

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
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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. 2:16cv00754	DATE FILED 7/13/2016	U.S. DISTRICT COURT Eastern District of Texas, Marshall Division
PLAINTIFF NOKIA SOLUTIONS AND NETWORKS US LLC AND NOKIA SOLUTIONS AND NETWORKS OY		DEFENDANT HUAWEI TECHNOLOGIES CO. LTD. AND HUAWEI DEVICE USA, INC.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 9,185,688	11/10/2015	Pajukoski et al.
2 9,148,877	9/29/2015	Pajukoski et al.
3 8,437,416	5/7/2013	Tiirola et al.
4		
5		

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

DATE INCLUDED	INCLUDED BY	
	<input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> 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
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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

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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.
14/793,941	11/10/2015	9185688	863.0076.U3(US)	6227

29683 7590 10/21/2015
HARRINGTON & SMITH
4 RESEARCH DRIVE, Suite 202
SHELTON, CT 06484-6212

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

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

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

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

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

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

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

Kari P. Pajukoski, Oulu, FINLAND;
Nokia Solutions and Networks Oy, Espoo, FINLAND;
Esa T. Tirola, Kempele, FINLAND;

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.

Receipt date: 07/08/2015

14793941 - GAU: 2477

Page No.: 1 of 2

INFORMATION DISCLOSURE CITATION FORM FOR PATENT APPLICATION (FORM PTO-1449) (Substitute)		Docket No.: 863.0076.U3(US)		Serial No.	
		Applicant(s): Kari Pajukoski et al.			
		Filing Date: herewith		Group:	
U.S. PATENT DOCUMENTS					
Examiner Initials	Document Number (Number-Kind Code)	Publication Date (MM-DD-YYYY)	Name of Patentee or Applicant	Class	Sub-class
	US-2007/0133458 A1	06-14-2007	Chandra et al.	370	329
	US-2003/0228876 A1	12-11-2003	Hwang	455	522
	US-2005/0047393 A1	03-03-2005	Liu	370	352
	US-2007/0171849 A1	07-26-2007	Zhang et al.	370	310
	US-2009/0022110 A1	01-2009	Muharenovic et al.	370	336
	US-2009/0316811	12-2009	Maeda et al.	375	250
	US-2008/0316959	12-2008	Bachi et al.	370	329
	US-2009/0022135	01-2009	Papasakellariou et al.	370	344
	US-2009/0046667	02-2009	Pelletier et al.	370	335
	US-				
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	US-				
	US-				
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	US-				
FOREIGN PATENT DOCUMENTS					
Examiner Initials	Document Number (Country Code-Number-Kind Code)	Publication Date (MM-DD-YYYY)	Name Of Patentee of Applicant	Translation? Yes/No/n/a	
Charge(s) applied to document, /S.H./ 8/26/2015	WO-2007/1-547-A2	09-07-2007	International Digital Technology Corporation	Abstract Abstract	
	JP-2009/049578-A	03-05-2009	KDDI Corp		
	RU-2305372-C2	08-27-2007	Samsung Electronics Co., Ltd.		
	WO-2004/110081-A1	12-16-2004	Nokia Corporation		
	WO-2005/015942-A1	02-17-2005	Qualcomm Incorporated		
	WO-2007/044414-A1	04-19-2007	Inter-Digital Technology Corporation		
	WO-2007/008123-A1	01-18-2007	Telefonaktiebolaget LM Ericsson		
OTHER DOCUMENTS (Author (Capitalize), Title, Date, Pages, Etc., if known)					
	"X2 downlink forwarding delay", NEC, 3GPP TSG-RAN WG2#59bis, October 2007, R2-074139, 4 pgs.				
	"Multiplexing of Scheduling Request and ACK/NACK and/or CQI", Nokia Siemens Networks, 3GPP TSG RAN WG1#49bis, R1-073011, 3 pgs.				
	"Handling NAS message during HO", Alcatel-Lucent, 3 GPP TSG RAN WG2 #59bis, October 2007, R2-074333, 2 pgs.				
	3GPP TSG RAN WG1 #48bis, R1-071662, St. Julians, Malta, March 26-30, 2007, Nokia Siemens, "Uplink Scheduling Request for LTE", 4 pgs.				
Examiner's Signature: /Otis Thompson, Jr/			Date Considered: 07/30/2015		
Initial if reference was considered, whether or not citation is in conformance with MPEP. Mark through citation if not considered. Include a copy of this citation form with your next correspondence to the Applicant(s).					

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.T./

Best Available Copy (S) TRANSMITTAL

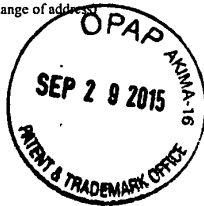
Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or **Fax** (571)-273-2885

Tu

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)

29683 7590 08/05/2015
HARRINGTON & SMITH
4 RESEARCH DRIVE, Suite 202
SHELTON, CT 06484-6212



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.

Elaine F. Mian	(Depositor's name)
<i>Elaine F. Mian</i>	(Signature)
9/24/2015	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/793,941	07/08/2015	Kari P. Pajukoski	863.0076.U3(US)	6227

TITLE OF INVENTION: Providing Improved Scheduling Request Signaling With ACK/NACK Or CQI

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	11/05/2015

EXAMINER	ART UNIT	CLASS-SUBCLASS
THOMPSON, JR, OTIS L	2477	370-329000

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.

Harrington & Smith

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)

Nokia Solutions and Networks Oy

Espoo, Finland

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 50-1924 (enclose an extra copy of this form).

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

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

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

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

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

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

Authorized Signature

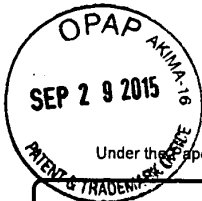
Typed or printed name

John A. Garrity

Date 09/30/2015 MAILING 00000003 501924 14793941

Registration No. 01-FC-1501

96000470



"FEE ADDRESS" INDICATION FORM

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

Fax to:
571-273-6500

- OR -

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

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

☒ Customer Number: 00287

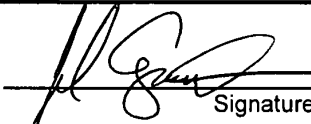
OR

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

PATENT NUMBER (if known)	APPLICATION NUMBER
	14/793,941

Completed by (check one):

☐ Applicant/Inventor


Signature

☒ Attorney or Agent of record 60,470
(Reg. No.)

John A. Garrity
Typed or printed name

☐ Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed.
(Form PTO/SB/96)

203-925-9400
Requester's telephone number

☐ Assignee recorded at Reel _____ Frame _____

9/24/2015
Date

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

☐ * Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.363. 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 5 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 COMPLETE FORMS TO THIS ADDRESS. SEND TO: Mail Stop M Correspondence, 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.



IFJ

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT(s): Kari . Pajukoski CONF. NO.: 6227
SERIAL NO.: 14/793,941 ART UNIT: 2477
FILED: July 8, 2015 EXAMINER: Thompson, Jr., Otis L.
TITLE: Providing Improved Scheduling Request Signaling With
ACK/NACK Or CQI
ATTORNEY DOCKET NO.: 863.0076.U3(US)

Mail Stop MISSING PARTS
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Alexandria, VA 22313

RESPONSE TO INFORMATIONAL NOTICE

Filing Date Granted

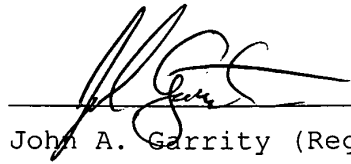
Sir:

In response to the Informational Notice to Application mailed June 7, 2013 (copy enclosed) attached please find the executed Declaration and Power of Attorney.

No fee is required. However, should the undersigned attorney be mistaken, please charge Deposit Account No. 50-1924 for any required fee deficiency.

Thank you.

Respectfully submitted,



John A. Garrity (Reg. No. 60,470)

8/14/2015

Date

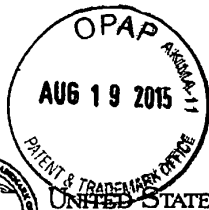
Harrington & Smith,
Attorneys at Law, LLC
4 Research Drive
Shelton, CT 06484-6212
(203) 925-9400
Customer No. 29683

CERTIFICATE OF MAILING

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

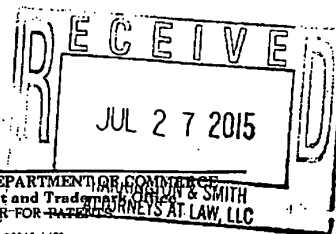
8/14/2015
Date

Elaine F. Mian
Elaine F. Mian



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/793,941	07/08/2015	Kari P. Pajukoski	863.0076.U3(US)

CONFIRMATION NO. 6227

29683
HARRINGTON & SMITH
4 RESEARCH DRIVE, Suite 202
SHELTON, CT 06484-6212

US ACTION

INFORMAL NOTICE

DUE DATE

9-23-15

PAPER DATED

7-23-15

DA

FINAL 1-23-16

(ASC PT) DWG

APPEAL

ISSUE FEE

OTHER

Declaration

0000000076398714

Date Mailed: 07/23/2015

INFORMATIONAL NOTICE TO APPLICANT

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

A new inventor's oath or declaration that identifies this application (e.g., by Application Number and filing date) is required. The inventor's oath or declaration does not comply with 37 CFR 1.63 in that it:

- does not state that the above-identified application was made or authorized to be made by the person executing the oath or declaration.

Kari P. Pajukoski
Esa T. Tirola

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/ygizaw/



H&S Docket No.: 863.0076.U3(US)
Nokia Docket No.: 2007P03991US03

**DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION
USING AN APPLICATION DATA SHEET (37 CFR 1.76)**

Title Of Invention: **Providing Improved Scheduling Request Signaling With ACK/NACK
Or CQI**

As a below named inventor, I hereby declare that:

This declaration is directed to the attached application, or (if the following box is checked):

☒ United States application or PCT international application number:
14/793,941 filed on **July 8, 2015**

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

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

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

I am aware of the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability.

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

(1)FULL NAME OF INVENTOR :	LAST NAME	FIRST NAME	MIDDLE NAME
	Pajukoski	Kari	P.

Signature

Date

(2)FULL NAME
OF INVENTOR :

LAST NAME
Tiirola

FIRST NAME
Esa

MIDDLE NAME
T.

Signature



Date

3.8.2018



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
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NOTICE OF ALLOWANCE AND FEE(S) DUE

29683 7590 08/05/2015
HARRINGTON & SMITH
4 RESEARCH DRIVE, Suite 202
SHELTON, CT 06484-6212

EXAMINER

THOMPSON, JR, OTIS L

ART UNIT

PAPER NUMBER

2477

DATE MAILED: 08/05/2015

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/793,941	07/08/2015	Kari P. Pajukoski	863.0076.U3(US)	6227

TITLE OF INVENTION: Providing Improved Scheduling Request Signaling With ACK/NACK Or CQI

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	11/05/2015

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)

29683 7590 08/05/2015
HARRINGTON & SMITH
4 RESEARCH DRIVE, Suite 202
SHELTON, CT 06484-6212

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

Certificate of Mailing or Transmission

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/793,941	07/08/2015	Kari P. Pajukoski	863.0076.U3(US)	6227

TITLE OF INVENTION: Providing Improved Scheduling Request Signaling With ACK/NACK Or CQI

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	11/05/2015

EXAMINER	ART UNIT	CLASS-SUBCLASS
THOMPSON, JR, OTIS L	2477	370-329000

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

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

2. For printing on the patent front page, list

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

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

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

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

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

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

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

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

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

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

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/793,941	07/08/2015	Kari P. Pajukoski	863.0076.U3(US)	6227
29683 7590 08/05/2015 HARRINGTON & SMITH 4 RESEARCH DRIVE, Suite 202 SHELTON, CT 06484-6212			EXAMINER THOMPSON, JR, OTIS L	
			ART UNIT	PAPER NUMBER

2477

DATE MAILED: 08/05/2015

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.

<i>Notice Requiring Inventor's Oath or Declaration</i>	Application No. 14/793,941	Applicant(s) Kari P. Pajukoski	
	Examiner THOMPSON, JR, OTIS L	Art Unit 2477	

This notice is an attachment to the Notice of Allowability (PTOL-37), or the Notice of Allowability For A Design Application (PTOL-37D).

An inventor's oath or declaration in compliance with 37 CFR 1.63 or 1.64 executed by or with respect to each inventor has not yet been submitted.

An oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each inventor (for any inventor for which a compliant oath, declaration, or substitute statement has not yet been submitted) **MUST** be filed no later than the date on which the issue fee is paid. See 35 U.S.C. 115(f). Failure to timely comply will result in ABANDONMENT of this application.

A properly executed inventor's oath to declaration has not been received for the following inventor(s):

If applicant previously filed one or more oaths, declarations, or substitute statements, applicant may have received an informational notice regarding deficiencies therein.

The following deficiencies are noted:

INFORMAL ACTION PROBLEMS

A new inventor's oath or declaration that identifies this application (e.g., by Application Number and filing date) is required. The inventor's oath or declaration does not comply with 37 CFR 1.63 in that it:

- does not state that the above-identified application was made or authorized to be made by the person executing the oath or declaration: **Kari P. Pajukoski and Esa T. Tirola.**

Questions relating to this Notice should be directed to the Application Assistance Unit at 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. 14/793,941	Applicant(s) PAJUKOSKI ET AL.	
	Examiner OTIS L. THOMPSON, JR	Art Unit 2477	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 7/8/2015.
☐ 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 56-103 (Renumbered 1-48 respectively). 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. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) 2. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>7/8/2015</u> 3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material 4. <input type="checkbox"/> Interview Summary (PTO-413), Paper No./Mail Date _____.	5. <input type="checkbox"/> Examiner's Amendment/Comment 6. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance 7. <input type="checkbox"/> Other _____.
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

/OTIS L THOMPSON, JR/ Primary Examiner, Art Unit 2477	
----------------------------------------------------------	--

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

DETAILED ACTION

Allowable Subject Matter

2. Claims 56-103 are allowed (Renumbered 1-48 respectively).
3. The following is an examiner's statement of reasons for allowance: the prior art does not teach adequately suggest an unmodulated sequence via a modulation scheme used for acknowledgement data in addition to a scheduling request being combined with an acknowledgement on a physical uplink control channel.

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

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to OTIS L. THOMPSON, JR whose telephone number is (571)270-1953. The examiner can normally be reached on Monday to Thursday 7:30 am to 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chirag Shah can be reached on (571)272-3144. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2477

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.

/OTIS L THOMPSON, JR/
Primary Examiner, Art Unit 2477

July 30, 2015

Notice of References Cited	Application/Control No. 14/793,941	Applicant(s)/Patent Under Reexamination PAJUKOSKI ET AL.	
	Examiner OTIS L. THOMPSON, JR	Art Unit 2477	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2011/0249634 A1	10-2011	LEE et al.	370/329
*	B	US-2011/0274099 A1	11-2011	Kwon et al.	370/338
*	C	US-2011/0280169 A1	11-2011	Seo et al.	370/311
*	D	US-2013/0022007 A1	01-2013	Berggren et al.	370/329
*	E	US-2013/0100919 A1	04-2013	Han et al.	370/329
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			


FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

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

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

Search Notes 	Application/Control No. 14793941	Applicant(s)/Patent Under Reexamination PAJUKOSKI ET AL.
	Examiner OTIS L THOMPSON, JR	Art Unit 2477

CPC- SEARCHED		
Symbol	Date	Examiner


CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner
H04W72 with text in EAST	7/30/2015	OT

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
Double Patenting Search	7/30/2015	OT
Parent cases search consideration (14/051646 and 12/290547 now patent 8,638,729)	7/30/2015	OT
EAST Text Search	7/30/2015	OT
Interference Text Search	7/30/2015	OT

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
H04W72	0413 with text in EAST	7/30/2015	OT


	/OTIS L THOMPSON, JR/ Primary Examiner.Art Unit 2477
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Issue Classification 	Application/Control No. 14793941	Applicant(s)/Patent Under Reexamination PAJUKOSKI ET AL.	
	Examiner OTIS L THOMPSON, JR	Art Unit 2477	

CPC					
Symbol				Type	Version
H04W	72	0413		F	2013-01-01
H04L	5	0055		I	2013-01-01
H04L	5	0057		I	2013-01-01

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	48	
/OTIS L THOMPSON, JR/ Primary Examiner.Art Unit 2477	07/30/2015	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Issue Classification 	Application/Control No. 14793941	Applicant(s)/Patent Under Reexamination PAJUKOSKI ET AL.
	Examiner OTIS L THOMPSON, JR	Art Unit 2477

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
-	1	-	17	-	33	-	49	10	65	26	81	42	97		
-	2	-	18	-	34	-	50	11	66	27	82	43	98		
-	3	-	19	-	35	-	51	12	67	28	83	44	99		
-	4	-	20	-	36	-	52	13	68	29	84	45	100		
-	5	-	21	-	37	-	53	14	69	30	85	46	101		
-	6	-	22	-	38	-	54	15	70	31	86	47	102		
-	7	-	23	-	39	-	55	16	71	32	87	48	103		
-	8	-	24	-	40	1	56	17	72	33	88				
-	9	-	25	-	41	2	57	18	73	34	89				
-	10	-	26	-	42	3	58	19	74	35	90				
-	11	-	27	-	43	4	59	20	75	36	91				
-	12	-	28	-	44	5	60	21	76	37	92				
-	13	-	29	-	45	6	61	22	77	38	93				
-	14	-	30	-	46	7	62	23	78	39	94				
-	15	-	31	-	47	8	63	24	79	40	95				
-	16	-	32	-	48	9	64	25	80	41	96				

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 48	
/OTIS L THOMPSON, JR/ Primary Examiner. Art Unit 2477 (Primary Examiner) _____ (Date) _____		07/30/2015 O.G. Print Claim(s) 1	O.G. Print Figure 2

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Kari Pajukoski et al.

