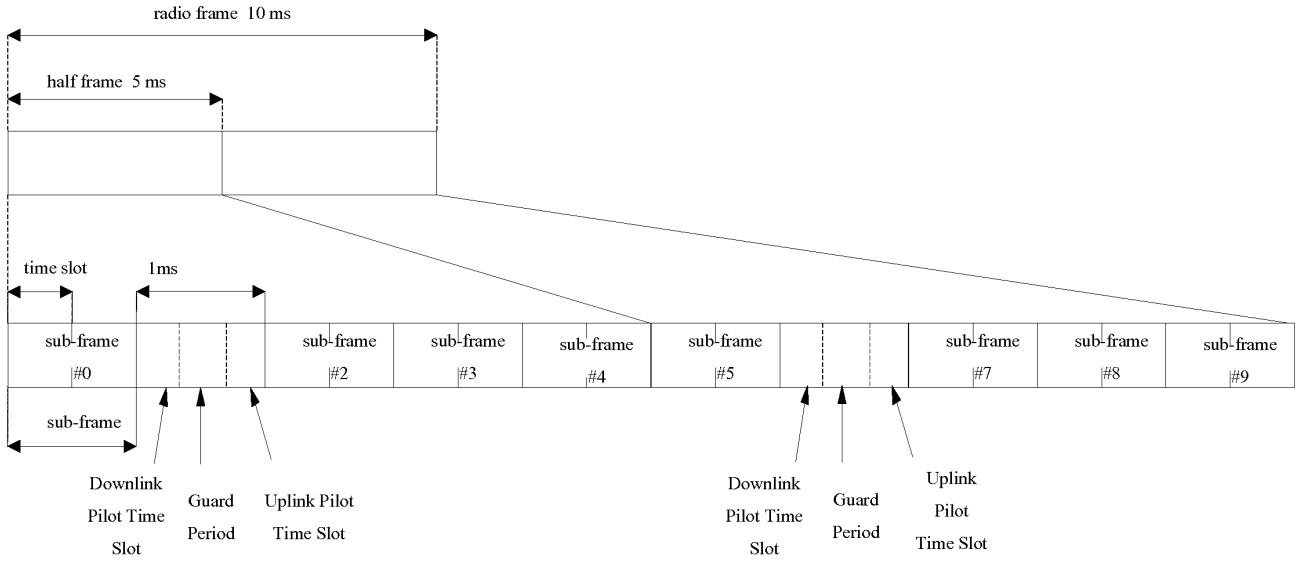

radio frame 10 ms
half frame 5 ms
time slot
1ms
sub-frame #0
sub-frame #2
sub-frame #3
sub-frame #4
sub-frame #5
sub-frame #7
sub-frame #8
sub-frame #9
sub-frame
Downlink Pilot Time Slot
Guard Period
Uplink Pilot Time Slot
Downlink Pilot Time Slot
Guard Period
Uplink Pilot Time Slot