SERIAL NO.:

ART UNIT:

FILED: herewith

EXAMINER:

TITLE: Providing Improved Scheduling Request Signaling with
ACK/NACK or CQI

ATTORNEY DOCKET NO.: 863.0076.U3(US)

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

Information Disclosure Statement

(37 C.F.R. §1.97(b))

Sir:

The following information is being disclosed to the U.S. Patent and Trademark Office as information that may be material to the examination of the above-identified patent application.

A Form PTO-1449 is enclosed for the Examiner's use which lists all the art cited in the parent application (Serial No.: 14/051,646). In accordance with 37 C.F.R. §1.98(d) copies of the art are not included. These can be obtained by the Examiner from the file of the parent application.

The filing of this Statement is not to be construed as a representation that a search has been made regarding the

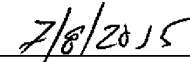
ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.T./

claimed invention (37 C.F.R. §1.97(g)) or that no other possible material information exists. In addition, the filing of this Statement is not to be construed to be an admission that the information cited in the Statement is, or is considered to be, material to Patentability (37 C.F.R. §1.97(h)).

Respectfully submitted,



John A. Garrity (Reg. No. 60,470)



Date

Customer No.: 29683

Harrington & Smith, Attorneys At Law, LLC

4 Research Drive

Shelton, CT 06484-6212

203-925-9400

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.T./

INFORMATION DISCLOSURE CITATION FORM FOR PATENT APPLICATION (FORM PTO-1449) (Substitute)		Docket No.: 863.0076.U3(US)		Serial No.	
		Applicant(s): Kari Pajukoski et al.		Group:	
Filing Date: herewith					
U.S. PATENT DOCUMENTS					
Examiner Initials	Document Number (Number-Kind Code)	Publication Date (MM-DD-YYYY)	Name of Patentee or Applicant	Class	Sub-class
	US-2007/0133458 A1	06-14-2007	Chandra et al.	370	329
	US-2003/0228876 A1	12-11-2003	Hwang	455	522
	US-2005/0047393 A1	03-03-2005	Liu	370	352
	US-2007/0171849 A1	07-26-2007	Zhang et al.	370	310
	US-2009/0022110 A1	01-2009	Muharenovic et al.	370	336
	US-2009/0316811	12-2009	Maeda et al.	375	250
	US-2008/0316959	12-2008	Bachi et al.	370	329
	US-2009/0022135	01-2009	Papasakellariou et al.	370	344
	US-2009/0046667	02-2009	Pelletier et al.	370	335
	US-				
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FOREIGN PATENT DOCUMENTS					
Examiner Initials	Document Number (Country Code-Number-Kind Code)	Publication Date (MM-DD-YYYY)	Name Of Patentee of Applicant	Translation? Yes/No/n/a	
	WO-2007/1--547-A2	09-07-2007	International Digital Technology Corporation		
	JP-2009/049578-A	03-05-2009	KDDI Corp	Abstract	
	RU-2305372-C2	08-27-2007	Samsung Electronics Co., Ltd.	Abstract	
	WO-2004/110081-A1	12-16-2004	Nokia Corporation		
	WO-2005/015942-A1	02-17-2005	Qualcomm Incorporated		
	WO-2007/044414-A1	04-19-2007	Inter-Digital Technology Corporation		
	WO-2007/008123-A1	01-18-2007	Telefonaktiebolaget LM Ericsson		
OTHER DOCUMENTS (Author (Capitalize), Title, Date, Pages, Etc., if known)					
	"X2 downlink forwarding delay", NEC, 3GPP TSG-RAN WG2#59bis, October 2007, R2-074139, 4 pgs.				
	"Multiplexing of Scheduling Request and ACK/NACK and/or CQI", Nokia Siemens Networks, 3GPP TSG RAN WG1#49bis, R1-073011, 3 pgs.				
	"Handling NAS message during HO", Alcatel-Lucent, 3 GPP TSG RAN WG2 #59bis, October 2007, R2-074333, 2 pgs.				
	3GPP TSG RAN WG1 #48bis, R1-071662, St. Julians, Malta, March 26-30, 2007, Nokia Siemens, "Uplink Scheduling Request for LTE", 4 pgs.				
Examiner's Signature: /Otis Thompson, Jr/			Date Considered: 07/30/2015		
Initial if reference was considered, whether or not citation is in conformance with MPEP. Mark through citation if not considered. Include a copy of this citation form with your next correspondence to the Applicant(s).					

INFORMATION DISCLOSURE CITATION FORM FOR PATENT APPLICATION (FORM PTO-1449) (Substitute)		Docket No. 863.0076.U3(US)		Serial No.:	
		Applicant(s): Kari P. Pajukoski, et al.		Filing Date: herewith	
				Group:	
U.S. PATENT DOCUMENTS					
Examiner Initials	Document Number (Number-Kind Code)	Publication Date (MM-DD-YYYY)	Name of Patentee or Applicant	Class	Sub-class
	US-2009/0109908 A1	04-30-2009	Bertrand et al.	370	329
	US-7,852,883 B2	12-14-2010	Kwak et al.	370	522
	US-8,200,252 B2	06-12-2012	Lee et al.	455	458
	US-8,254,244 B2	08-28-2012	Montojo et al.	370	207
	US-				
	US-				
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FOREIGN PATENT DOCUMENTS					
Examiner Initials	Document Number (Country Code-Number-Kind Code)	Publication Date (MM-DD-YYYY)	Name Of Patentee of Applicant	Translation? Yes/No/n/a	
	EP-2 109 946-B1	05-08-2013	LG Electronics Inc.		
	EP-2 117 246-A1	11-11-2009	NTT DoCoMo, Inc.		
	WO-2004/102980-A2	11-25-2004	Motorola Inc.		
	WO-2007/081564-A2	07-19-2007	Inter-Digital Technology Corporation		
	WO-2007/130324-A2	11-15-2007	Inter-Digital Technology Corporation		
	WO-2007/130324-A3	11-15-2007	Inter-Digital Technology Corporation		
	WO-2009/022866-A1	02-19-2009	LG Electronics Inc.		
OTHER DOCUMENTS (Author (Capitalize), Title, Date, Pages, Etc., if known)					
	"Data-non-associated control signal transmission without UL data", Nokia Siemens, 3GPP TSG RAN WG1 Meeting #48bis, R1-071676, March 2007, 6 pgs.				
	"Multiplexing of Scheduling Request Indicator", Huawei, 3GPP TSG-RAN-WG1 Meeting #49bis, R1-072895, June 2007, 4 pgs.				
	"Multiplexing the Scheduling Request in the Uplink", Alcatel-Lucent, 3GPP TSG-RAN WG1 #49bis, R1-073066, June 2007, 4 pgs.				
	"Proposed Scheduling Request (SR) structure and multiplexing with PUCCH", LG Electronics, 3GPP TSG RAN WG1 #50, R1073485, August 2007, 6 pgs.				
Examiner's Signature: /Otis Thompson, Jr/			Date Considered: 07/30/2015		
Initial if reference was considered, whether or not citation is in conformance with MPEP. Mark through citation if not considered. Include a copy of this citation form with your next correspondence to the Applicant(s).					

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /O.T./

EAST Search History**EAST Search History (Prior Art)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	154800	H04w72/\$.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2015/07/30 19:26
L2	2554	l1 and (ack or nack or acknowledg\$5) same (schedul\$3 request or sr)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2015/07/30 19:27
L3	681	l1 and (ack or nack or acknowledg\$5) same (schedul\$3 request or sr) same \$2modulat\$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2015/07/30 19:27
L4	89	l1 and (ack or nack or acknowledg\$5) same (schedul\$3 request or sr) same \$2modulat\$3 same (combin\$5 or bundl\$3 or group\$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2015/07/30 19:28
L5	143	(ack or nack or acknowledg\$5) same (schedul\$3 request or sr) same \$2modulat\$3 same (combin\$5 or bundl\$3 or group\$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2015/07/30 19:32
L6	101	l5 same (pucch or physical uplink control channel)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2015/07/30 19:32
L7	249	((Kari) near2 (Pajukoski)).INV.	US-PGPUB; USPAT; USOCR	ADJ	ON	2015/07/30 19:33
L8	284	((Esa) near2 (Tirola)).INV.	US-PGPUB; USPAT; USOCR	ADJ	ON	2015/07/30 19:33
L9	314	l7 or l8	US-PGPUB; USPAT;	ADJ	ON	2015/07/30 19:34

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
L10	4	l9 and (ack or nack or acknowledg\$5).clm. and (schedul\$3 request or sr).clm. and \$2modulat\$3.clm. and (combin\$5 or bundl\$3 or group\$3).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2015/07/30 19:34
L11	4	l9 and (ack or nack or acknowledg\$5).clm. and (schedul\$3 request or sr).clm. and \$2modulat\$3.clm. and (combin\$5 or bundl\$3 or group\$3).clm. and (pucch or physical uplink control channel).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2015/07/30 19:34

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L12	81	((Esa) near2 (Tirola)).INV.	USPAT; UPAD	ADJ	ON	2015/07/30 19:35
L13	75	((KARI) near2 (PAJUKOSKI)).INV.	USPAT; UPAD	ADJ	ON	2015/07/30 19:35
L14	93	l12 or l13	USPAT; UPAD	ADJ	ON	2015/07/30 19:35
L15	1074	h04w72/0413.cpc.	USPAT; UPAD	ADJ	ON	2015/07/30 19:37
L16	3	l15 and (ack or nack or acknowledg\$5).clm. and (schedul\$3 request or sr).clm. and \$2modulat\$3.clm. and (combin\$5 or bundl\$3 or group\$3).clm. and (pucch or physical uplink control channel).clm.	USPAT; UPAD	ADJ	ON	2015/07/30 19:37
L17	7	(ack or nack or acknowledg\$5).clm. and (schedul\$3 request or sr).clm. and \$2modulat\$3.clm. and (combin\$5 or bundl\$3 or group\$3).clm. and (pucch or physical uplink control channel).clm.	USPAT; UPAD	ADJ	ON	2015/07/30 19:38

7/ 30/ 2015 7:39:18 PM**C:\Users\othompson1\Documents\EAST\Workspaces\14-793941.wsp**



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BIB DATA SHEET


CONFIRMATION NO. 6227

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
14/793,941	07/08/2015	370	2477	863.0076.U3(US)		
APPLICANTS Nokia Solutions and Networks Oy, Espoo, FINLAND; INVENTORS Kari P. Pajukoski, Oulu, FINLAND; Esa T. Tirola, Kempele, FINLAND; ** CONTINUING DATA ***** This application is a CON of 14/051,646 10/11/2013 which is a CON of 12/290,547 10/30/2008 PAT 8638729 which claims benefit of 61/001,207 10/30/2007 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 07/20/2015						
Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Verified and /OTIS L THOMPSON, Acknowledged JR/ Examiner's Signature		<input type="checkbox"/> Met after Allowance Initials	STATE OR COUNTRY FINLAND	SHEETS DRAWINGS 9	TOTAL CLAIMS 48	INDEPENDENT CLAIMS 9
ADDRESS HARRINGTON & SMITH 4 RESEARCH DRIVE, Suite 202 SHELTON, CT 06484-6212 UNITED STATES						
TITLE Providing Improved Scheduling Request Signaling With ACK/NACK Or CQI						
FILING FEE RECEIVED 6360	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		

<i>Index of Claims</i> 	Application/Control No. 14793941	Applicant(s)/Patent Under Reexamination PAJUKOSKI ET AL.
	Examiner OTIS L THOMPSON, JR	Art Unit 2477

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47										
CLAIM		DATE								
Final	Original	07/30/2015								
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	2	-								
	3	-								
	4	-								
	5	-								
	6	-								
	7	-								
	8	-								
	9	-								
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	32	-								
	33	-								
	34	-								
	35	-								
	36	-								

<i>Index of Claims</i> 	Application/Control No. 14793941	Applicant(s)/Patent Under Reexamination PAJUKOSKI ET AL.
	Examiner OTIS L THOMPSON, JR	Art Unit 2477

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant			<input type="checkbox"/> CPA			<input type="checkbox"/> T.D.			<input type="checkbox"/> R.1.47		
CLAIM		DATE									
Final	Original	07/30/2015									
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14	69	=									
15	70	=									
16	71	=									
17	72	=									

<i>Index of Claims</i> 	Application/Control No. 14793941	Applicant(s)/Patent Under Reexamination PAJUKOSKI ET AL.
	Examiner OTIS L THOMPSON, JR	Art Unit 2477

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant			<input type="checkbox"/> CPA			<input type="checkbox"/> T.D.			<input type="checkbox"/> R.1.47		
CLAIM			DATE								
Final	Original		07/30/2015								
18	73	=									
19	74	=									
20	75	=									
21	76	=									
22	77	=									
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44	99	=									
45	100	=									
46	101	=									
47	102	=									
48	103	=									



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/793,941	07/08/2015	Kari P. Pajukoski	863.0076.U3(US)

CONFIRMATION NO. 6227

29683
HARRINGTON & SMITH
4 RESEARCH DRIVE, Suite 202
SHELTON, CT 06484-6212

INFORMAL NOTICE



Date Mailed: 07/23/2015

INFORMATIONAL NOTICE TO APPLICANT

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

A new inventor's oath or declaration that identifies this application (e.g., by Application Number and filing date) is required. The inventor's oath or declaration does not comply with 37 CFR 1.63 in that it:

- does not state that the above-identified application was made or authorized to be made by the person executing the oath or declaration.

Kari P. Pajukoski
Esa T. Tiirola

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/ygizaw/



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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
14/793,941	07/08/2015	2414	6360	863.0076.U3(US)	48	9

CONFIRMATION NO. 6227

FILING RECEIPT



0000000076398713

29683
HARRINGTON & SMITH
4 RESEARCH DRIVE, Suite 202
SHELTON, CT 06484-6212

Date Mailed: 07/23/2015

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)

Kari P. Pajukoski, Oulu, FINLAND;
Esa T. Tirola, Kempele, FINLAND;

Applicant(s)

Nokia Solutions and Networks Oy, Espoo, FINLAND;

Power of Attorney: The patent practitioners associated with Customer Number 29683

Domestic Priority data as claimed by applicant

This application is a CON of 14/051,646 10/11/2013
which is a CON of 12/290,547 10/30/2008 PAT 8638729
which claims benefit of 61/001,207 10/30/2007

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access - A proper **Authorization to Permit Access to Application by Participating Offices** (PTO/SB/39 or its equivalent) has been received by the USPTO.

If Required, Foreign Filing License Granted: 07/20/2015

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/793,941**

Projected Publication Date: 10/29/2015

Non-Publication Request: No

Early Publication Request: No
Title

Providing Improved Scheduling Request Signaling With ACK/NACK Or CQI

Preliminary Class

370

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

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.

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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).

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 14/793,941	
APPLICATION AS FILED - PART I							
(Column 1)		(Column 2)		SMALL ENTITY		OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	280
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	600
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	720
TOTAL CLAIMS (37 CFR 1.16(i))	48	minus 20 = *	28			x 80 =	2240
INDEPENDENT CLAIMS (37 CFR 1.16(h))	9	minus 3 = *	6			x 420 =	2520
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL		TOTAL	6360
APPLICATION AS AMENDED - PART II							
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)
	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	
(Column 1)		(Column 2)		(Column 3)		OTHER THAN SMALL ENTITY	
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=
	Application Size Fee (37 CFR 1.16(s))						
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.							

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner For Patents
Mail Stop: NEW PATENT APPLICATION
P.O. Box 1450
Alexandria, VA 22313-1450

NEW APPLICATION TRANSMITTAL FORM

Sir:

Transmitted herewith for filing is the patent application of

Inventor(s): **Kari P. PAJUKOSKI, Esa T. TIROLA**

For (title): **Providing Improved Scheduling Request Signaling With ACK/NACK
Or CQI**

Enclosed are the following:

- ☐ Application Cover Page
- ☒ 34 pages of Specification that consists of, 24 pages of Description, 9 pages of Claims and 1 page of Abstract;
- ☒ 9 sheet of drawings;
- ☒ Inventor(s) Declaration; (from S/N 14/051,646)
- ☒ Power of Attorney from Applicant;
- ☒ Preliminary Amendment;
- ☐ Certified Copy of priority document(s);
- ☐ English language translation of priority document;
- ☒ Application Data Sheet;
- ☒ Information Disclosure Statement and/or Form PTO 1449 and cited non-U.S. art (if applicable);
- ☐ Assignment,
 - ☐ Inventor Declaration is in Assignment document (Assignment contains the statements required by § 1.63 (35 U.S.C 115(e) and § 1.63(e)));
- ☐ Recordation Form Cover Sheet for Assignment;
- ☐ Return Receipt Postcard;
- ☐ Other:

Assignment Data

- ☒ An assignment of the invention to Nokia Solutions and Networks Oy
☐ is attached.
☐ will follow.
☒ has been previously filed.

Small Entity Status

- ☐ Applicant claims small entity status.