Figure 1

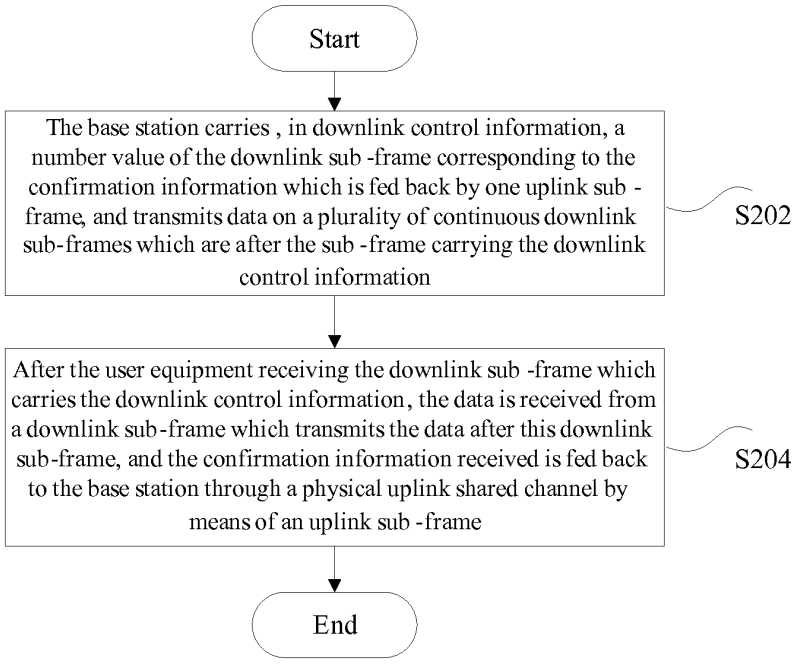


Figure 2

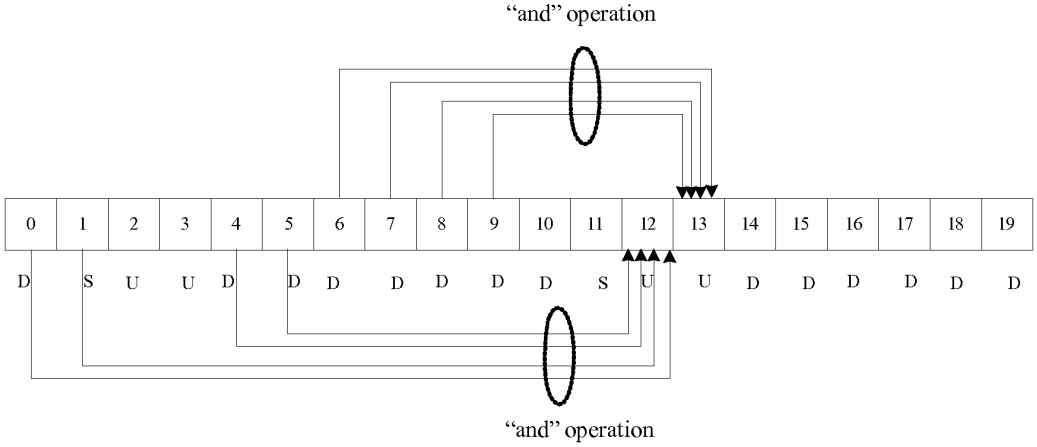


Figure 3

A METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL

This is a continuation of International Application PCT/CN/2009/071008, with an International Filing Date of March 25, 2009, which claims priority to Chinese Application No. 200810096053.2, filed April 25, 2008, each of which is incorporated by reference.

Field of the Invention

The present invention relates to communication field, and in particular to a method for feeding back confirmation information on a physical uplink shared channel (PUSCH).

Background of the Invention

Figure 1 shows the frame structure of the Time Division Duplex ("TDD" for short) mode of a Long Term Evolution ("LTE" for short) system. As shown in Figure 1, in such a frame structure, one radio frame of 10ms is divided into two half frames, and each of which is divided into 10 time slots with a length of 0.5ms, and two adjacent time slots form a sub-frame with a length of 1ms. One half frame includes 5 sub-frames. For a Normal Cyclic Prefix ("Normal CP" for short), one time slot includes 7 symbols with a length of 66.7us, wherein the CP length of the first symbol is 5.21us, and the CP lengths of the other six symbols are 4.69us; and for an Extended CP, one time slot includes 6 symbols, the CP lengths of all the symbols are 16.67us. In this frame structure, the configuration of the sub-frames has the following characteristics:

(1) With reference to Table 1, LTE TDD defines 7 kinds of configuration solutions for the number of the uplink/downlink sub-frames in one radio frame in order to reduce the number of configurations for the number of the uplink/downlink sub-frames. All of the sub-frames can be classified into three categories: one category is a downlink sub-frame, another category is a special sub-frame, and the other category is an uplink sub-frame. As in configuration 1, the sub-frames 2, 3, 7 and 8 are used for uplink transmission, the sub-frames 0, 4, 5 and 9 are used for downlink transmission, and meanwhile the sub-frames 1

and 6 are special sub-frames

(2) The special sub-frame includes 3 special time slots, namely, a Downlink Pilot Time Slot ("DwPTS" for short), a Guard Period ("GP" for short) and an Uplink Pilot Time Slot ("UpPTS" for short), wherein the DwPTS is used for downlink, and at least one symbol is used to transmit the Primary-Synchronization Channel ("P-SCH" for short); the GP is a guard time without transmitting any data; and the UpPTS is used for uplink and may be used to transmit signals such as sounding reference signal and the Random Access Channel ("RACH" for short);

(3) The sub-frame immediately before the special sub-frame is fixedly used for the downlink transmission; and the sub-frame immediately after the special sub-frame is fixedly used for the uplink transmission.

Table 1

DL/UL Proportion Configuration	Conversion Point Period	Sub-frame Number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	10 ms	D	S	U	U	U	D	S	U	U	D

Table 1 shows the LTE TDD uplink/downlink proportion configuration, wherein D represents the downlink sub-frame, U represents the uplink sub-frame and S represents the special sub-frame.

Table 2

DL/UL Proportion Configuration	Conversion Point Period	Sub-frame Number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	-	-	1	-	1	-	-	1	-	1
1		-	-	2	1	-	-	-	2	1	-
2		-	-	4	-	-	-	-	4	-	-
3	10 ms	-	-	3	2	2	-	-	-	-	-
4		-	-	4	4	-	-	-	-	-	-
5		-	-	9	-	-	-	-	-	-	-

6		-	-	1	1	1	-	-	1	1	-

Table 2 shows the number of the corresponding downlink sub-frames when the uplink sub-frames feed back the confirmation information.

In the LTE TDD, a UE should feed back, in Physical Uplink Control Channel ("PUCCH" for short) of the uplink sub-frame in sub-frame n+k (k>3), the acknowledgement/negative acknowledgement message (ACK/NACK) of the data in a Physical Downlink Shared Channel ("PDSCH" for short) of the downlink sub-frame n, and may also feed back the confirmation information ACK/NACK in the physical uplink shared channel for transmitting the uplink data in this uplink sub-frame. Wherein the index of the uplink sub-frame PUCCH is implicitly indicated by sending the serial number of the sub-frame of the downlink data and the smallest index of the Control Channel Element ("CCE" for short) where its corresponding Physical Downlink Control Channel ("PDCCH" for short) is located;

Downlink Control Information ("DCI" for short) Format 0 is used to transmit the control information associated with the PUSCH;

In some configurations of the number of the uplink/downlink sub-frames of the LTE TDD, the number of the downlink sub-frames allocated will be greater than the number of the uplink sub-frames allocated, i.e., one uplink sub-frame should feed back the ACK/NACK information of a plurality of PDSCH sub-frames (Table 2 shows the corresponding number of ACK/NACK when the uplink sub-frames feed back the downlink PDSCH in different configurations in Table 1). Since LTE uplink should satisfy the characteristic of single carrier, one problem which is needed to be solved is how to feed back the ACK/NACK information of a plurality of the downlink PDSCH sub-frames in one uplink sub-frame. One method is to transmit the ACK/NACK information of a plurality of the downlink sub-frames together with the uplink data on the Physical Uplink Shared Channel ("PUSCH" for short).