Fees

- ☒ Utility ☐ Reissue
☐ Design

Basic Filing Fee \$ 280.00

Excess Claim Fee

	Number Filed	Number Extra	Rate	
Total Claims	48 -20 =	28 x	\$ 80.00	\$ 2240.00
Independent Claims	9 - 3 =	6 x	\$ 420.00	\$ 2520.00

☐ Multiple Dependent Claim Fee (\$780.00) \$

Examination Fee \$ 720.00

Patent Search Fee \$ 600.00

Exceeding of 100 sheets of paper fee (\$400.00 per each 50 sheets) \$

Assignment Recordal 0 x \$ 40.00 \$

TOTAL FEES \$ 6360.00

- ☐ A check in the amount of \$_____ in payment of the filing fee is enclosed.
- ☒ Charge \$ 6360.00 to Deposit Account No. 50-1924
- ☒ The Commissioner is hereby authorized to charge any additional fees under 37 C.F.R. 1.16 and 1.17 which may be required for this communication or during the entire pendency of this patent application, or credit any overpayment, to Deposit Account No. 50-1924.

Authorization To Permit Access To Application by Participating Offices

- ☒ The undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the above-identified patent application is filed access to the above-identified patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the above-identified patent application is filed to have access to the above-identified patent application. In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the above-identified patent application with respect to: 1) the above-identified patent application-as-filed; 2) any foreign application to which the above-identified patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the above-identified patent application; and 3) any U.S. application-as-filed from which benefit is sought in the above-identified patent application. In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing the Authorization to Permit Access to Application by Participating Offices.

Certification And Authorization To Permit Access To Search Results By The European Patent Office (EPO)

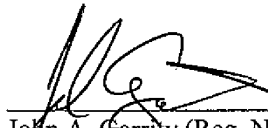
- ☒ The Undersigned Hereby Certifies And Authorizes The Following For The Above-Identified Application:
1. The undersigned hereby certifies that I am:
 - a. an Attorney or agent of record; and/or
 - b. a registered attorney or agent named in the application papers filed under 37 CFR 1.53 or 1.495 (37 CFR 1.63 or 1.497 oath or declaration was not filed.); and
 2. The undersigned hereby authorizes the USPTO to provide the European Patent Office (EPO) access to the bibliographic data and search results for the above-identified U.S. patent application.

Correspondence

Address all future communications to: **Customer No.: 29683**
Direct telephone calls to John A. Garrity at (203) 925-9400
Direct facsimiles to (203) 944-0245

Date

2/8/2015



John A. Garrity (Reg. No.: 60,470)

Customer No.: 29683

Harrington & Smith,
Attorneys At Law, LLC
4 Research Drive
Shelton, CT 06484-6212
(203) 925-9400

Doc Code: PA..

Document Description: Power of Attorney

PTO/AIA/82A (07-12)

Approved for use through 11/30/2014. OMB 0651-0035

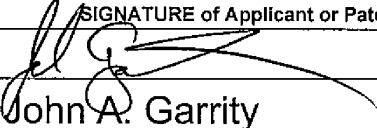
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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.

**TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE
REGISTERED PRACTITIONERS**

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B or equivalent) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5. If the Power of Attorney by Applicant form is not accompanied by this transmittal form or an equivalent, the Power of Attorney will not be recognized in the application.

Application Number	
Filing Date	herewith
First Named Inventor	Kari P. Pajukoski
Title	Providing Improved Scheduling Request Signaling With ACK/NACK or CQI
Art Unit	
Examiner Name	
Attorney Docket Number	863.0076.U3(US)

SIGNATURE of Applicant or Patent Practitioner			
Signature		Date	7/8/2015
Name	John A. Garrity	Telephone	203 925-9400
Registration Number	60,470		

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

☐ *Total of _____ forms are submitted.

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

GENERAL POWER OF ATTORNEY

The undersigned:

Nokia Solutions and Networks Oy
Karaportti 3
02610 Espoo
Finland

hereby appoints all practitioners associated with:

Customer Number: **29,683**

to represent the undersigned in the U.S. Patent and Trademark Office in connection with any and all patent applications and patents which the undersigned is the applicant or patent owner.

Signatures:

By: 

Name: Bernd Schaar

Nokia Solutions and Networks Oy

Title: authorized signatory

Date: 11th October 2013

By: 

Name: Alexander Schabel

Nokia Solutions and Networks Oy

Title: authorized signatory

Date: 11th October 2013

POWER OF ATTORNEY BY APPLICANT

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent):

OR

29683

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent):

Name Registration	Number

Name Registration	Number

Please recognize or change the correspondence address for the above-identified patent to:

☒ The address associated with the above-mentioned Customer Number.

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the Applicant:

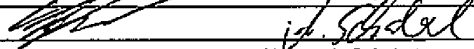
☐ Inventor or Joint Inventor

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor

☒ Assignee or Person to Whom the Inventor is Under an Obligation to Assign

☐ Person Who Otherwise Shows Sufficient *Proprietary* Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document)

SIGNATURE of Applicant for Patent

Signature		Date	11 th October 2013
Name	Bernd Schaar Alexander Schabel	Telephone	+49 (0)89 5159 25080
Title and Company	Both authorized signatories Nokia Solutions and Networks Oy		

NOTE: Signature - This form must be signed by the applicant or applicant's representative in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms for more than one signature, see below.

☐ *Total of _____ forms are submitted.

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Kari Pajukoski et al.

SERIAL NO.:

ART UNIT:

FILED: herewith

EXAMINER:

TITLE: Providing Improved Scheduling Request Signaling with
ACK/NACK or CQI

ATTORNEY DOCKET NO.: 863.0076.U3(US)

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

Information Disclosure Statement

(37 C.F.R. §1.97(b))

Sir:

The following information is being disclosed to the U.S. Patent and Trademark Office as information that may be material to the examination of the above-identified patent application.

A Form PTO-1449 is enclosed for the Examiner's use which lists all the art cited in the parent application (Serial No.: 14/051,646). In accordance with 37 C.F.R. §1.98(d) copies of the art are not included. These can be obtained by the Examiner from the file of the parent application.

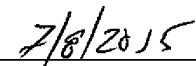
The filing of this Statement is not to be construed as a representation that a search has been made regarding the

claimed invention (37 C.F.R. §1.97(g)) or that no other possible material information exists. In addition, the filing of this Statement is not to be construed to be an admission that the information cited in the Statement is, or is considered to be, material to Patentability (37 C.F.R. §1.97(h)).

Respectfully submitted,



John A. Garrity (Reg. No. 60,470)



Date

Customer No.: 29683

Harrington & Smith, Attorneys At Law, LLC

4 Research Drive

Shelton, CT 06484-6212

203-925-9400

INFORMATION DISCLOSURE CITATION FORM FOR PATENT APPLICATION (FORM PTO-1449) (Substitute)		Docket No.: 863.0076.U3(US) Serial No. Applicant(s): Kari Pajukoski et al. Filing Date: herewith Group:			
U.S. PATENT DOCUMENTS					
Examiner Initials	Document Number (Number-Kind Code)	Publication Date (MM-DD-YYYY)	Name of Patentee or Applicant	Class	Sub-class
	US-2007/0133458 A1	06-14-2007	Chandra et al.	370	329
	US-2003/0228876 A1	12-11-2003	Hwang	455	522
	US-2005/0047393 A1	03-03-2005	Liu	370	352
	US-2007/0171849 A1	07-26-2007	Zhang et al.	370	310
	US-2009/0022110 A1	01-2009	Muharenovic et al.	370	336
	US-2009/0316811	12-2009	Maeda et al.	375	250
	US-2008/0316959	12-2008	Bachi et al.	370	329
	US-2009/0022135	01-2009	Papasakellariou et al.	370	344
	US-2009/0046667	02-2009	Pelletier et al.	370	335
	US-				
	US-				
	US-				
	US-				
	US-				
	US-				
	US-				
FOREIGN PATENT DOCUMENTS					
Examiner Initials	Document Number (Country Code-Number-Kind Code)	Publication Date (MM-DD-YYYY)	Name Of Patentee of Applicant	Translation? Yes/No/n/a	
	WO-2007/1--547-A2	09-07-2007	International Digital Technology Corporation		
	JP-2009/049578-A	03-05-2009	KDDI Corp	Abstract	
	RU-2305372-C2	08-27-2007	Samsung Electronics Co., Ltd.	Abstract	
	WO-2004/110081-A1	12-16-2004	Nokia Corporation		
	WO-2005/015942-A1	02-17-2005	Qualcomm Incorporated		
	WO-2007/044414-A1	04-19-2007	Inter-Digital Technology Corporation		
	WO-2007/008123-A1	01-18-2007	Telefonaktiebolaget LM Ericsson		
OTHER DOCUMENTS (Author (Capitalize), Title, Date, Pages, Etc., if known)					
	"X2 downlink forwarding delay", NEC, 3GPP TSG-RAN WG2#59bis, October 2007, R2-074139, 4 pgs.				
	"Multiplexing of Scheduling Request and ACK/NACK and/or CQI", Nokia Siemens Networks, 3GPP TSG RAN WG1#49bis, R1-073011, 3 pgs.				
	"Handling NAS message during HO", Alcatel-Lucent, 3 GPP TSG RAN WG2 #59bis, October 2007, R2-074333, 2 pgs.				
	3GPP TSG RAN WG1 #48bis, R1-071662, St. Julians, Malta, March 26-30, 2007, Nokia Siemens, "Uplink Scheduling Request for LTE", 4 pgs.				
Examiner's Signature:			Date Considered:		
Initial if reference was considered, whether or not citation is in conformance with MPEP. Mark through citation if not considered. Include a copy of this citation form with your next correspondence to the Applicant(s).					

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

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	863.0076.U3(US)
		Application Number	
Title of Invention	Providing Improved Scheduling Request Signaling with ACK/NACK or CQI		
<p>The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.</p> <p>This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.</p>			

Secrecy Order 37 CFR 5.2

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

Inventor Information:

Inventor 1					Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Kari	P.	Pajukoski		
Residence Information (Select One) <input type="radio"/> US Residency <input checked="" type="radio"/> Non US Residency <input type="radio"/> Active US Military Service					
City	Oulu	Country of Residence ⁱ	FI		
Mailing Address of Inventor:					
Address 1		Purantie 3			
Address 2					
City	Oulu	State/Province			
Postal Code	90240	Country ⁱ	FI		
Inventor 2					Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Esa	T.	Tirola		
Residence Information (Select One) <input type="radio"/> US Residency <input checked="" type="radio"/> Non US Residency <input type="radio"/> Active US Military Service					
City	Kempele	Country of Residence ⁱ	FI		
Mailing Address of Inventor:					
Address 1		Porttikellonkuja 12			
Address 2					
City	Kempele	State/Province			
Postal Code	90450	Country ⁱ	FI		
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.					Add

Correspondence Information:

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	863.0076.U3(US)
		Application Number	
Title of Invention	Providing Improved Scheduling Request Signaling with ACK/NACK or CQI		

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

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

Customer Number	29683		
Email Address	patent@hspatent.com	<input type="button" value="Add Email"/>	<input type="button" value="Remove Email"/>

Application Information:

Title of the Invention	Providing Improved Scheduling Request Signaling with ACK/NACK or CQI		
Attorney Docket Number	863.0076.U3(US)	Small Entity Status Claimed	<input type="checkbox"/>
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	9	Suggested Figure for Publication (if any)	

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

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

Representative Information:

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

Please Select One:	<input checked="" type="radio"/> Customer Number	<input type="radio"/> US Patent Practitioner	<input type="radio"/> Limited Recognition (37 CFR 11.9)
Customer Number	29683		

Domestic Benefit/National Stage Information:

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

Prior Application Status		<input type="button" value="Remove"/>	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation of	14/051646	2013-10-11
Prior Application Status		<input type="button" value="Remove"/>	

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

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	863.0076.U3(US)
		Application Number	
Title of Invention	Providing Improved Scheduling Request Signaling with ACK/NACK or CQI		

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
14/051646	Continuation of	12/290547	2008-10-30
Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
12/290547	non provisional of	61/001207	2007-10-30

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

Foreign Priority Information:

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

Remove			
Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ⁱ (if applicable)

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

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

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices

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

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	863.0076.U3(US)
		Application Number	
Title of Invention	Providing Improved Scheduling Request Signaling with ACK/NACK or CQI		

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

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

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

Applicant Information:

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

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

☒ Assignee

☐ Legal Representative under 35 U.S.C. 117

☐ Joint Inventor

☐ Person to whom the inventor is obligated to assign.

☐ Person who shows sufficient proprietary interest

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name

Nokia Solutions and Networks Oy

Mailing Address Information For Applicant:

Address 1

Karaportti 3

Address 2

City

Espoo

State/Province

Country

FI

Postal Code

02610

Phone Number

Fax Number

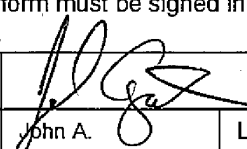
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	863.0076.U3(US)
		Application Number	
Title of Invention	Providing Improved Scheduling Request Signaling with ACK/NACK or CQI		
Email Address			
Additional Applicant Data may be generated within this form by selecting the Add button.			

Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.				
Assignee 1				
Complete this section only if non-applicant assignee information is desired to be included on the patent application publication in accordance with 37 CFR 1.215(b). Do not include in this section an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest), as the patent application publication will include the name of the applicant(s).				
If the Assignee is an Organization check here. <input type="checkbox"/>				
Prefix	Given Name	Middle Name	Family Name	Suffix
Mailing Address Information For Non-Applicant Assignee:				
Address 1				
Address 2				
City		State/Province		
Country		Postal Code		
Phone Number		Fax Number		
Email Address				
Additional Assignee Data may be generated within this form by selecting the Add button.				

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.					
Signature			Date (YYYY-MM-DD)	2015-07-08	
First Name	John A.	Last Name	Garrity	Registration Number	60470
Additional Signature may be generated within this form by selecting the Add button.					

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

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	863.0076.U3(US)
		Application Number	
Title of Invention	Providing Improved Scheduling Request Signaling with ACK/NACK or CQI		

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



DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION

As the below named inventor, I hereby declare that:

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

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

PROVIDING IMPROVED SCHEDULING REQUEST SIGNALING WITH ACK/NACK
OR COI

the specification of which:

(check one) ☐ is attached hereto.

☒ was filed on 11.10.2013 as U.S. Application Serial No. 14/051,646, and was amended on _____ (if applicable).

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

I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to me to be material to the patentability of this application as defined in Title 37, Code of Federal Regulations, §1.56

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate(s) listed below and have also identified below any foreign application(s) for patent or inventor's certificate(s) having a filing date before that of the application on which priority is claimed:

Prior foreign applications

Priority Claimed

(Number)

(Country)

(Day Month Year Filed)

☐ Yes

☐ No

I hereby claim the benefit under Title 35, United States Code, §119(e) of the United States provisional patent application(s) listed below:

61/001,207
(Application Serial No.)

30.10.2007
(Filing Date)

I hereby claim benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

12/290,547
(Application Serial No.)

30.10.2008
(Filing Date)

Pending
(Status)

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PROVIDING IMPROVED SCHEDULING REQUEST SIGNALING WITH ACK/NACK OR CQI

CROSS-REFERENCE TO RELATED APPLICATIONS:

[0001] This patent application claims priority under 35 U.S.C. §119(e) from Provisional Patent Application No.: 61/001,207, filed October 30, 2007, the disclosure of which is incorporated by reference herein in its entirety.

TECHNICAL FIELD:

[0002] The exemplary and non-limiting embodiments of this invention relate generally to wireless communication systems, apparatus, methods and computer program products and, more specifically, relate to improved signaling of a scheduling request in conjunction with an acknowledgement or channel quality indicator.

BACKGROUND:

[0003] This section is intended to provide a background or context to the invention that is recited in the claims. The description herein may include concepts that could be pursued, but are not necessarily ones that have been previously conceived or pursued. Therefore, unless otherwise indicated herein, what is described in this section is not prior art to the description and claims in this application and is not admitted to be prior art by inclusion in this section.

[0004] The following abbreviations are utilized herein:

3GPP	third generation partnership project
ACK	acknowledgement
BPSK	binary phase-shift keying
CAZAC	constant amplitude zero autocorrelation
CM	cubic metric
CQI	channel quality indicator
DNA	data-non-associated

DL	downlink (Node B to UE)
DL-SCH	downlink shared channel
eNode B	evolved Node B (LTE base station)
E-UTRAN	evolved universal terrestrial radio access network
LTE	long term evolution of UTRAN (E-UTRAN)
NACK	negative acknowledgement
Node B	base station
PAR	peak-to-average ratio
PUCCH	physical uplink control channel
PUSCH	physical uplink shared channel
QPSK	quadrature phase-shift keying
RACH	random access channel
RAN	radio access network
RRC	radio resource control
RS	reference signal
SF	spreading factor
SR	scheduling request
TSG	technical specifications group
TTI	transmission time interval
UE	user equipment, such as a mobile station or mobile terminal
UL	uplink (UE to Node B)
UTRAN	universal terrestrial radio access network
VoIP	voice over internet protocol
WG	working group

[0005] The 3GPP has been working on the standardization of LTE (E-UTRAN). In the absence of UL data, data-non-associated control signals (e.g., ACK/NACK, periodic CQI) are transmitted on the PUCCH. Furthermore, it has been decided that:

- (a) ACK/NACK (only) signals are transmitted utilizing modulated CAZAC¹ sequences (coherent): BPSK is used for 1-bit ACK/NACK and QPSK for 2-bit

¹ The applied sequences may not be true CAZAC but computer searched Zero-Autocorrelation (ZAC) sequences. The same sequences are applied as reference signals with bandwidth allocation of one resource block.

ACK/NACK. Block-wise spreading with SF=3/SF=4 (pilot/data) is applied for the modulated CAZAC sequences.

(b) Periodic CQI (and combinations of CQI and ACK/NACK) is also transmitted utilizing modulated CAZAC sequences. Block-spreading is not used.

[0006] In the 3GPP TSG RAN WG1 meeting #47bis in Sorrento, it was agreed that a non-contention based SR mechanism for time synchronized users will be supported.