When the above method is used, if the control channel corresponding to the downlink data is not correctly detected, a User Equipment ("UE" for short) will not feed back the ACK/NACK information, i.e., the situation of Discontinuous

Transmission ("DTX" for short) occurs, then the confirmation information corresponding to this downlink data cannot be sent on the PUSCH together with the confirmation information corresponding to other downlink data. Since the eNodeB does not know whether a DTX occurs to the sent downlink data, or to which downlink data the DTX occurs, if the downlink data is still regarded as being all received, it is quite easy to mistakenly feed back an ACK as the confirmation information that should be fed back as an NACK (the DTX should be regarded as the NACK), and further possibly, since the amount of the confirmation information fed back is inconsistent, it results in erroneous detection of the confirmation information of other downlink data, then the situation that the downlink sub-frame data is lost occurs, and UE cannot correctly obtain the information transferred by the received data block, thereby a re-transmission processing by a higher layer being required, which increases additional delay.

However, a technical solution which is able to solve the problem of the lost of the downlink data is still not provided currently.

Summary of the Invention

The present invention is proposed with considering the problem of the lost of the downlink data existed in the related art above. Therefore, the main objective of the present invention is to provide an improved solution for feeding back messages on the physical uplink shared channel, so as to solve the above problem.

In order to accomplish the above objective, according to one aspect of the present invention, a method for feeding back confirmation information on a physical uplink shared channel is provided, which is used for enabling a user equipment to feed back to an eNodeB whether data of a downlink sub-frame is correctly received in a situation that a number of the downlink sub-frames is greater than a number of uplink sub-frames in a time division duplex system.

The method includes: the eNodeB carries, in downlink control information, a number value of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame, and transmits data on a

plurality of continuous downlink sub-frames after the sub-frame carrying the downlink control information, wherein the number of the downlink sub-frames which transmit the data is equal to an number of the downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame; after the user equipment receives the downlink sub-frame which carries the downlink control information, the data is received from the downlink sub-frame which transmits the data after this downlink sub-frame, and the confirmation information received is fed back to the eNodeB through a physical uplink shared channel through an uplink sub-frame.

Wherein the eNodeB uses a signaling in the downlink control information for representing an index of the uplink sub-frame for transmitting uplink data in the situation that the number of the downlink sub-frames is smaller than the number of the uplink sub-frames to carry the number of the downlink sub-frames corresponding to the confirmation information which is fed back by the one uplink sub-frame.

In addition, the eNodeB determines a set of number values of all the downlink sub-frames corresponding to information which is fed back by the one uplink sub-frame according to a configuration pattern for the current number of downlink/uplink sub-frames, and selects corresponding number values from the set according to an amount of the data actually required to be transmitted to be carried in the downlink control information.

Preferably, the eNodeB sends a control signaling associated with the allocation of the physical uplink shared channel on a first downlink sub-frame in the downlink sub-frames corresponding to the confirmation information fed back by the uplink sub-frame.

Moreover, in the uplink sub-frames fed back to the eNodeB, the user equipment, according to the order of serial numbers of the received downlink sub-frames which transmit the data, receives each downlink sub-frame which transmits the data and feeds back corresponding confirmation information.

Preferably, in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame

transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

Wherein on one hand, in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back by the user equipment to the eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data; in a situation that the data in the downlink sub-frame that transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the UE acquires the confirmation information corresponding to each codeword stream thereof, in a situation that any one or more pieces of confirmation information among the confirmation information acquired is the negative acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement; in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement.

On the other hand, in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame; in the situation that the number of codeword streams of the downlink sub-frames is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the number of the maximum codeword streams, wherein confirmation information

without a corresponding codeword stream is set as a predefined fixed value; when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame.

Besides, in the situation that the downlink sub-frames sent by the eNodeB to the user equipment includes special sub-frames which cannot transmit data, the user equipment does not consider the special sub-frames when feeding back the confirmation information.

In order to accomplish the above objective, according to another aspect of the present invention, a method for feeding back confirmation information on a physical uplink shared channel is provided.

The method for feeding back confirmation information on a physical uplink shared channel according to the present invention includes: in a situation that a user equipment fails to detect a physical downlink control channel corresponding to transmitted data in a sub-frame transmitting data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

Wherein on one hand, in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back by the user equipment to the eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data; in a situation that the data in the downlink sub-frame which transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the UE acquires the

confirmation information corresponding to each codeword stream thereof, in a situation that any one or more pieces of confirmation information among the confirmation information acquired is the negative acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement; in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement.

On the other hand, in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame; in a situation that the number of the codeword streams of the downlink sub-frame is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the maximum number of the codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value; when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame.

By the above technical solutions of the present invention, the feedback efficiency and system work efficiency can be improved, the characteristic of the uplink single carrier is ensured, the problem of the lost of the downlink data is solved, the delay is reduced, and the capability of the system is ensured.