[0007] The basic principles for SR multiplexing were agreed to in the 3GPP TSG RAN WG1 meeting #50bis in Shanghai. Reference in this regard may further be made to R2-074333, 3GPP TSG-RAN WG2#59bis, Alcatel-Lucent, "Handling NAS messages during HO," October 8-12, 2007, Shanghai, China.

[0008] In the Shanghai meeting, the following was also decided:

(i) There are two sizes of the SR corresponding to two states. Either the UE requests to be scheduled or (in case of no transmission) the UE does not request to be scheduled.

(ii) On-off keying based on ACK/NACK design: The length 7 sequence is split into two orthogonal sequences of length 3 and length 4. FIG. 1 shows the length 7 sequence 40 with two constituent orthogonal sequences 42, 44 of lengths 3 and 4, respectively.

(iii) There will be compatibility with ACK/NACK transmissions from different UEs.

(iv) Different resources corresponding to a cyclic shift and an orthogonal cover code can be assigned for scheduling requests and ACK/NACK.

[0009] It is noted that the ACK/NACK signaled on the UL is related to DL-SCH (Physical Downlink Shared Channel, PDSCH). In the case where the UE has no data to transmit (i.e., on the UL), the ACK/NACK is signaled on the PUCCH. When the UE has UL data to transmit, the ACK/NACK is signaled on the PUSCH.

SUMMARY:

[0010] In an exemplary aspect of the invention, there is a method comprising determining that an acknowledgment is to be sent, and for the case where there is also a scheduling request to be sent, combining the acknowledgment with the scheduling request on a scheduling resource, else placing the acknowledgment in another resource.

[0011] In an exemplary aspect of the invention, there is a computer readable medium encoded with a computer program executable by a processor to perform actions comprising determining that an acknowledgment is to be sent, and for the case where there is also a scheduling request to be sent, combining the acknowledgment with the scheduling request on a scheduling resource, else placing the acknowledgment in another resource.

[0012] In an exemplary aspect of the invention, there is an apparatus comprising a processor configured to determine that an acknowledgment is to be sent, and the processor further configured to, for the case where there is also a scheduling request to be sent, combine the acknowledgment with the scheduling request on a scheduling resource, else placing the acknowledgment in another resource.

[0013] In an exemplary aspect of the invention, there is an apparatus comprising means for determining that an acknowledgment is to be sent, and means for, in the case where there is also a scheduling request to be sent, combining the acknowledgment with the scheduling request on a scheduling resource, else placing the acknowledgment in another resource.

[0014] In another exemplary aspect of the invention, there is a method comprising receiving information on a scheduling resource, and determining that the information received on the scheduling resource comprises an acknowledgment.

[0015] In another exemplary aspect of the invention, there is a computer readable medium encoded with a computer program executable by a processor to perform actions

comprising receiving information on a scheduling resource, and determining that the information received on the scheduling resource comprises an acknowledgment.

[0016] In still another exemplary aspect of the invention, there is an apparatus comprising a receiver, the receiver configured to receive information on a scheduling resource, and a processor configured to determine that the information received on the scheduling resource comprises an acknowledgment.

[0017] In yet another exemplary aspect of the invention, there is an apparatus comprising means for receiving information on a scheduling resource, and means for determining that the information received on the scheduling resource comprises an acknowledgment.

[0018] In still another exemplary aspect of the invention there is a method comprising determining that a scheduling request resource and at least one other resource are reserved for a user equipment in a same sub-frame, and based on whether a scheduling request is desired to be transmitted by the user equipment, placing at least one of an acknowledgment/negative acknowledgement and a channel quality indicator that is desired to be transmitted by the user equipment in one of the resources and leaving at least one other resource unused.

BRIEF DESCRIPTION OF THE DRAWINGS:

[0019] In the attached Drawing Figures:

[0020] FIG. 1 shows a length 7 sequence having two constituent orthogonal sequences of lengths 3 and 4;

[0021] FIG. 2 illustrates an example of ACK/NACK and SR resource assignments for UL transmissions on the PUCCH;

[0022] FIG. 3 shows an example of ACK/NACK resources configured for 18 parallel ACK/NACK channels;

[0023] FIG. 4 shows an example of SR resources configured for 72 parallel SR

channels;

[0024] FIG. 5 shows a flowchart illustrating one non-limiting example of a method for practicing the exemplary embodiments of this invention;

[0025] FIG. 6 shows a simplified block diagram of various electronic devices that are suitable for use in practicing the exemplary embodiments of this invention;

[0026] FIG. 7 depicts a flowchart illustrating another non-limiting example of a method for practicing the exemplary embodiments of this invention;

[0027] FIG. 8 depicts a flowchart illustrating another non-limiting example of a method for practicing the exemplary embodiments of this invention; and

[0028] FIG. 9 A, B, and C, depicts a flowchart illustrating yet another example of a method for practicing the exemplary embodiments of the invention.

DETAILED DESCRIPTION:

[0029] Consider a multiplexing case where data-non-associated control signals, such as ACK/NACK (e.g., DL ACK/NACK) and/or periodic CQI, exist simultaneously with an UL SR. Further assume that the UE is not transmitting UL data since separate SR/buffer status reporting principles will be used when the UE has scheduled UL data transmission on the PUSCH. As noted above, in the absence of UL data data-non-associated control signals are transmitted on the PUCCH.

[0030] To date, SR decisions made in 3GPP RAN1 only cover the case where a SR is transmitted standalone. However, it may occur that the SR is transmitted with additional data-non-associated control signals, such as ACK/NACK and/or periodic CQI (e.g., ACK/NACK + SR, periodic CQI + SR, periodic CQI + ACK/NACK + SR). Various complications may arise in such cases.

[0031] FIG. 2 illustrates an example of ACK/NACK and SR resource assignments for UL transmissions on the PUCCH. In FIG. 2, ACK/NACK and SR have been configured for different frequency-hopping radio resources. FIG. 3 shows an example of ACK/NACK resources configured for 18 parallel ACK/NACK channels. FIG. 4 shows an

example of SR resources configured for 72 parallel SR channels.

[0032] Each UE has certain code resources allocated to two different channels: one UE may occupy, for example, the eighth (8th) ACK/NACK resource and the twenty-eighth (28th) SR resource, respectively (see FIGS. 3 and 4).

[0033] One problem with the considered signaling combinations is related to the single-carrier property of LTE UL – it is not possible to transmit signals via multiple frequency bands (see FIG. 2) such that the beneficial low PAR properties of single-carrier transmission are maintained. However, due to the lack of a common pilot in the UL direction, it would not be economical to transmit two low rate control signals (e.g., SR + ACK/NACK and/or CQI) via two separate clusters (or via four clusters if SR and ACK/NACK and/or CQI have been configured into non-overlapping frequency resources).

[0034] There are some prior art techniques being discussed in RAN1 to avoid the multicarrier/multi-cluster transmission in the presence of a SR:

(a) One technique is to prioritize a predetermined signaling type (e.g., ACK/NACK instead of SR or SR instead of CQI). This means that when two signaling types exist in a same subframe, only the signaling type with the higher priority is transmitted whereas the lower priority signaling is not transmitted at all. One problem with this approach is the increased SR (or CQI) delay. This delay may be significant, for example, in a VoIP application.

(b) Periodic CQI + SR: The idea would be to arrange the periodic CQI reporting and SR signaling in such a way that they do not appear in a same subframe. One problem with this approach is that the arrangement will introduce limitations for either SR or CQI signaling. This may also be difficult to arrange as the periodicity of SR and CQI may not be the same.

(c) ACK/NACK + SR: It is possible to avoid this situation by introducing certain scheduler limitations for UEs being allocated for the given SR resource (i.e., do not allocate DL data for a time resource which will cause an ACK/NACK transmission to occur for a TTI in which the UE has simultaneous SR transmission).

(d) It would also be possible to develop a special multiplexing scheme for different alternatives (e.g., different schemes for ACK/NACK + SR, periodic CQI + SR, ACK/NACK + periodic CQI + SR). Problems with this approach are related to link performance (modulation method) and/or resource allocation (multicode method, sequence selection method). Reference with regard to this technique may be made to commonly-owned U.S. provisional patent application no. 60/936,033, "Multiplexing of Scheduling Request and ACK/NACK and/or CQI Transmitted on PUCCH" by Tirola et al. filed on June 18, 2007 (attorney docket no. 863.0067.P1(US)). Further reference in this regard may be made to R2-074139, 3GPP TSG-RAN WG2#59bis, NEC, "X2 downlink forwarding delay," October 8-12, 2007, Shanghai, China.

[0035] Exemplary embodiments of the invention provide improved techniques for signaling a SR with an ACK/NACK and/or CQI. In some exemplary embodiments, different multiplexing procedures are provided for cases with positive SR than for cases with negative SR. In accordance with the 3GPP TSG-RAN WG1#50bis Shanghai decisions, when the SR is transmitted standalone, only positive SRs are signaled (i.e., there is no transmission for negative SR).

[0036] In one, non-limiting exemplary embodiment of the invention:

(i) For negative SR, the ACK/NACK and/or CQI are signaled using original ACK/NACK (ACK/NACK PUCCH) and/or CQI resources (CQI PUCCH).

(ii) For positive SR, the ACK/NACK signal is transmitted using the SR resources (SR PUCCH). Transmission of the ACK/NACK on the SR resource(s) can be performed in a similar way to when ACK/NACK is transmitted on the ACK/NACK resource (unmodulated sequence 1 and modulated sequence 2 or unmodulated sequence 1 and unmodulated sequence 2). In this case, the ACK/NACK resource (ACK/NACK PUCCH) is left unused.

(iii) For positive SR without a simultaneous ACK/NACK signal, the SR signal is transmitted using the original SR resource(s), SR PUCCH. The simultaneous CQI is dropped (i.e., not transmitted) and the CQI resource(s), (CQI PUCCH) is left unused.

[0037] In such a manner, simultaneous transmission of ACK/NACK and (positive)

SR is supported whereas there is no provision for simultaneous transmission of (positive) SR and CQI.

[0038] It is briefly noted that, as utilized herein, "positive SR" signifies that the UE desires to transmit a SR (e.g., to a Node B). Similarly, "negative SR" indicates that the UE does not desire to transmit a SR (e.g., to a Node B). Any reference to "resource" should be construed as covering a single resource or multiple resources assigned for the specified signaling.

[0039] With a negative SR, it is possible to signal the ACK/NACK and/or CQI using the original resources allocated for ACK/NACK or CQI, respectively. The SR resource(s) is left (SR PUCCH) unused. Thus, the following hold: If there is a negative SR and an ACK/NACK, transmit the ACK/NACK using only the original ACK/NACK resource(s), ACK/NACK PUCCH. If there is a negative SR and a CQI (e.g., periodic CQI), transmit the CQI using only the original CQI resource(s), CQI PUCCH. If there is a negative SR and both ACK/NACK and a CQI, transmit the ACK/NACK and CQI using only the original ACK/NACK and CQI resources, CQI PUCCH respectively.

[0040] As noted above, with a positive SR, simultaneous transmission of ACK/NACK and SR is supported whereas there is no support for simultaneous transmission of CQI and SR. Simultaneous transmission of ACK/NACK and positive SR is performed using the SR resource(s), SR PUCCH. Thus, the following procedures are applied:

[0041] If there is a positive SR and an ACK/NACK, signal the ACK/NACK using the existing SR resource(s), SR PUCCH. The ACK/NACK resource(s), ACK/NACK PUCCH, are left unused. The ACK/NACK can be transmitted similarly to when it is transmitted on its own resource (e.g., unmodulated sequence 1, BPSK/QPSK-modulated sequence 2).

[0042] If there is a positive SR and a CQI (e.g., periodic CQI), the SR is prioritized over the CQI. That is, transmit the SR using only the original SR resource (e.g., on the PUCCH). The CQI resource, CQI PUCCH is left unused.

[0043] If there is a positive SR and both ACK/NACK and CQI, the ACK/NACK

is signaled using only the original SR resource (e.g., on the PUCCH). The CQI resource, CQI PUCCH is left unused and the CQI is not transmitted. The ACK/NACK can be transmitted similarly to when it is transmitted on its own resource (e.g., unmodulated sequence 1, BPSK/QPSK-modulated sequence 2).

[0044] On the Node B side, the Node B is responsible for the UL/DL resource allocation (e.g., for CQI, DL data and ACK/NACK, SR). Therefore, the Node B can receive the ACK/NACK, CQI and SR from the various resources, taking into account the different UE operation in light of positive or negative SR.

[0045] In further exemplary embodiments, the Node B can modify the above-stated prioritizations, for example, using RRC signaling (e.g., cell-specific, UE-specific). In such a manner, and as a non-limiting example, the Node B could modify the prioritization such that CQI is prioritized over ACK/NACK.

[0046] FIG. 5 shows a flowchart illustrating one non-limiting example of a method for practicing the exemplary embodiments of this invention. In box 52, it is determined whether there is a positive SR ("YES") or a negative SR ("NO"). If there is a negative SR, the method proceeds to boxes 54 and 56. In box 54, if there is an ACK/NACK (w/o CQI), the ACK/NACK is transmitted using ACK/NACK resources and the SR resources are unused. In box 56, if there is a CQI (with or without ACK/NACK), the CQI (or CQI+ACK/NACK) is transmitted using CQI resources, CQI PUCCH, and the SR resources (and ACK/NACK PUCCH) are unused. If there is a positive SR ("YES" for box 52), the method proceeds to box 58. In box 58, it is determined whether ACK/NACK is present ("YES") or not ("NO"). If ACK/NACK is not present ("NO" for box 58), then in box 60 the SR is transmitted using the SR resources and the additional resource which may be data-non-associated (DNA) resources, such as ACK/NACK PUCCH and CQI PUCCH are unused. No CQI is transmitted, regardless of whether or not it is present. If ACK/NACK is present ("YES" for box 58), then in box 62 the ACK/NACK is transmitted using the SR resources and the DNA resources, such as ACK/NACK PUCCH and CQI PUCCH are unused. No CQI is transmitted, regardless of whether or not it is present.

[0047] Reference is made to FIG. 6 for illustrating a simplified block diagram of

various electronic devices that are suitable for use in practicing the exemplary embodiments of this invention. In FIG. 6, a wireless network 12 is adapted for communication with a user equipment (UE) 14 via an access node (AN) 16. The UE 14 includes a data processor (DP) 18, a memory (MEM) 20 coupled to the DP 18, and a suitable RF transceiver (TRANS) 22 (having a transmitter (TX) and a receiver (RX)) coupled to the DP 18. The MEM 20 stores a program (PROG) 24. The TRANS 22 is for bidirectional wireless communications with the AN 16. Note that the TRANS 22 has at least one antenna to facilitate communication.

[0048] The AN 16 includes a data processor (DP) 26, a memory (MEM) 28 coupled to the DP 26, and a suitable RF transceiver (TRANS) 30 (having a transmitter (TX) and a receiver (RX)) coupled to the DP 26. The MEM 28 stores a program (PROG) 32. The TRANS 30 is for bidirectional wireless communications with the UE 14. Note that the TRANS 30 has at least one antenna to facilitate communication. The AN 16 is coupled via a data path 34 to one or more external networks or systems, such as the internet 36, for example.

[0049] At least one of the PROGs 24, 32 is assumed to include program instructions that, when executed by the associated DP, enable the electronic device to operate in accordance with the exemplary embodiments of this invention, as discussed herein.

[0050] In general, the various exemplary embodiments of the UE 14 can include, but are not limited to, user equipments, terminals, mobile phones, cellular phones, personal digital assistants (PDAs) having wireless communication capabilities, portable computers having wireless communication capabilities, image capture devices such as digital cameras having wireless communication capabilities, gaming devices having wireless communication capabilities, music storage and playback appliances having wireless communication capabilities, Internet appliances permitting wireless Internet access and browsing, as well as portable units or terminals that incorporate combinations of such functions.

[0051] The embodiments of this invention may be implemented by computer software executable by one or more of the DPs 18, 26 of the UE 14 and the AN 16, or by

hardware, or by a combination of software and hardware.

[0052] The MEMs 20, 28 may be of any type suitable to the local technical environment and may be implemented using any suitable data storage technology, such as semiconductor-based memory devices, magnetic memory devices and systems, optical memory devices and systems, fixed memory and removable memory, as non-limiting examples. The DPs 18, 26 may be of any type suitable to the local technical environment, and may include one or more of general purpose computers, special purpose computers, microprocessors, digital signal processors (DSPs) and processors based on a multi-core processor architecture, as non-limiting examples.

[0053] By utilizing exemplary embodiments of the invention, unlike with other prior art techniques supporting simultaneous transmission of ACK/NACK and SR, SR, ACK/NACK and CQI performance can be maintained with very little, if any, change.

[0054] In many cases, it may be possible to configure periodic CQI and periodic SR into different subframes. In such cases, the performance degradation caused by dropping CQI is estimated to be very marginal.

[0055] Furthermore, accepted modulation options may be utilized in conjunction with exemplary embodiments of the invention. That is, there is no need to specify separate modulation or multiplexing options for positive SR versus negative SR. Existing data-non-associated signaling can be maintained as similar as possible with both positive SR and negative SR. Furthermore, no changes are needed for CM properties.

[0056] Below are provided further descriptions of non-limiting, exemplary embodiments. The below-described exemplary embodiments are separately numbered for clarity and identification. This numbering should not be construed as wholly separating the below descriptions since various aspects of one or more exemplary embodiments may be practiced in conjunction with one or more other aspects or exemplary embodiments.