Brief Description of the Drawings

The drawings illustrated here provide a further understanding of the present invention and form a part of the present application. The exemplary embodiments of the present invention and description thereof are used to

explain the present invention without unduly limiting the scope of the invention, wherein:

Figure 1 is a schematic drawing of the frame structure of the LTE system under the TDD mode according to the related art;

Figure 2 is a flow chart of the method for feeding back confirmation information on the PUSCH according to the embodiments of the present invention; and

Figure 3 is a schematic drawing of the corresponding relationship between the uplink/downlink sub-frames when feeding back is performed in a processing example of the method according to the embodiments of the present invention.

Detailed Description of Embodiments

Function Overview

As mentioned above, the problem of the lost of the downlink data will be resulted in by the application of the method for transmitting ACK/NACK information of a plurality of the downlink sub-frames together with the uplink data in PUSCH to solve the problem of how to feed back the ACK/NACK information of a plurality of downlink PDSCH sub-frames in one uplink sub-frame. In order to solve the problem of the lost of the downlink data, the present invention provides an improved solution for feeding back messages on the physical uplink shared channel, i.e., the eNodeB carries, in downlink control information, a number value of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame, and transmits data on a plurality of continuous downlink sub-frames after the sub-frame carrying the downlink control information, wherein the number of the downlink sub-frames which transmit the data is equal to an number of the downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame; after the user equipment receives the downlink sub-frame which carries the downlink control information, the data is received from the downlink sub-frame which transmits the data after this downlink sub-frame, and the confirmation information received is fed back to the

eNodeB through a physical uplink shared channel through an uplink sub-frame.

The present invention will be described hereinafter in detail in conjunction with the drawings thereof and the embodiments. It should be indicated that the embodiments and the features in the embodiments of the present application can be combined with each other if they are not conflicted.

In the embodiments of the present invention, an method for feeding back confirmation information on a PUSCH is provided, which is used for enabling a UE to feed back to an eNodeB whether data of a downlink sub-frame is correctly received in a situation that a number of the downlink sub-frames is greater than a number of uplink sub-frames in a time division duplex system.

Figure 2 is a flow chart of the method for feeding back confirmation information on the PUSCH according to the embodiments of the present invention, as shown in Figure 2, the method for feeding back confirmation information on a physical uplink shared channel according to the embodiments of the present invention includes: step S202, the eNodeB carries, in downlink control information (DCI), a number value of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame, and transmits data on a plurality of continuous downlink sub-frames after the sub-frame carrying the DCI, wherein the number of the downlink sub-frames which transmit the data is equal to an number of the downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame; step S204, after the UE receives the downlink sub-frame which carries the DCI, the data is received from the downlink sub-frame which transmits the data after this downlink sub-frame, and the confirmation information received is fed back to the eNodeB through a physical uplink shared channel through an uplink sub-frame.

Wherein the eNodeB uses a signaling in the DCI to carry the number of the downlink sub-frames corresponding to the confirmation information which is fed back by the one uplink sub-frame. This signaling is used to represent the index of the uplink sub-frame for transmitting the uplink data in the situation that the number of the downlink sub-frames is smaller than the number of the uplink sub-frames.

A signaling representing the number (k) of the downlink sub-frames corresponding to the confirmation information which is fed back in one uplink sub-frame is sent in DCI format 0; i.e., when the number of the downlink sub-frames is greater than the number of the uplink sub-frames, the signaling representing the index of the uplink sub-frame where the uplink data is transmitted in the TDD system in DCI format 0 may be multiplexed (i.e., redefined) to represent a signaling of the number of the downlink sub-frame corresponding to the confirmation information which is fed back in one uplink sub-frame. Moreover, this signaling may also represent that k continuous downlink sub-frames, starting from the downlink sub-frame carrying DCI format 0, are sent with the data of an object UE; k is one element in the set H, and the value of k is indicated by the signaling used to represent the index of the uplink sub-frame where the uplink data is transmitted in the TDD system.

In addition, the eNodeB determines a set of number values of all the downlink sub-frames corresponding to information which is fed back by the one uplink sub-frame according to a configuration pattern for the current number of downlink/uplink sub-frames, and selects corresponding number values from the set according to an amount of the data actually required to be transmitted to be carried in the DCI.

That is to say, the value range (set H) of the above k is selected according to the uplink/downlink proportion configuration. For example, for a 5ms period conversion point, the selection according to the configuration pattern is as follow:

Configuration 1, H is any nonempty subset of the set M, wherein M={1, 2}; and it is recommended that H={1, 2};

Configuration 2, H is any nonempty subset of the set M, wherein M={1, 2, 3, 4}; and it is recommended that H={1, 2, 3, 4};

For a 10ms period conversion point, the selection is as follow:

Configuration 3, H is any nonempty subset of the set M, wherein M={1, 2, 3}; and it is recommended that H={1, 2, 3};

Configuration 4, H is any nonempty subset of the set M, wherein M={1, 2, 3, 4}; and it is recommended that H={1, 2, 3, 4};

Configuration 5, H is any nonempty subset of the set M, wherein M={1, 2, 3, 4, 5, 6, 7, 8, 9}; and it is recommended that H={1, 2, 3, 4}, or H={1, 3, 6, 9}.

Moreover, in the uplink sub-frames fed back to the eNodeB, the UE, according to the order of serial numbers of the received downlink sub-frames which transmit the data, receives each downlink sub-frame which transmits the data and feeds back corresponding confirmation information.