[0057] In one non-limiting, exemplary embodiment, and as illustrated in FIG. 7, a method includes: providing that at least one of an acknowledgement and a channel quality indicator (CQI) is to be transmitted, wherein the transmission comprises at least one scheduling request (SR) resource (SR PUCCH) and at least one additional resource that

can be a data-non-associated (DNA) resource, such as ACK/NACK PUCCH or CQI PUCCH (box 71); determining whether a SR is to be transmitted (box 72); determining whether the acknowledgement is to be transmitted (box 73); determining whether the CQI is to be transmitted (box 74); in response to determining that the SR is not to be transmitted and that the acknowledgement is to be transmitted, transmitting the acknowledgement using a corresponding at least one acknowledgement resource of the at least one additional resource such as a DNA resource, wherein the at least one SR resource is unused (box 75); in response to determining that the SR is not to be transmitted and that the CQI (or CQI+ACK/NACK) is to be transmitted, transmitting the CQI (or CQI+ACK/NACK) using a corresponding at least one CQI resource of the at least one additional resource such as a DNA resource, wherein the at least one SR resource is unused (box 76); in response to determining that the SR is to be transmitted and that the acknowledgement is not to be transmitted, transmitting the SR using the at least one SR resource, wherein if the CQI is to be transmitted the CQI is not transmitted and the at least one additional resource such as the DNA resource is unused (box 77); and in response to determining that the SR is to be transmitted and that the acknowledgement is to be transmitted, transmitting the acknowledgement using the at least one SR resource, wherein if the CQI is to be transmitted the CQI is not transmitted and the at least one additional resource such as the DNA resource is unused (box 78).

[0058] A method as above, wherein a periodic CQI transmission and a periodic SR transmission are configured into different subframes. A method as in any above, wherein transmissions are transmitted on a PUCCH. A method as in any above, wherein transmissions are transmitted on an UL. A method as in any above, wherein if transmitted the acknowledgement comprises an unmodulated sequence 1, BPSK/QPSK-modulated sequence 2. A method as in any above, wherein the method is implemented by a UE or terminal. A method as in any above, wherein the method is implemented within a wireless communication network. A method as in any above, wherein the method is implemented within an E-UTRAN. A method as in any above, wherein the method is implemented by a computer program. A method as in any above, wherein the method is implemented by a processor of a user equipment.

[0059] In another non-limiting, exemplary embodiment, a computer program

product comprises program instructions embodied on a tangible computer-readable medium. Execution of the program instructions results in operations comprising: providing that at least one of an acknowledgement and a channel quality indicator (CQI) is to be transmitted, wherein the transmission comprises at least one scheduling request (SR) resource and at least one additional resource such as a data-non-associated (DNA) resource, such as ACK/NACK PUCCH or CQI PUCCH; determining whether a SR is to be transmitted; determining whether the acknowledgement is to be transmitted; determining whether the CQI is to be transmitted; in response to determining that the SR is not to be transmitted and that the acknowledgement is to be transmitted, transmitting the acknowledgement using a corresponding at least one acknowledgement resource of the at least one additional resource such as a DNA resource, wherein the at least one SR resource is unused; in response to determining that the SR is not to be transmitted and that the CQI (or CQI+ACK/NACK) is to be transmitted, transmitting the CQI (or CQI+ACK/NACK) using a corresponding at least one CQI resource of the at least one additional resource such as a DNA resource, wherein the at least one SR resource is unused; in response to determining that the SR is to be transmitted and that the acknowledgement is not to be transmitted, transmitting the SR using the at least one SR resource, wherein if the CQI is to be transmitted the CQI is not transmitted and the at least one additional resource such as a DNA resource is unused; and in response to determining that the SR is to be transmitted and that the acknowledgement is to be transmitted, transmitting the acknowledgement using the at least one SR resource, wherein if the CQI is to be transmitted the CQI is not transmitted and the at least one additional resource such as a DNA resource is unused.

[0060] A computer program as above, wherein a periodic CQI transmission and a periodic SR transmission are configured into different sub-frames. A computer program as in any above, wherein transmissions are transmitted on a PUCCH. A computer program as in any above, wherein transmissions are transmitted on an UL. A computer program as in any above, wherein if transmitted the acknowledgement comprises an unmodulated sequence 1, BPSK/QPSK-modulated sequence 2. A computer program as in any above, wherein the method is implemented by a UE or terminal. A computer program as in any above, wherein the computer program is implemented within a wireless communication network. A computer program as in any above, wherein the computer

program is implemented within an E-UTRAN.

[0061] In another non-limiting, exemplary embodiment, an apparatus comprising: a transceiver configured to transmit at least one of an acknowledgement and a channel quality indicator (CQI), wherein the transmission comprises at least one scheduling request (SR), SR PUCCH resource and at least one additional resource which may be a data-non-associated (DNA) resource, such as ACK/NACK PUCCH or CQI PUCCH; and a processor configured to determine whether a SR is to be transmitted, to determine whether the acknowledgement is to be transmitted, and to determine whether the CQI is to be transmitted, wherein in response to the processor determining that the SR is not to be transmitted and that the acknowledgement is to be transmitted, the transceiver is configured to transmit the acknowledgement using a corresponding at least one acknowledgement resource of the at least one additional resource such as a DNA resource and wherein the at least one SR resource is unused, wherein in response to the processor determining that the SR is not to be transmitted and that the CQI is to be transmitted, the transceiver is configured to transmit the CQI using a corresponding at least one CQI resource of the at least one additional resource such as a DNA resource and wherein the at least one SR resource is unused, wherein in response to the processor determining that the SR is to be transmitted and that the acknowledgement is not to be transmitted, the transceiver is configured to transmit the SR using the at least one SR resource and wherein if the CQI is to be transmitted the CQI is not transmitted and the at least one additional resource such as a DNA resource is unused, wherein in response to the processor determining that the SR is to be transmitted and that the acknowledgement is to be transmitted, the transceiver is configured to transmit the acknowledgement using the at least one SR resource and wherein if the CQI is to be transmitted the CQI is not transmitted and the at least one additional resource such as a DNA resource is unused.

[0062] An apparatus as above, wherein a periodic CQI transmission and a periodic SR transmission are configured by the processor into different sub-frames. An apparatus as in any above, wherein transmissions are transmitted by the transceiver on a PUCCH. An apparatus as in any above, wherein transmissions are transmitted by the transceiver on an UL. An apparatus as in any above, wherein if transmitted by the transceiver the acknowledgement comprises an unmodulated sequence 1, BPSK/QPSK-modulated

sequence 2. An apparatus as in any above, wherein the apparatus comprises a UE or terminal. An apparatus as in any above, wherein the apparatus comprises a node of a wireless communication network. An apparatus as in any above, wherein the apparatus comprises a node of an E-UTRAN.

[0063] In another non-limiting, exemplary embodiment, an apparatus comprising: means for transmitting at least one of an acknowledgement and a channel quality indicator (CQI), wherein the transmission comprises at least one scheduling request (SR) resource and at least one additional resource which may be a data-non-associated (DNA) resource, such as ACK/NACK PUCCH or CQI PUCCH; means for determining whether a SR is to be transmitted; means for determining whether the acknowledgement is to be transmitted; and means for determining whether the CQI is to be transmitted, wherein in response to the processor determining that the SR is not to be transmitted and that the acknowledgement is to be transmitted, the means for transmitting is further for transmitting the acknowledgement using a corresponding at least one acknowledgement resource of the at least one additional resource such as a DNA resource and wherein the at least one SR resource is unused, wherein in response to the processor determining that the SR is not to be transmitted and that the CQI is to be transmitted, the means for transmitting is further for transmitting the CQI using a corresponding at least one CQI resource of the at least one additional resource such as a DNA resource and wherein the at least one SR resource is unused, wherein in response to the processor determining that the SR is to be transmitted and that the acknowledgement is not to be transmitted, the means for transmitting is further for transmitting the SR using the at least one SR resource and wherein if the CQI is to be transmitted the CQI is not transmitted and the at least one additional resource such as a DNA resource is unused, wherein in response to the processor determining that the SR is to be transmitted and that the acknowledgement is to be transmitted, the means for transmitting is further for transmitting the acknowledgement using the at least one SR resource and wherein if the CQI is to be transmitted the CQI is not transmitted and the at least one additional resource such as a DNA resource is unused.

[0064] An apparatus as above, wherein the means for transmitting comprises a transmitter and the means for determining whether the SR is to be transmitted, the means for determining whether the acknowledgement is to be transmitted and the means for

determining whether the CQI is to be transmitted comprise a processor.

[0065] In another non-limiting, exemplary embodiment, and as illustrated in FIG. 8, a method includes: receiving a transmission comprising at least one scheduling request (SR) resource and at least one other resource which may be a data-non-associated (DNA) resource (box 81); such as ACK/NACK PUCCH or CQI PUCCH; in response to determining that the at least one SR resource is unused, determining that the transmission does not comprise a SR (box 82); in response to determining that the at least one SR resource is unused and that at least one acknowledgement resource of the at least one other resource such as a DNA resource is used, determining that the transmission comprises an acknowledgement and obtaining acknowledgement information from the acknowledgement (box 83); in response to determining that the at least one SR resource is unused and that at least one channel quality indicator (CQI) resource of the at least one additional resource such as a DNA resource is used, determining that the transmission comprises a CQI (or CQI+ACK/NACK) and obtaining CQI (or CQI+ACK/NACK) information from the CQI (box 84); in response to determining that the at least one SR resource is used, determining that the transmission comprises a SR (box 85); in response to determining that the at least one SR resource is used by an acknowledgement, determining that the transmission comprises a SR and obtaining acknowledgement information from the acknowledgement (box 86); and responding accordingly to the determination(s) and/or obtained information (box 87).

[0066] A method as above, wherein a periodic CQI transmission and a periodic SR transmission are configured into different sub-frames. A method as in any above, wherein the transmission is received on a PUCCH. A method as in any above, wherein the transmission is received on an UL. A method as in any above, wherein if received the acknowledgement comprises an unmodulated sequence 1, BPSK/QPSK-modulated sequence 2. A method as in any above, wherein the method is implemented by a base station or network element. A method as in any above, wherein the method is implemented within a wireless communication network. A method as in any above, wherein the method is implemented within an E-UTRAN. A method as in any above, wherein the method is implemented by a computer program. A method as in any above, wherein the method is implemented by a processor of a network element.

[0067] In another non-limiting, exemplary embodiment, a computer program product comprises program instructions embodied on a tangible computer-readable medium. Execution of the program instructions results in operations comprising: receiving a transmission comprising at least one scheduling request (SR) resource and at least one additional resource which may be a data-non-associated (DNA) resource, such as ACK/NACK PUCCH or CQI PUCCH; in response to determining that the at least one SR resource is unused, determining that the transmission does not comprise a SR; in response to determining that the at least one SR resource is unused and that at least one acknowledgement resource of the at least one additional resource such as a DNA resource is used, determining that the transmission comprises an acknowledgement and obtaining acknowledgement information from the acknowledgement; in response to determining that the at least one SR resource is unused and that at least one channel quality indicator (CQI) resource of the at least one additional resource such as a DNA resource is used, determining that the transmission comprises a CQI and obtaining CQI information from the CQI; in response to determining that the at least one SR resource is used, determining that the transmission comprises a SR; in response to determining that the at least one SR resource is used by an acknowledgement, determining that the transmission comprises a SR and obtaining acknowledgement information from the acknowledgement; and responding accordingly to the determination(s) and/or obtained information.

[0068] A computer program as above, wherein a periodic CQI transmission and a periodic SR transmission are configured into different sub-frames. A computer program as in any above, wherein the transmission is received on a PUCCH. A computer program as in any above, wherein the transmission is received on an UL. A computer program as in any above, wherein if received the acknowledgement comprises an unmodulated sequence 1, BPSK/QPSK-modulated sequence 2. A computer program as in any above, wherein the method is implemented by a base station or network element. A computer program as in any above, wherein the computer program is implemented within a wireless communication network. A computer program as in any above, wherein the computer program is implemented within an E-UTRAN.

[0069] In another non-limiting, exemplary embodiment, an apparatus comprising: a receiver configured to receive a transmission comprising at least one scheduling request

(SR) resource and at least one additional resource which may be a data-non-associated (DNA) resource, such as ACK/NACK PUCCH or CQI PUCCH; and a processor configured, in response to determining that the at least one SR resource is unused, to determine that the transmission does not comprise a SR, in response to determining that the at least one SR resource is unused and that at least one acknowledgement resource of the at least one additional resource such as a DNA resource is used, to determine that the transmission comprises an acknowledgement and to obtain acknowledgement information from the acknowledgement, in response to determining that the at least one SR resource is unused and that at least one channel quality indicator (CQI) resource of the at least one DNA resource is used, to determine that the transmission comprises a CQI and to obtain CQI information from the CQI, in response to determining that the at least one SR resource is used, to determine that the transmission comprises a SR, in response to determining that the at least one SR resource is used by an acknowledgement, to determine that the transmission comprises a SR and to obtain acknowledgement information from the acknowledgement, and to respond accordingly to the determination(s) and/or obtained information.

[0070] An apparatus as above, wherein a periodic CQI transmission and a periodic SR transmission are configured by the processor into different sub-frames. An apparatus as in any above, wherein transmissions are received by the receiver on a PUCCH. An apparatus as in any above, wherein transmissions are received by the receiver on an UL. An apparatus as in any above, wherein if received by the receiver the acknowledgement comprises an unmodulated sequence 1, BPSK/QPSK-modulated sequence 2. An apparatus as in any above, wherein the apparatus comprises a base station or network element. An apparatus as in any above, wherein the apparatus comprises a node of a wireless communication network. An apparatus as in any above, wherein the apparatus comprises a node of an E-UTRAN.

[0071] In another non-limiting, exemplary embodiment, an apparatus comprising: means for receiving a transmission comprising at least one scheduling request (SR) resource and at least one additional resource which may be a data-non-associated (DNA) resource, such as ACK/NACK PUCCH or CQI PUCCH; means for determining, in response to determining that the at least one SR resource is unused, that the transmission

does not comprise a SR, means for determining, in response to determining that the at least one SR resource is unused and that at least one acknowledgement resource of the at least one additional resource such as a DNA resource is used, that the transmission comprises an acknowledgement and to obtain acknowledgement information from the acknowledgement, means for determining, in response to determining that the at least one SR resource is unused and that at least one channel quality indicator (CQI) resource of the at least one additional resource such as a DNA resource is used, that the transmission comprises a CQI and to obtain CQI information from the CQI, means for determining, in response to determining that the at least one SR resource is used, that the transmission comprises a SR; means for determining, in response to determining that the at least one SR resource is used by an acknowledgement, that the transmission comprises a SR and to obtain acknowledgement information from the acknowledgement, and means for responding accordingly to the determination(s) and/or obtained information.

[0072] An apparatus as above, wherein the means for receiving comprises a receiver and the means for determining/obtaining and the means for responding comprise a processor.

[0073] In accordance with the exemplary embodiments of the invention, and as illustrated in Figures 9A, 9B, and 9C, there is a method, executable computer program, and apparatus configured for operations determining that a scheduling request resource and at least one other resource are reserved for a user equipment in a same sub-frame (box 910); and based on whether a scheduling request is desired to be transmitted by the user equipment, placing at least one of an acknowledgment/negative acknowledgement and a channel quality indicator that is desired to be transmitted by the user equipment in one of the resources and leaving at least one other resource unused (box 920). The method, executable computer program, and apparatus as above where the scheduling request resource and the at least one other resource are physical uplink control channel resources (box 930). Further, as method as in any of the above comprising for the case where the user equipment desires to transmit a scheduling request and transmit an acknowledgment/negative acknowledgement, transmitting the acknowledgment/negative acknowledgement with the scheduling request on the scheduling request resource and leaving the at least one other resource unused, or for the case where the user equipment

does not desire to transmit a scheduling request and does desire to transmit an acknowledgment/negative acknowledgement, transmitting the acknowledgment/negative acknowledgement on the at least one other resource and leaving the scheduling request resource unused (box 940). The method, executable computer program, and apparatus as above for the case where the user equipment desires to transmit a scheduling request and a channel quality indicator but no acknowledgment/negative acknowledgement, transmitting the scheduling request on the scheduling request resource, not transmitting the channel quality indicator, and leaving the at least one other resource unused (box 950). Further, The method, executable computer program, and apparatus as above for the case where the user equipment desires to transmit a scheduling request, transmit a channel quality indicator, and transmit an acknowledgment/negative acknowledgement, transmitting the acknowledgment/negative acknowledgement with the scheduling request on the scheduling request resource, not transmitting the channel quality indicator, and leaving the at least one other resource unused, or for the case where the user equipment does not desire to transmit a scheduling request and does desire to transmit a channel quality indicator and an acknowledgment/negative acknowledgement, transmitting the acknowledgment/negative acknowledgement and the channel quality indicator on the at least one other resource and leaving the scheduling request resource unused (box 960).

[0074] The method, executable computer program, and apparatus as above where the scheduling request information is conveyed based on a selected physical uplink control channel selection.

[0075] Further in accordance with the exemplary embodiments of the invention there is a method, executable computer program, and apparatus configured for operations comprising determining the PUCCH resource to be used in the case where at least one of two resources, ACK/NACK resource (ACK/NACK PUCCH) and CQI resource (CQI PUCCH) are reserved by the same UE in the same sub-frame with the scheduling request resource (SR PUCCH). The method, executable computer program, and apparatus as above operational for the case where there is a positive scheduling request, transmitting the acknowledgment with the scheduling request on the scheduling request resource (SR PUCCH) and leaving ACK/NACK PUCCH resource unused and, for the case where there is a negative scheduling request, transmitting the acknowledgment (ACK/NACK) on the

original ACK/NACK resource (ACK/NACK PUCCH) and leaving SR PUCCH resource unused. The method, executable computer program, and apparatus as above for a case where a channel quality indicator is also to be sent and the corresponding CQI PUCCH resource is being reserved, and for the case of positive scheduling request with CQI but without ACK/NACK, transmitting the scheduling request on the SR PUCCH resource and not transmitting the channel quality indicator (CQI PUCCH resource is unused), and for the case of positive scheduling request with CQI and ACK/NACK, transmitting ACK/NACK on the scheduling request resource (SR PUCCH) and not transmitting the channel quality indicator at all (CQI PUCCH and ACK/NACK PUCCH resources are left unused), and for the case of negative scheduling request, transmitting the channel quality indicator and possible ACK/NACK on the original CQI PUCCH resource. The method, executable computer program, and apparatus as above where the scheduling request information is conveyed based on selected PUCCH resource.