Furthermore, in this method, in a situation that the UE fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the UE feeds back an NACK message as the confirmation information of this downlink sub-frame; in a situation that the UE detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the UE analyzes the data in this downlink sub-frame, and feeds back an ACK message as the confirmation information in a situation that the analysis is successful, otherwise, the UE feeds back the NACK message as confirmation information.

That is to say, starting from the downlink sub-frame that sends the control signaling associated with the uplink data, the ACK/NACK is sequentially fed back according to the serial numbers of the downlink sub-frames, the order of feeding back the ACK/NACK corresponds to the order of the downlink sub-frames where the ACK/NACK is located; when the UE fails to detect the corresponding PDCCH on the downlink sub-frame that should transmit the data, the confirmation information fed back by this downlink sub-frame is the NACK; if the corresponding PDCCH is detected, the data is analyzed and the corresponding ACK/NACK is fed back.

Moreover, in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back by the UE to the eNodeB corresponds to the codeword stream of one downlink sub-frame that

transmits the data; in a situation that the data in the downlink sub-frame that transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the user equipment acquires the confirmation information corresponding to each codeword stream thereof, in a situation that any one or more pieces of the confirmation information among the acquired confirmation information is the NACK message, the UE sets the confirmation information of this downlink sub-frame as an NACK; and in a situation that all of the acquired confirmation information is the ACK message, the UE sets the confirmation information of this downlink sub-frame as an ACK.

That is to say, assume that the ACK/NACK information of k downlink sub-frames is fed back on one uplink sub-frame, when k>1, each downlink sub-frame feeds back one piece of the ACK/NACK information, when the downlink data is sent as a single codeword stream, each downlink sub-frame that transmits the single codeword stream feeds back one ACK/NACK; when the downlink data is sent as multiple codeword streams, each downlink sub-frame that transmits the multiple codeword streams performs "and" operation to the ACK/NACK corresponding to all the codeword streams first, then, the result of and operation is fed back to the eNodeB;

While when k=1, the and operation is not needed for the multiple codeword streams, the ACK/NACK corresponding to each codeword stream is directly fed back according to the order of the serial numbers of the codeword streams.

On the other hand, in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame; in the situation that the number of codeword streams of the downlink sub-frames is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the number of the maximum codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value;

when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame.

That is to say, in a situation that the ACK/NACK information of k downlink sub-frames is fed back on one uplink sub-frame and the maximum number of codeword streams of the downlink sub-frames is m, the UE feeds back k groups of the ACK/NACK information, each group corresponds to one downlink sub-frame and includes m pieces of the ACK/NAACK information, each piece of the ACK/NACK information in the group corresponds to the ACK/NACK information of one codeword stream in the downlink sub-frame corresponding to the group, and in the situation of the single codeword stream the ACK/NACK information of the other codeword streams is default value, the default value is the NACK information.

In the situation that the downlink sub-frames sent by the eNodeB to the user equipment includes the special sub-frames that cannot transmit the data, the user equipment does not consider the special sub-frames when feeding back the confirmation information, i.e., when the special sub-frames fail to send the downlink data, the special sub-frames are not included in the above continuous downlink sub-frames, and the special sub-frames may not be included in the calculation of the eNodeB or the receipt of the UE, at this moment, the special sub-frames do not need to feed back the ACK/NACK information.

Preferably in this method, DCI format 0 will be sent on the first downlink sub-frame in the downlink sub-frames corresponding to the confirmation information fed back by this uplink sub-frame.

Besides, the ACK/NACK information fed back may be sent on the PUSCH together with the uplink data.

The present invention will be described hereinafter in conjunction with the embodiments.

Take the LTE TDD system as an example, assume that 20 continuous

sub-frames are present, and the uplink/downlink proportion configuration is in the situation of configuration 4 in above Table 1, namely, sub-frame 0, sub-frame 1, sub-frame 4, sub-frame 5, sub-frame 6, sub-frame 7, sub-frame 8, sub-frame 9, sub-frame 10, sub-frame 11, sub-frame 14, sub-frame 15, sub-frame 16, sub-frame 17, sub-frame 18 and sub-frame 19 are downlink sub-frames, sub-frame 2, sub-frame 3, sub-frame 12 and sub-frame 13 are uplink sub-frames, according to a downlink timing relationship, the ACK/NACK of sub-frames 0, 1, 4 and 5 is fed back on sub-frame 12, the ACK/NACK of sub-frames 6, 7, 8 and 9 is fed back on sub-frame 13. Figure 3 is a schematic drawing of the corresponding relationship between the uplink/downlink sub-frames when feeding back is performed in a processing example of the method according to the embodiments of the present invention.. As shown in Figure 3, D in the figure represents the downlink sub-frame, U represents the uplink sub-frame, and S represents the special sub-frame, and at this moment, H={1, 2, 3, 4};

Assume that the eNodeB sends the data on downlink sub-frames 6, 7, 8 and 9 to the object UE, the object transmits the uplink data and the ACK/NACK information of the corresponding downlink sub-frames on sub-frame 13;

The signaling information of DCI format 0 of the object UE is sent on downlink sub-frame 6, and the signaling, specially used in TDD system in DCI format 0 to indicate the index of the uplink sub-frame where the uplink data is located, is used to represent the number of the downlink sub-frames carrying the data sent by the eNodeB to the object UE;