[0076] While the exemplary embodiments have been described above in the context of the E-UTRAN (UTRAN-LTE) system, it should be appreciated that the exemplary embodiments of this invention are not limited for use with only this one particular type of wireless communication system, and that they may be used to advantage in other wireless communication systems.

[0077] The exemplary embodiments of the invention, as discussed above and as particularly described with respect to exemplary methods, may be implemented as a computer program product comprising program instructions embodied on a tangible computer-readable medium. Execution of the program instructions results in operations comprising steps of utilizing the exemplary embodiments or steps of the method.

[0078] It should be noted that the terms "connected," "coupled," or any variant thereof, mean any connection or coupling, either direct or indirect, between two or more elements, and may encompass the presence of one or more intermediate elements between two elements that are "connected" or "coupled" together. The coupling or connection between the elements can be physical, logical, or a combination thereof. As employed herein two elements may be considered to be "connected" or "coupled" together by the use of one or more wires, cables and/or printed electrical connections, as well as by the use of electromagnetic energy, such as electromagnetic energy having wavelengths in the

radio frequency region, the microwave region and the optical (both visible and invisible) region, as several non-limiting and non-exhaustive examples.

[0079] In general, the various embodiments may be implemented in hardware or special purpose circuits, software, logic or any combination thereof. For example, some aspects may be implemented in hardware, while other aspects may be implemented in firmware or software which may be executed by a controller, microprocessor or other computing device, although the invention is not limited thereto. While various aspects of the invention may be illustrated and described as block diagrams, flow charts, or using some other pictorial representation, it is well understood that these blocks, apparatus, systems, techniques or methods described herein may be implemented in, as non-limiting examples, hardware, software, firmware, special purpose circuits or logic, general purpose hardware or controller or other computing devices, or some combination thereof.

[0080] Embodiments of the inventions may be practiced in various components such as integrated circuit modules. The design of integrated circuits is by and large a highly automated process. Complex and powerful software tools are available for converting a logic level design into a semiconductor circuit design ready to be etched and formed on a semiconductor substrate.

[0081] Programs, such as those provided by Synopsys, Inc. of Mountain View, California and Cadence Design, of San Jose, California automatically route conductors and locate components on a semiconductor chip using well established rules of design as well as libraries of pre-stored design modules. Once the design for a semiconductor circuit has been completed, the resultant design, in a standardized electronic format (e.g., Opus, GDSII, or the like) may be transmitted to a semiconductor fabrication facility or "fab" for fabrication.

[0082] The foregoing description has provided by way of exemplary and non-limiting examples a full and informative description of the invention. However, various modifications and adaptations may become apparent to those skilled in the relevant arts in view of the foregoing description, when read in conjunction with the accompanying drawings and the appended claims. However, all such and similar modifications of the teachings of this invention will still fall within the scope of this invention.

[0083] Furthermore, some of the features of the preferred embodiments of this invention could be used to advantage without the corresponding use of other features. As such, the foregoing description should be considered as merely illustrative of the principles of the invention, and not in limitation thereof.

CLAIMS

What is claimed is:

1. A method comprising:

determining that an acknowledgment is to be sent; and

for the case where there is also a scheduling request to be sent, combining the acknowledgment with the scheduling request on a scheduling resource,

else placing the acknowledgment in another resource.

2. The method of claim 1, comprising:

for the case where there is also the scheduling request to be sent, transmitting the acknowledgment with the scheduling request on the scheduling resource.

3. The method of any of claims 1 or 2, comprising:

for a case where a channel quality indicator is also to be sent, the channel quality indicator is not sent and the another resource is unused.

4. The method of any one of claims 1 or 2, where the another resource is a data-non-associated resource.

5. The method of claim 2, where the transmitting is on a physical uplink control channel.

6. The method of any one of claims 2 or 5, where the transmitting is on an uplink.

7. The method of any one of claims 1 or 2, where the acknowledgment comprises an unmodulated sequence 1 and a BPSK/QPSK modulated sequence 2.

8. The method of any one of claims 1 or 2 implemented in a user equipment.
9. The method of any one of claims 1 or 2 implemented in a wireless communications network.
10. The method of any one of claims 1, 2, 8, or 9 implemented in an evolved universal terrestrial radio access network.
11. A computer readable medium encoded with a computer program executable by a processor to perform actions comprising:

determining that an acknowledgment is to be sent; and

for the case where there is also a scheduling request to be sent, combining the acknowledgment with the scheduling request on a scheduling resource,

else placing the acknowledgment in another resource.

12. The computer readable medium encoded with a computer program of claim 11, comprising:

for the case where there is also the scheduling request to be sent, transmitting the acknowledgment with the scheduling request on the scheduling resource.

13. The computer readable medium encoded with a computer program of any one of claims 11 or 12, comprising:

for a case where a channel quality indicator is also to be sent, the channel quality indicator is not sent and the another resource is unused.

14. The computer readable medium encoded with a computer program of any one of claims 11 or 12, where the another resource is a data-non-associated resource.

15. An apparatus comprising:

a processor configured to determine that an acknowledgment is to be sent; and

the processor further configured to, for the case where there is also a scheduling request to be sent, combine the acknowledgment with the scheduling request on a scheduling resource,

else placing the acknowledgment in another resource.

16. The apparatus of claim 15, comprising:

a transmitter configured to, for the case where there is also the scheduling request to be sent, transmit the acknowledgment with the scheduling request on the scheduling resource.

17. The apparatus of any one of claims 15 or 16, comprising:

the processor further configured to, for a case where a channel quality indicator is also to be sent, drop the channel quality indicator such that it is not sent and the another resource is unused.

18. The apparatus of any one of claims 15 or 16, where the another resource is a data-non-associated resource.

19. The apparatus of claim 16, where the transmitter is configured to transmit the acknowledgment with the scheduling request on a physical uplink control channel.

20. The apparatus of any one of claims 16 or 19, where the transmitter is configured to transmit the acknowledgment with the scheduling request on an uplink.

21. The apparatus of any one of claims 15 or 16, where the acknowledgment

comprises an unmodulated sequence 1 and a BPSK/QPSK modulated sequence 2.

22. The apparatus of any one of claims 15 or 16 embodied in a user equipment.

23. The apparatus of any one of claims 15 or 16 configured to operate in a wireless communications network.

24. The apparatus of any one of claims 15, 16, 22, or 23 configured to operate in an evolved universal terrestrial radio access network.

25. An apparatus comprising:

means for determining that an acknowledgment is to be sent; and

means, in the case where there is also a scheduling request to be sent, for combining the acknowledgment with the scheduling request on a scheduling resource,

else placing the acknowledgment in another resource.

26. The apparatus of claim 25, comprising:

means, in the case where there is also the scheduling request to be sent, for transmitting the acknowledgment with the scheduling request on the scheduling resource.

27. The apparatus of any of claims 25 or 26, comprising:

means, in a case where a channel quality indicator is also to be sent, for dropping the channel quality indicator such that it is not sent and the another resource is unused.

28. The apparatus of any one of claims 25 or 26, where the another resource is a data-non-associated resource.

29. The apparatus of claim 26, where the means for transmitting further comprises

means for transmitting the acknowledgment with the scheduling request on a physical uplink control channel.

30. The apparatus of any of claims 26 or 29, where the means for transmitting further comprises means for transmitting the acknowledgment with the scheduling request on an uplink.

31. The apparatus of any one of claims 25 or 26, where the acknowledgment comprises an unmodulated sequence 1 and a BPSK/QPSK modulated sequence 2.

32. The apparatus of any one of claims 25 or 26 embodied in a user equipment.

33. The apparatus of any one of claims 25 or 26 comprising means for operating in a wireless communications network.

34. The apparatus of any of claims 25, 26, 28, or 29 comprising means for operating in an evolved universal terrestrial radio access network.

35. A method comprising:

receiving information on a scheduling resource; and

determining that the information received on the scheduling resource comprises an acknowledgment.

36. The method of claim 35, comprising

responding accordingly to the determining that the information received on the scheduling resource comprises the acknowledgment.

37. The method of any one of claims 35 or 36 where the information is received on a physical uplink control channel.

38. The method of any one of claims 35 or 36 where the information is received from a wireless communications network.

39. The method of any one of claims 31, 32 or 34 where the information is received from an evolved universal terrestrial radio access network.

40. A computer readable medium encoded with a computer program executable by a processor to perform actions comprising:

receiving information on a scheduling resource; and

determining that the information received on the scheduling resource comprises an acknowledgment.

41. The computer readable medium encoded with a computer program of claim 40, comprising

responding accordingly to the determining that the information received on the scheduling resource comprises the acknowledgment

42. An apparatus comprising:

a receiver;

the receiver configured to receive information on a scheduling resource; and

a processor configured to determine that the information received on the scheduling resource comprises an acknowledgment.

43. The apparatus of claim 42 further comprising:

a transmitter;

the transmitter and the processor responding accordingly to the determining that the information received on the scheduling resource comprises the acknowledgment.

44. The apparatus of any one of claims 42 or 43 where the receiver is further configured to receive the information on a physical uplink control channel.

45. The apparatus of any one of claims 42 or 43 where the receiver is further configured to receive the information from a wireless communications network.

46. The apparatus of any of claims 42, 43, or 45 where the receiver is further configured to receive the information from an evolved universal terrestrial radio access network.

47. An apparatus comprising:

means for receiving information on a scheduling resource; and

means for determining that the information received on the scheduling resource comprises an acknowledgment.

48. The apparatus of claim 47, comprising

means for responding accordingly to the determining that the information received on the scheduling resource comprises the acknowledgment.

49. The apparatus of any one of claims 46 or 47 where the means for receiving comprises a receiver; the means for determining comprises a processor; and the means for responding comprises a transmitter.

50. A method comprising:

determining that a scheduling request resource and at least one other resource are reserved for a user equipment in a same sub-frame; and

based on whether a scheduling request is desired to be transmitted by

the user equipment, placing at least one of an acknowledgment/negative acknowledgment and a channel quality indicator that is desired to be transmitted by the user equipment in one of the resources and leaving at least one other resource unused.

51. The method of claim 50, where the scheduling request resource and the at least one other resource are physical uplink control channel resources.

52. The method of any one of claims 50 or 51 comprising:

for the case where the user equipment desires to transmit a scheduling request and transmit an acknowledgment/negative acknowledgement, transmitting the acknowledgment/negative acknowledgement with the scheduling request on the scheduling request resource and leaving the at least one other resource unused; or

for the case where the user equipment does not desire to transmit a scheduling request and does desire to transmit an acknowledgment/negative acknowledgement, transmitting the acknowledgment/negative acknowledgement on the at least one other resource and leaving the scheduling request resource unused.

53. The method of any one of claims 50 or 51 comprising:

for the case where the user equipment desires to transmit a scheduling request and a channel quality indicator but no acknowledgment/negative acknowledgement, transmitting the scheduling request on the scheduling request resource and not transmitting the channel quality indicator leaving the at least one other resource unused.

54. The method any one of claims 50 or 51 comprising:

for the case where the user equipment desires to transmit a scheduling request, transmit a channel quality indicator, and transmit an acknowledgment/negative acknowledgement, transmitting the acknowledgment/negative acknowledgement with the scheduling request on the scheduling request resource and not transmitting the channel quality indicator leaving the at least one other resource unused; or

for the case where the user equipment does not desire to transmit a scheduling request and does desire to transmit a channel quality indicator and an acknowledgment/negative acknowledgement, transmitting the acknowledgment/negative acknowledgement and the channel quality indicator on the at least one other resource and leaving the scheduling request resource unused.

55. The method of any one any one of claims 50 or 51 where the scheduling request information is conveyed based on a selected physical uplink control channel selection.

ABSTRACT

In accordance with the exemplary embodiments of the invention there is a method, executable computer program, and apparatus for determining that an acknowledgment is to be sent, and for the case where there is also a scheduling request to be sent, combining the acknowledgment with the scheduling request on a scheduling resource, else placing the acknowledgment in another resource. In accordance with another exemplary embodiment of the invention there is a method, executable computer program, and apparatus for receiving information on a scheduling resource, and determining that the information received on the scheduling resource includes an acknowledgment. Further, in accordance with the exemplary embodiments of the invention there is a method, executable computer program, and apparatus for determining that a scheduling request resource and at least one other resource are reserved for a user equipment in a same sub-frame, and based on whether a scheduling request is desired to be transmitted by the user equipment, placing at least one of an acknowledgment/negative acknowledgement and a channel quality indicator that is desired to be transmitted by the user equipment in one of the resources and leaving at least one other resource unused.

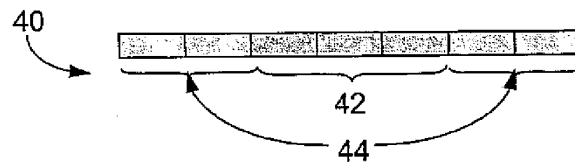


FIG. 1

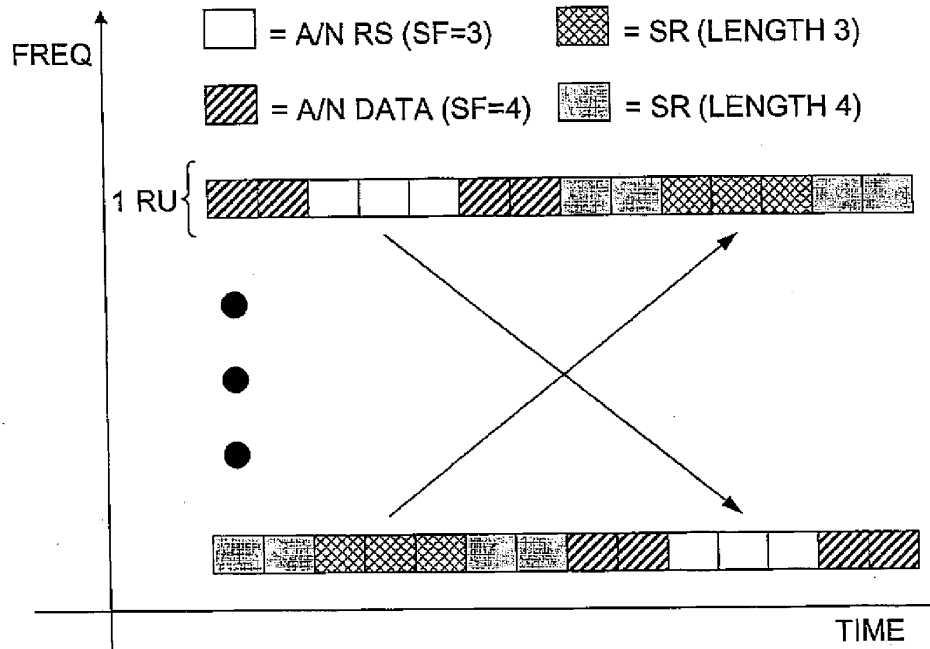


FIG. 2

Cyclic shift inside LB	Block cover codes		
0	1	2	3
0	0	6	17
1	1	7	12
2	2	8	13
3	3	9	14
4	4	10	15
5	5	11	16
6	6	12	17
7	7	13	14
8	8	14	15
9	9	15	16
10	10	16	17
11	11	17	12

FIG. 3

Cyclic shift inside LB	Additional cover code (1/2/3)		
	Block cover code		
	0	1	2
0	0	23	34
1	1	12	35
2	2	13	24
3	3	14	25
4	4	15	26
5	5	16	27
6	6	17	28
7	7	18	29
8	8	19	30
9	9	20	31
10	10	21	32
11	11	22	33

Cyclic shift inside LB	Additional cover code (1/2/3)		
	Block cover code		
	0	1	2
0	36	59	70
1	37	48	71
2	38	49	60
3	39	50	61
4	40	51	62
5	41	52	63
6	42	53	64
7	43	54	65
8	44	55	66
9	45	56	67
10	46	57	68
11	47	58	69

FIG. 4

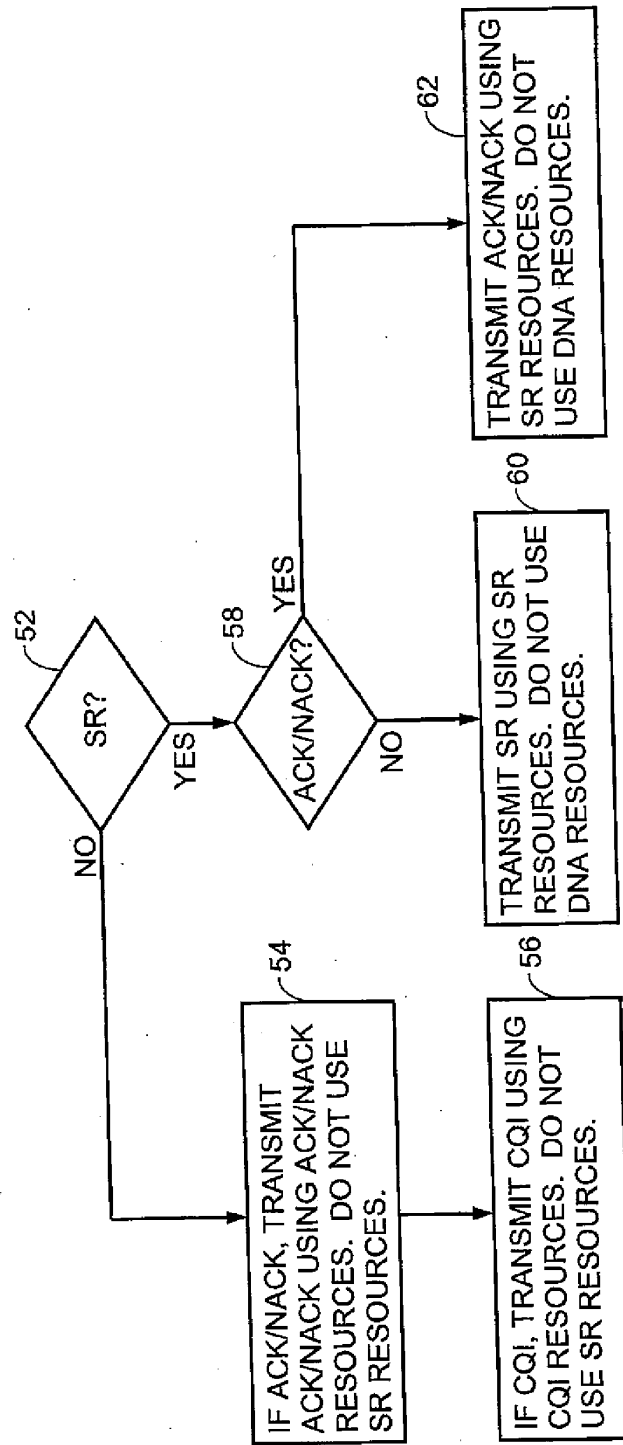


FIG. 5

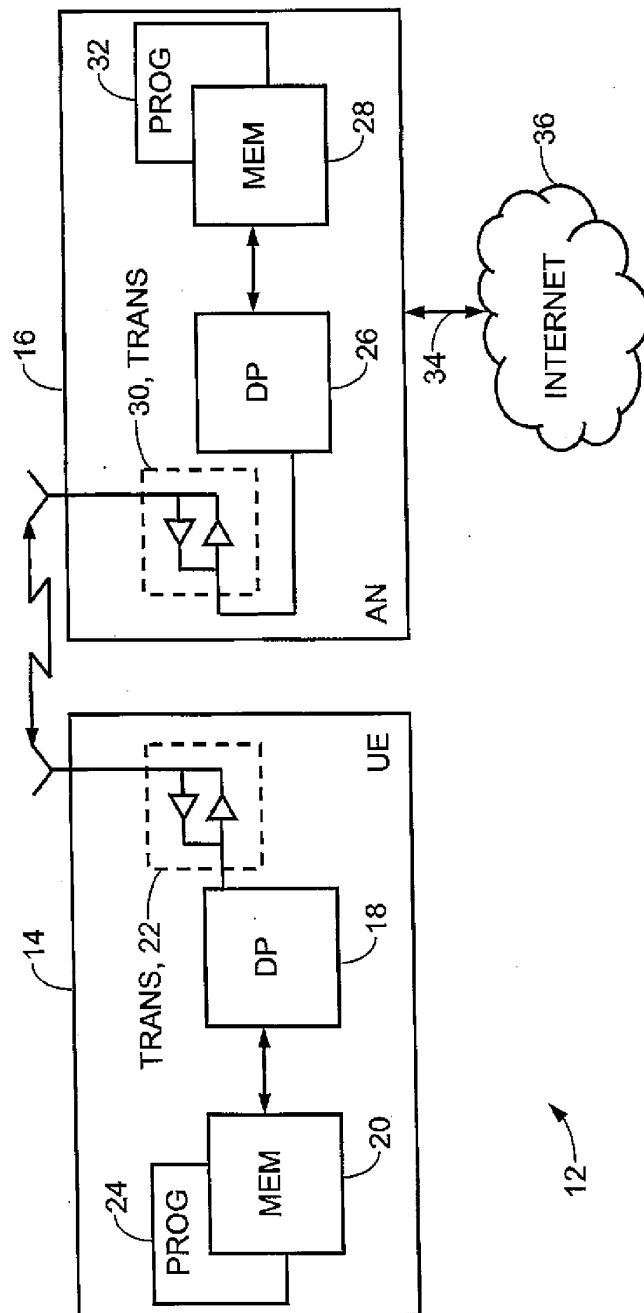


FIG. 6

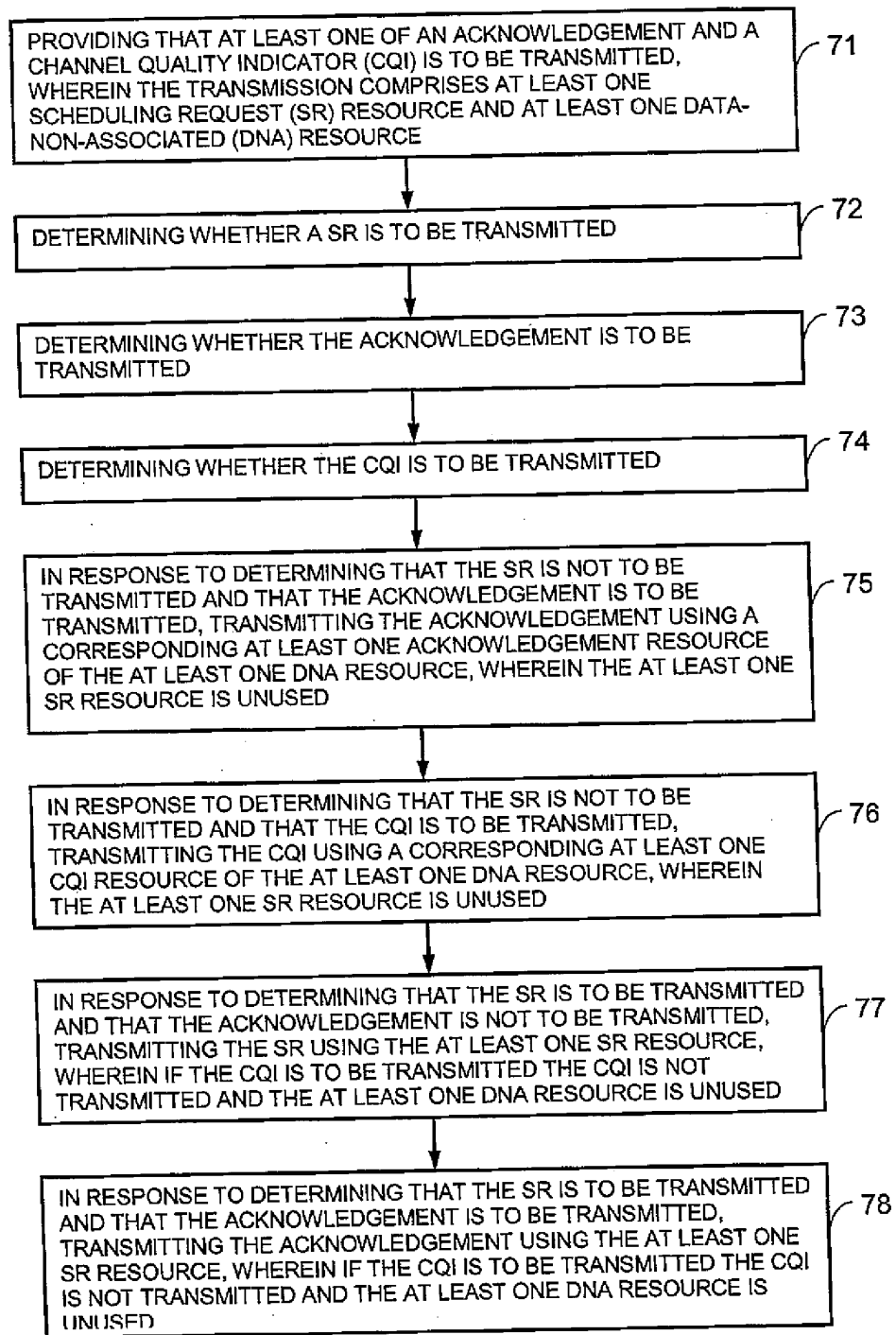


FIG. 7

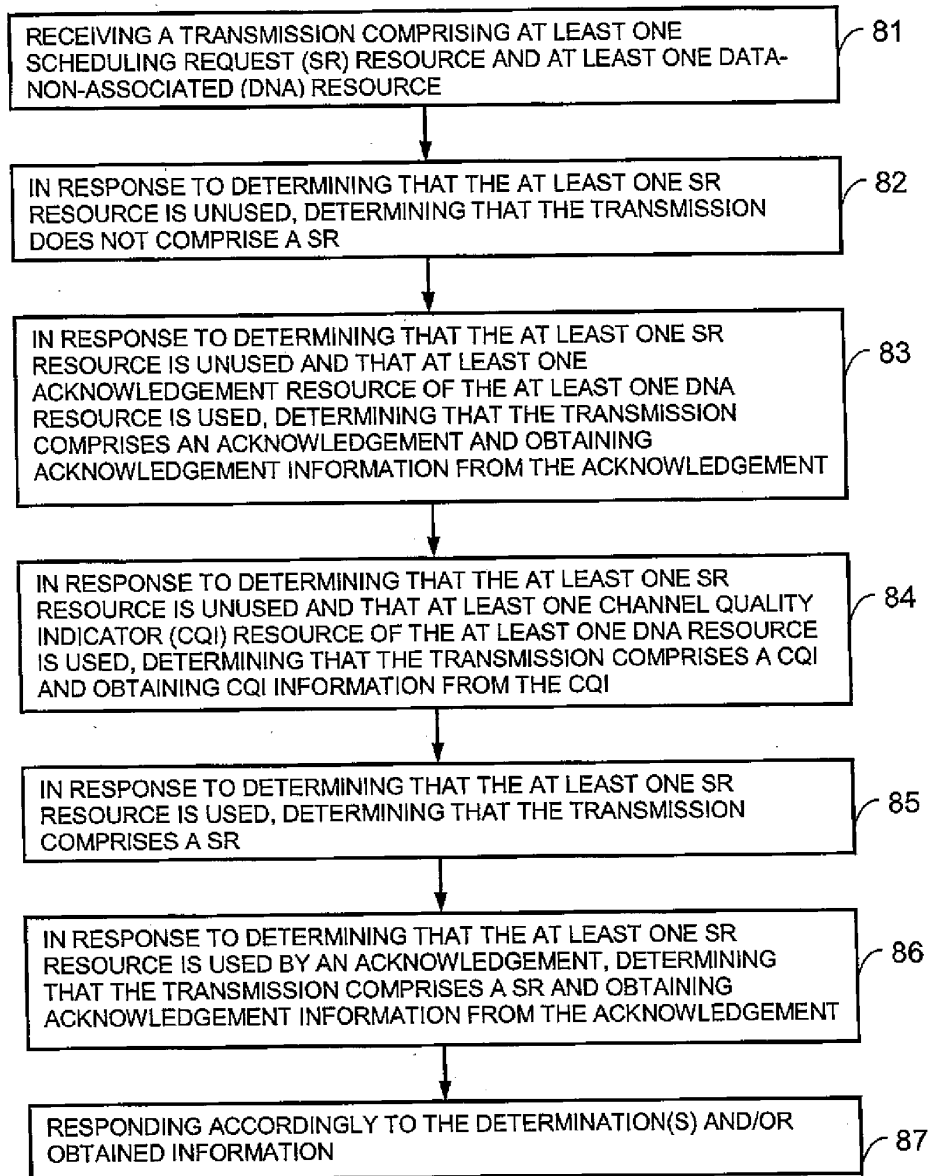


FIG. 8

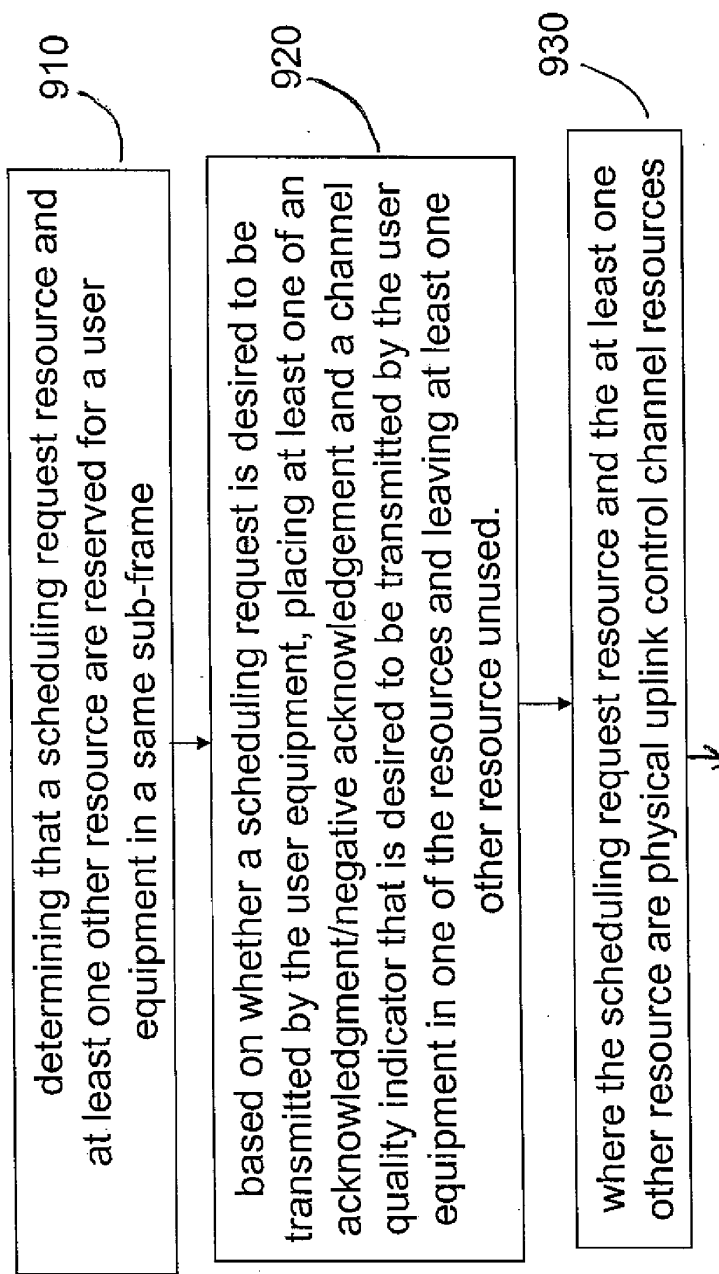


Figure 9A

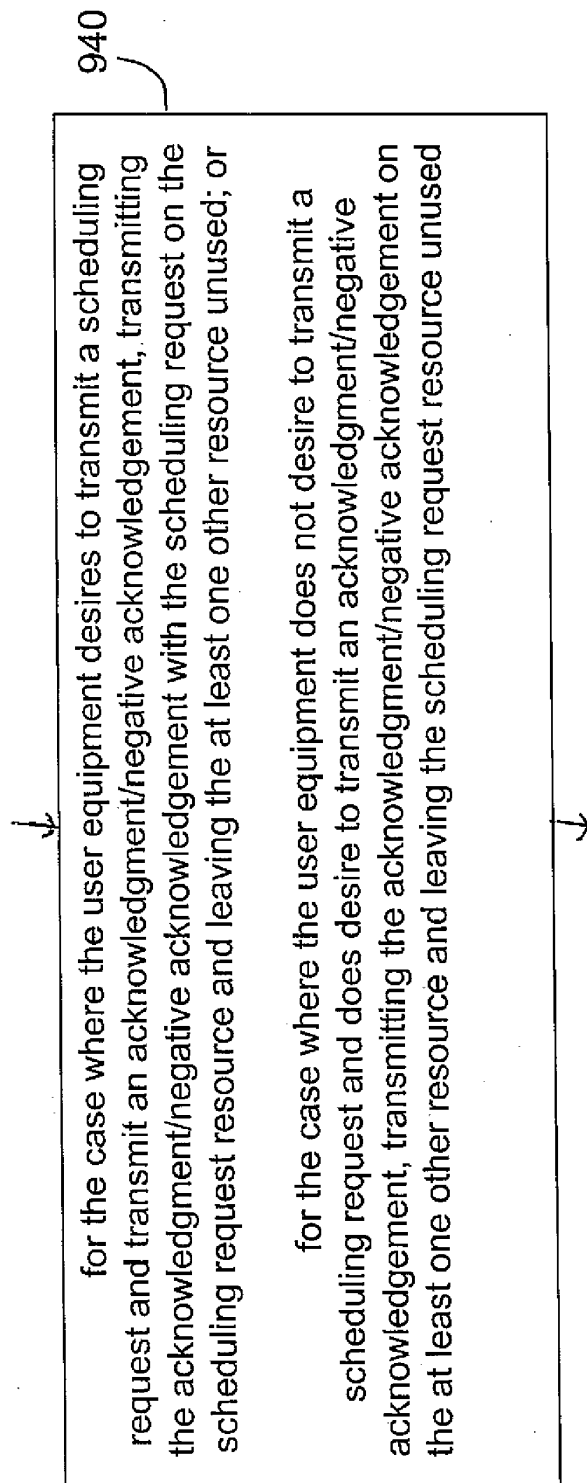


Figure 9B

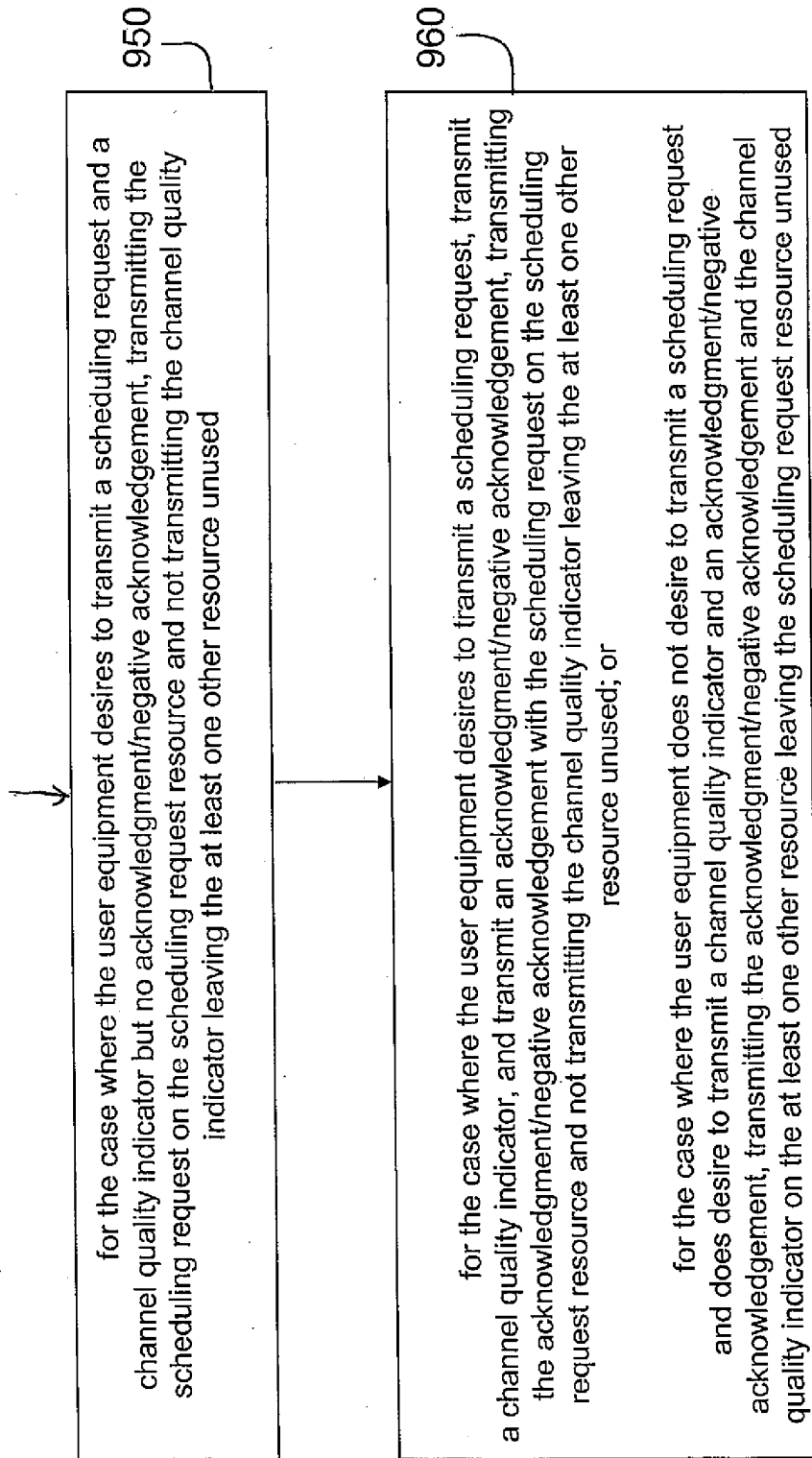


Figure 9C

IN THE U.S. PATENT AND TRADEMARK OFFICE

In re U.S. Patent Application of:

APPLICANTS: Kari P. Pajukoski et al.

SERIAL NO.: to be assigned FILING DATE: Herewith

EXAMINER: ART UNIT:

ATTORNEY'S DOCKET NO.: 863.0076.U3(US)

TITLE: PROVIDING IMPROVED SCHEDULING REQUEST SIGNALLING WITH
ACK/NACK OR CQI

Commissioner for Patents

Alexandria, VA 22313

PRELIMINARY AMENDMENT

Sir:

Applicant submits this preliminary amendment with the filing of the attached continuation application. Please amend the attached application as follows:

Amendments to the Specification: begins at page 2 of this paper.

Amendments to the Claims: begins at page 3 of this paper.

Amendments to the Drawings: None.

Remarks/Arguments begins at page 13 of this paper.

Appendix: None.

All fees due with this preliminary amendment are enumerated in the attached New Application Transmittal Form.

Please amend the continuation application as shown below:

AMENDMENTS TO THE SPECIFICATION:

At page 1, line 1, please amend paragraph [0001] to recite:

This patent application is a continuation of and claims priority to U.S. Patent Application Serial Number 14/051,646, filed October 11, 2013 and U.S. Patent Application Serial Number 12/290,547, filed on October 30, 2008, which claims priority under 35 U.S.C. §119(e) from Provisional Patent Application No.: 61/001,207, filed October 30, 2007, the disclosure of which is incorporated by reference herein in its entirety

AMENDMENTS TO THE CLAIMS:

This listing of the claims will replace all prior versions, and listings, of the claims in this application.

1. – 55. (Cancelled)

56. (New) A method comprising:

determining that an acknowledgment is to be sent on a physical uplink control channel, where transmission of the acknowledgement on the physical uplink control channel comprises in addition to the acknowledgement data, a sequence that is unmodulated via a modulation scheme used for the acknowledgement data; and

for a case where there is also a scheduling request to be sent, combining the acknowledgment with the scheduling request on a scheduling resource,

else placing the acknowledgment in another resource.

57. (New) The method of claim 56, comprising:

for the case where there is also the scheduling request to be sent, transmitting the acknowledgment with the scheduling request on the scheduling resource.

58. (New) The method of claim 56, comprising:

for a case where a channel quality indicator is also to be sent, the channel quality indicator is not sent and the another resource is unused.

59. (New) The method of claim 56, where the another resource is a data-non-associated resource.

60. (New) The method of claim 57, where the transmitting is on a physical uplink control channel.

61. (New) The method of claim 57, where the transmitting is on an uplink.

62. (New) The method of claim 56, where the physical uplink control channel comprises an unmodulated sequence, where the unmodulated sequence comprises reference signals and the acknowledgement data comprises a BPSK/QPSK modulated sequence.

63. (New) The method of claim 56 implemented in a wireless communications network.

64. (New) The method of claim 56 implemented in an evolved universal terrestrial radio access network.

65. (New) A non-transitory computer readable medium encoded with a computer program executable by a processor to perform actions comprising:

determining that an acknowledgment with acknowledgement data is to be sent on a physical uplink control channel, where transmission of the acknowledgement on the physical uplink control channel comprises in addition to the acknowledgement data, a sequence that is unmodulated via a modulation scheme used for the acknowledgment data; and

for a case where there is also a scheduling request to be sent, combining the acknowledgment with the scheduling request on a scheduling resource,

else placing the acknowledgment in another resource.

66. (New) The non-transitory computer readable medium encoded with a computer program of claim 65, comprising:

for the case where there is also the scheduling request to be sent, transmitting the acknowledgment with the scheduling request on the scheduling resource.

67. (New) The non-transitory computer readable medium encoded with a computer program of claim 66, comprising:

for a case where a channel quality indicator is also to be sent, the channel quality indicator is not sent and the another resource is unused.

68. (New) The non-transitory computer readable medium encoded with a computer program of claim 66, where the another resource is a data-non-associated resource.

69. (New) An apparatus comprising:

at least one processor; and

at least one memory including computer program code, where the at least one memory and the computer program code are configured, with the at least one processor, to cause the apparatus to at least:

determine that an acknowledgment is to be sent on a physical uplink control channel, where transmission of the acknowledgement on the physical uplink control channel comprises in addition to acknowledgement data, a sequence that is unmodulated via a modulation scheme used for the acknowledgement data; and

for a case where there is also a scheduling request to be sent, combine the acknowledgment with the scheduling request on a scheduling resource,

else placing the acknowledgment in another resource.

70. (New) The apparatus of claim 69, where the at least one memory including the computer program code is configured with the at least one processor to cause the apparatus, for the case where there is also the scheduling request to be sent, to transmit the acknowledgment with the scheduling request on the scheduling resource.

71. (New) The apparatus of claim 69 where the at least one memory including the computer program code is configured with the at least one processor to cause the apparatus, for a case where a channel quality indicator is also to be sent, to drop the channel quality indicator such that it is not sent and the another resource is unused.

72. (New) The apparatus of claim 69, where the acknowledgment transmission is communicated on the scheduling resource if there is also a scheduling request combined with the acknowledgment transmission on the scheduling resource, else the acknowledgment transmission is communicated on another resource.

73. (New) The apparatus of claim 69, where the another resource is a data-non-associated resource.

74. (New) The apparatus of claim 70, where the acknowledgment with the scheduling request is transmitted on a physical uplink control channel.

75. (New) The apparatus of claim 70, where the transmitter is configured to transmit the acknowledgment with the scheduling request on an uplink.

76. (New) The apparatus of claim 70, where the physical uplink control channel comprises an unmodulated sequence, and where the unmodulated sequence comprises reference signals and the acknowledgement data comprises a BPSK/QPSK modulated sequence.

77. (New) The apparatus of claim 70, embodied in a user equipment.

78. (New) The apparatus of claim 70, configured to operate in a wireless communications network.

79. (New) The apparatus of claim 70 configured to operate in an evolved universal terrestrial radio access network.

80. (New) A method comprising:

receiving information on a scheduling resource on a physical uplink control channel; and

determining that the information received on the scheduling resource comprises an acknowledgment transmission, where the acknowledgment transmission comprises in addition to acknowledgement data, a sequence that is unmodulated via a modulation scheme used for the acknowledgement data.

81. (New) The method of claim 80, comprising

responding accordingly to the determining that the information received on the scheduling resource comprises the acknowledgment.

82. (New) The method of claim 80 where the information is received from a wireless communications network.

83. (New) The method of claim 80 where the information is received from an evolved universal terrestrial radio access network.

84. (New) A non-transitory computer readable medium encoded with a computer program executable by a processor to perform actions comprising:

receiving information on a scheduling resource; and

determining that the information received on the scheduling resource comprises an acknowledgment transmission, where the transmission comprises in addition to acknowledgement data, a sequence that is unmodulated via a modulation scheme used for the acknowledgment data.

85. (New) The non-transitory computer readable medium encoded with a computer program of claim 84, comprising

responding accordingly to the determining that the information received on the scheduling resource comprises the acknowledgment