The object UE detects the information of DCI format 0 on downlink sub-frame 6 and acquire that there is data being sent on downlink sub-frames 6, 7, 8 and 9, the object UE detects the corresponding downlink control channel on downlink sub-frames 6, 7, 8 and 9, to find the positions of the corresponding downlink data according to the downlink control channel for decoding. If the decoding is correct, an ACK is fed back; if the decoding is incorrect, an NACK is fed back. When the corresponding downlink control channel is not detected on the object downlink sub-frame, this downlink sub-frame feeds back the NACK;

Finally, the feedback information sequentially arranged according to the serial numbers of the downlink sub-frames is sent on the PUSCH together with the uplink data;

If the number of the downlink sub-frames carrying the data sent by the eNodeB to the object UE is 1, it is the multiple codeword stream transmission on this downlink sub-frame, each codeword stream feeds back one piece of the confirmation information, if the decoding is correct, the ACK is fed back, and if the decoding is incorrect, the NACK is fed back, finally, the confirmation information arranged according to the serial numbers of the codeword streams is sent on the PUSCH together with the uplink data;

If the number of the downlink sub-frames carrying the data sent by the eNodeB to the object UE is greater than 1, there is multiple codeword stream transmission in this downlink sub-frame, the downlink sub-frames of the multiple codeword stream transmission need to combine the confirmation information of a plurality of codeword streams into one piece of the confirmation information as the confirmation information of this sub-frame, finally, the confirmation information arranged according to the serial numbers of the downlink sub-frames is sent on the PUSCH together with the uplink data.

To sum up, the present invention accomplishes the objective of sending the ACK/NACK of a plurality of downlink sub-frames on an uplink PUSCH. By the technical solutions of the present invention, the feedback efficiency and the system work efficiency can be effectively improved, the characteristic of the uplink single carrier is ensured, the problem of the lost of downlink data is solved, the delay is reduced, and the capability of the system is ensured.

Apparently, the person skilled in the art should understand that each step of the present invention above may be realized by the general calculating apparatus; they may be collected in a single calculating apparatus or distributed on the network formed by a plurality of the calculating apparatus. Selectively, they may be realized by the program codes executable by the calculating apparatus, therefore, they can be stored in the storing apparatus to be executed by the calculating apparatus, or they can be fabricated into integrated circuit modules respectively, or a plurality of the steps thereof are fabricated into

individual integrated circuit module for the accomplishment. Thus, the present invention is not limited to the combination of any particular hardware and software.

Above description is only to illustrate the preferred embodiments but not to limit the present invention. Various alterations and changes to the present invention are apparent to those skilled in the art. The scope defined in claims shall comprise any modification, equivalent substitution and improvement within the spirit and principle of the present invention.

What is claimed is:

1. A method for feeding back confirmation information on a physical uplink shared channel, which is used for enabling a user equipment to feed back to an eNodeB whether data of a downlink sub-frame is correctly received in a situation that a number of the downlink sub-frames is greater than a number of uplink sub-frames in a time division duplex system, wherein the method comprises:

the eNodeB carries, in downlink control information, a number value of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame, and transmits data on a plurality of continuous downlink sub-frames after the sub-frame carrying the downlink control information, wherein the number of the downlink sub-frames which transmit the data is equal to an number of the downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame;

after the user equipment receives the downlink sub-frame which carries the downlink control information, the data is received from the downlink sub-frame which transmits the data after this downlink sub-frame, and the confirmation information received is fed back to the eNodeB through a physical uplink shared channel through an uplink sub-frame.

2. The method according to Claim 1, wherein the eNodeB uses a signaling in the downlink control information for representing an index of the uplink sub-frame for transmitting uplink data in the situation that the number of the downlink sub-frames is smaller than the number of the uplink sub-frames to carry the number of the downlink sub-frames corresponding to the confirmation information which is fed back by the one uplink sub-frame.

3. The method according to Claim 1, wherein the eNodeB determines a set of number values of all the downlink sub-frames corresponding to information which is fed back by the one uplink sub-frame according to a configuration pattern for the current number of downlink/uplink sub-frames, and selects corresponding number values from the set according to an amount of the data

actually required to be transmitted to be carried in the downlink control information.

4. The method according to Claim 1, wherein the eNodeB sends a control signaling associated with the allocation of the physical uplink shared channel on a first downlink sub-frame in the downlink sub-frames corresponding to the confirmation information fed back by the uplink sub-frame.

5. The method according to Claim 1, wherein in the uplink sub-frames fed back to the eNodeB, the user equipment, according to the order of serial numbers of the received downlink sub-frames which transmit the data, receives each downlink sub-frame which transmits the data and feeds back corresponding confirmation information.

6. The method according to Claim 1, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

7. The method according to Claim 6, wherein

in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back by the user equipment to the eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data;

in a situation that the data in the downlink sub-frame that transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the user equipment acquires the confirmation information

corresponding to each codeword stream thereof, in a situation that any one or more pieces of confirmation information among the confirmation information acquired is the negative acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement; in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement.

8. The method according to Claim 6, wherein

in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame;

in the situation that the number of codeword streams of the downlink sub-frames is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the number of the maximum codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value;

when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame.

9. The method according to Claim 1, wherein in a situation that the downlink sub-frames sent by the eNodeB to the user equipment includes special sub-frames which cannot transmit data, the user equipment does not consider the special sub-frames when feeding back the confirmation information.

10. A method for feeding back confirmation information on a physical

uplink shared channel, wherein in a situation that a user equipment fails to detect a physical downlink control channel corresponding to transmitted data in a sub-frame transmitting data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

11. The method according to Claim 10, wherein

in a situation that the data in the downlink sub-frame that transmits the data is sent as a single codeword stream, each piece of confirmation information in the uplink sub-frame fed back by the user equipment to an eNodeB corresponds to a codeword stream of one downlink sub-frame that transmits the data;

in a situation that the data in the downlink sub-frame which transmits the data is sent as multiple codeword streams, for one downlink sub-frame that transmits the data, the user equipment acquires the confirmation information corresponding to each codeword stream thereof, in a situation that any one or more pieces of confirmation information among the confirmation information acquired is the negative acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as a negative acknowledgement; in a situation that all the confirmation information acquired is the acknowledgement message, the user equipment sets the confirmation information of this downlink sub-frame as an acknowledgement.

12. The method according to Claim 10, wherein

in a situation that the user equipment feeds back a plurality of groups of the confirmation information, an amount of the confirmation information fed back in each group is equal to a maximum number of codeword streams in this downlink sub-frame, and respective confirmation information in each group

corresponds to the confirmation information of the codeword stream of a corresponding downlink sub-frame;

in a situation that the number of the codeword streams of the downlink sub-frame is smaller than the maximum number of the codeword streams of the downlink sub-frame, the user equipment feeds back the confirmation information of the maximum number of the codeword streams, wherein confirmation information without a corresponding codeword stream is set as a predefined fixed value;

when the user equipment fails to detect the physical downlink control channel corresponding to the transmitted data in the sub-frame which transmits the data, the user equipment feeds back the negative acknowledgement message as the confirmation information of each codeword stream in a group corresponding to this downlink sub-frame.

13. The method according to Claim 2, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

14. The method according to Claim 3, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an

acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

15. The method according to Claim 4, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

16. The method according to Claim 5, wherein in a situation that the user equipment fails to detect a physical downlink control channel corresponding to transmitted data in the sub-frame transmitting the data, or fails to receive the data thereof, the user equipment feeds back a negative acknowledgement message as the confirmation information of this downlink sub-frame; in a situation that the user equipment detects the physical downlink control channel corresponding to the transmitted data in the sub-frame transmitting the data, the user equipment analyzes the data in this downlink sub-frame, and feeds back an acknowledgement message as the confirmation information in a situation that the analysis is successful, otherwise, the negative acknowledgement message is fed back as the confirmation information.

Abstract

A method for feeding back confirmation information on a physical uplink shared channel, this method includes: an eNodeB carries, in downlink control information, a number value of the downlink sub-frame corresponding to the confirmation information which is fed back by one uplink sub-frame, and transmits data on a plurality of continuous downlink sub-frames after the sub-frame carrying the downlink control information (S202), wherein the number of the downlink sub-frames which transmit the data is equal to an number of the downlink sub-frames corresponding to the confirmation information fed back by the one uplink sub-frame; after the user equipment receives the downlink sub-frame which carries the downlink control information, the data is received from the downlink sub-frame which transmits the data after this downlink sub-frame, and the confirmation information received is fed back to the eNodeB through a physical uplink shared channel through an uplink sub-frame (S204). By the present invention, the feedback efficiency and the system work efficiency can be improved, the characteristic of the uplink single carrier is ensured, the problem of the lost of downlink data is solved, the delay is reduced, and the capability of the system is ensured.

Declaration and Power of Attorney for Patent Application

專利申請聲明及委託書

Chinese Language Declaration

中文聲明

作爲下述發明者，我在此宣告：

As a below named Inventor, I hereby declare that:

我的住址，郵局地址和國籍均列在我名下。

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

我相信我是首創的，第一個和唯一的發明者（如只列出一人姓名）或是首創的，首位共同發明者（如列出數人姓名）。我提出作爲專利申請權利要求的題目如下

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

_____

_____

_____

如不再下麵小方格中打叉則須將說明書附此：

the specification of which is attached hereto unless the following box is checked:

☐ 以美國申請號碼或 PCT 國際申請號碼_____
立案於_____
修正於（如適用）_____

☒ was filed on **March 25, 2009**
as Untied States Application Number or PCT International Application Number
PCT/CN2009/071008 and was amended on
_____ (if applicable.)

我在此聲明我已閱畢並理解上述說明書的內容，包括上述任何修正案所修正的權利要求。

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

按照聯邦法規第三十七節第一．五六條，我有責任提供支援專利權的實質性資料。

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

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Chinese Language Declaration

我申請享受按照美國法規第三十五節第一百一十九條（a）-（b）項或第 365 條（b）項列出的以下任何外國專利申請書或發明者證書或第 365 條（a）項列出任何 PCT 國際申請指定至少在美國以外的任何一個國家的外國優先權，並確認下列方格內打記號，具有優先權申請前立案日期的，任何外國專利申請書或發明者證書或是 PCT 國際申請書。

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

國外優先申請書

不要求優先權
Priority Not Claimed

200810096053.2	China	25/04/2008	☐
（號碼）(Number)	（國名）(Country)	（申請日/月/年）(Day/Month/Year Filed)	
			☐
（號碼）(Number)	（國名）(Country)	（申請日/月/年）(Day/Month/Year Filed)	
			☐
（號碼）(Number)	（國名）(Country)	（申請日/月/年）(Day/Month/Year Filed)	

我申請享受被美國法規第 35 節 119（e）列出的以下任何美國臨時申請書的利益。

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

（申請順序號碼）(Application No.)	（申請日期）(Filing Date)	（申請順序號碼）(Application No.)	（申請日期）(Filing Date)

我申請享受按照美國法規第三十五節一百二十條或 362 條（c）項列出任何 PCT 國際申請所指定的美國列出的以下任何美國申請書的利益，如果此申請書中提出的每項權利要求的題目未案美國法規或是 PCT 國際申請第三十五節第一百二十條第一段的要求在以前的美國申請書中披露，則我有責任按照聯邦法規第三十七節第一．五六（甲）條提供支援專利權的實質性資料，這一法規條文生效於以前申請的立案日期之後，但在美國或 PCT 國際申請立案日之前。

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

（申請順序號碼）(Application No.)	（申請日期）(Filing Date)	（狀況）(Status)(patented, pending, abandoned)（已獲專利權，申請中，取消）	

我在此聲明根據我所知而作的所有聲明都真實無誤，所有有關資料和資訊的聲明也真實無誤；我還知道，按照美國法規第十八節第一千零一項，任何蓄意僞造的聲明都將受到罰款或監禁，或同時受到兩種懲罰。這類蓄意僞造的聲明將微機此申請書或任何已頒發專利的效力。

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 of any patent issued thereon.

Chinese Language Declaration

委託書：
以列名發明者的身份，我在此指定下列律師和、或代理人執行此申請並從事與專利商標公署有關的所有業務（列出姓名和註冊號碼）：

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: (list name and registration number):

通讯地址

Send Correspondence to:

直拨电话（姓名及电话号码）

Direct Telephone Calls to: (name and telephone number)

第一個或唯一的發明者的全名	Full name of sole or first inventor **DAI, Bo**
發明者簽字 日期	Inventor's signature Dai Bo Date June 30, 2010
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第二個共同發明者全名（如有）	Full name of second joint inventor, if any **YU, Guanghui**
第二個發明者簽字 日期	Second Inventor's signature Yu. Guanghui Date Jun 30, 2010
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國籍	Citizenship: **P.R. China**
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(第三個和其他共同發明者需提供同樣資料和簽字)

(Supply information and signature for third and subsequent joint inventors)

Chinese Language Declaration

第三個共同發明者的全名（如有）	Full name of third joint inventor, if any **XIA, Shuqiang**
第三個發明者簽字 日期	Third Inventor's signature XIA, Shuqiang Date June 30, 2010
地址	Residence: **ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong Province 518057, P.R. China**
國籍	Citizenship: **P.R. China**
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第四個共同發明者全名（如有）	Full name of fourth joint inventor, if any **HAO, Peng**
第四個發明者簽字 日期	Fourth Inventor's signature Hao Peng Date June 30, 2010
住址	Residence: **ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong Province 518057, P.R. China**
國籍	Citizenship: **P.R. China**
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	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong Province 518057, P.R. China
第五個共同發明者全名（如有）	Full name of fifth joint inventor, if any **LIANG, Chunli**
第五個發明者簽字 日期	Fifth Inventor's signature LIANG, Chunli Date June 30, 2010
住址	Residence: **ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong Province 518057, P.R. China**
國籍	Citizenship: **P.R. China**
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	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong Province 518057, P.R. China

Electronic Patent Application Fee Transmittal	
Application Number:	
Filing Date:	
Title of Invention:	A METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
First Named Inventor/Applicant Name:	Bo DAI
Filer:	Christopher P. Maiorana/Greg Beirne
Attorney Docket Number:	6284.00013 / P34599ZTE
Filed as Large Entity	

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	330	330
Utility Search Fee	1111	1	540	540
Utility Examination Fee	1311	1	220	220
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1090**

Electronic Acknowledgement Receipt	
EFS ID:	8634433
Application Number:	12905299
International Application Number:	
Confirmation Number:	7676
Title of Invention:	A METHOD FOR FEEDING BACK CONFIRMATION INFORMATION ON A PHYSICAL UPLINK SHARED CHANNEL
First Named Inventor/Applicant Name:	Bo DAI
Customer Number:	21615
Filer:	Christopher P. Maiorana/Greg Beirne
Filer Authorized By:	Christopher P. Maiorana
Attorney Docket Number:	6284.00013 / P34599ZTE
Receipt Date:	15-OCT-2010
Filing Date:	
Time Stamp:	13:17:12
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1090
RAM confirmation Number	11895
Deposit Account	
Authorized User	

File Listing:

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

1		628400013_application_101510.PDF	1480232 dcde3ac0ba30ff424349ef32fb6e4f9346e3515a	yes	31

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Transmittal of New Application	1	1
Drawings-only black and white line drawings	2	3
Specification	4	20
Claims	21	26
Abstract	27	27
Oath or Declaration filed	28	31

Warnings:

Information:

2	Fee Worksheet (PTO-875)	fee-info.pdf	33208 c2fa7e9c583696a4f4727ebef8caf39ef4ecfad9	no	2

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Total Files Size (in bytes):	1513440

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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.

PTO/SB/06 (12-04)

Date: **10/15/10**

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

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PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number
12/905,299

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	330
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	540
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	220
TOTAL CLAIMS (37 CFR 1.16(i))	16 minus 20 =		x$26		OR	x$52	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*	x$110			x$220	
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $270 ($135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			195			390	
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1090

APPLICATION AS AMENDED – PART II

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

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

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

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

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