86. (New) The non-transitory computer readable medium encoded with a computer program of claim 84, where the acknowledgment transmission is communicated on the scheduling resource if there is also a scheduling request combined with the acknowledgment transmission on the scheduling resource, else the acknowledgment transmission is communicated on another resource

87. (New) An apparatus comprising:

at least one processor; and

at least one memory including computer program code, where the at least one memory and the computer program code are configured, with the at least one processor, to cause the apparatus to at least:

receive information on a scheduling resource; and

determine that the information received on the scheduling resource comprises an acknowledgment data transmission, where the acknowledgement data transmission comprises in addition to acknowledgment data, a sequence that is unmodulated via a modulation scheme used for the acknowledgment data.

88. (New) The apparatus of claim 87, where the at least one memory including the computer program code is configured with the at least one processor to cause the apparatus to respond accordingly to the determining that the information received on the scheduling resource comprises the acknowledgment data transmission.

89. (New) The apparatus of claim 87 where the at least one memory including the computer program code is configured with the at least one processor to cause the apparatus to receive the information on a physical uplink control channel.

90. (New) The apparatus of claim 87 where the at least one memory including the computer program code is configured with the at least one processor to cause the apparatus to receive the information from a wireless communications network.

91. (New) The apparatus of claim 87 where the at least one memory including the computer program code is configured with the at least one processor to cause the apparatus to receive the information from an evolved universal terrestrial radio access network.

92. (New) A method comprising:

determining that a scheduling request resource and at least one other resource are reserved for a user equipment in a same sub-frame; and

based on whether a scheduling request is desired to be transmitted by the user equipment, placing at least one of an acknowledgment/negative acknowledgement and a channel quality indicator that is desired to be transmitted by the user equipment in one of the resources and leaving at least one other resource unused, where the transmission comprises in addition to acknowledgement data, a sequence that is unmodulated via a modulation scheme used for the acknowledgment data.

93. (New) The method of claim 92, where the scheduling request resource and the at least one other resource are physical uplink control channel resources.

94. (New) The method of claim 92 comprising:

for a case where the user equipment desires to transmit a scheduling request and transmit an acknowledgment/negative acknowledgement, transmitting the acknowledgment/negative acknowledgement with the scheduling request on the scheduling request resource and leaving the at least one other resource unused; or

for a case where the user equipment does not desire to transmit a scheduling request and does desire to transmit an acknowledgment/negative acknowledgement, transmitting the acknowledgment/negative acknowledgement on the at least one other resource and leaving the scheduling request resource unused.

95. (New) The method of claim 92 comprising:

for a case where the user equipment desires to transmit a scheduling request and a channel quality indicator but no acknowledgment/negative acknowledgement, transmitting the scheduling request on the scheduling request resource and not transmitting the channel quality indicator leaving the at least one other resource unused.

96. (New) The method of claim 92 comprising:

for a case where the user equipment desires to transmit a scheduling request, transmit a channel quality indicator, and transmit an acknowledgment/negative acknowledgement, transmitting the acknowledgment/negative acknowledgement with the scheduling request on the scheduling request resource and not transmitting the channel quality indicator leaving the at least one other resource unused; or

for a case where the user equipment does not desire to transmit a scheduling request and does desire to transmit a channel quality indicator and an acknowledgment/negative acknowledgement, transmitting the acknowledgment/negative acknowledgement and the channel quality indicator on the at least one other resource and leaving the scheduling request resource unused.

97. (New) The method of claim 92, where the scheduling request information is conveyed based on a selected physical uplink control channel selection.

98. (New) A method comprising:

determining that an acknowledgment data transmission is to be sent; and

for a case where there is also a scheduling request to be sent, transmitting the acknowledgment data with the scheduling request on a scheduling resource in an uplink, where there is no need to specify a separate modulation or multiplexing operation used for transmission of the acknowledgement data with the scheduling request, from a modulation or multiplexing operation used for transmission of the acknowledgement on another resource.

99. (New) The method of claim 98, comprising: transmitting the acknowledgment with the scheduling request on the scheduling resource.

100. (New) The method of claim 98, where the transmitting is on a physical uplink control channel.

101. (New) An apparatus comprising:

at least one processor; and

at least one memory including computer program code, where the at least one memory and the computer program code are configured, with the at least one processor, to cause the apparatus to at least:

determine that an acknowledgment transmission is to be sent; and

for a case where there is also a scheduling request to be sent, transmit the acknowledgment with the scheduling request on a scheduling resource in an uplink, where there is no need to specify a separate modulation or multiplexing operation used for transmission of the acknowledgement with the scheduling request, from a modulation or multiplexing operation used for transmission of the acknowledgement on another resource.

102. (New) The apparatus of claim 101, where the at least one memory including the computer program code is configured with the at least one processor to cause the apparatus to transmit the acknowledgment with the scheduling request on the scheduling resource.

103. (New) The apparatus of claim 101, where the transmitting is on a physical uplink control channel.

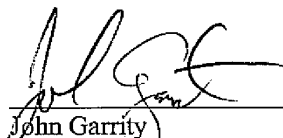
REMARKS

The attached application is a continuation of Application serial numbers 12/290,547 and 14/051,646, the former of which is allowed.

This preliminary amendment cancels claims 1-55 of the prior Application without prejudice or disclaimer. This preliminary amendment adds new claims 56-103, and also adds cross-reference language to the specification. No new matter is added.

Examination on the merits is respectfully requested.

Respectfully submitted:



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7/8/2015
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Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		Providing Improved Scheduling Request Signaling With ACK/NACK Or CQI		
First Named Inventor/Applicant Name:		Kari P. Pajukoski		
Filer:		Robert J. Mauri/Elaine Mian		
Attorney Docket Number:		863.0076.U3(US)		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility application filing	1011	1	280	280
Utility Search Fee	1111	1	600	600
Utility Examination Fee	1311	1	720	720
Pages:				
Claims:				
Claims in Excess of 20	1202	28	80	2240
Independent claims in excess of 3	1201	6	420	2520
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				6360

Electronic Acknowledgement Receipt	
EFS ID:	22855070
Application Number:	14793941
International Application Number:	
Confirmation Number:	6227
Title of Invention:	Providing Improved Scheduling Request Signaling With ACK/NACK Or CQI
First Named Inventor/Applicant Name:	Kari P. Pajukoski
Customer Number:	29683
Filer:	Robert J. Mauri/Elaine Mian
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Authorized User	HARRINGTON & SMITH, ATTORNEYS AT LAW, LLC
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File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	Transmittal.pdf	78437 cc28a0becf53fb472daf4b48c797a52b72e527c1	no	3
Warnings:					
Information:					
2	Power of Attorney	PowerofAttorney.pdf	90159 916003b7f1aa03c086d9738ae5ee2c1c2f0bd083	no	3
Warnings:					
Information:					
3	Information Disclosure Statement (IDS) Form (SB08)	IDS.pdf	100504 bc4490b9afb5d7a260019de10679b42b7c120bd	no	4
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
4	Application Data Sheet	ADS.pdf	203824 2bbf941042e852df23f5fb24284fdcf67fa35cca	no	6
Warnings:					
Information:					
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5	Oath or Declaration filed	Declaration.pdf	104229 7433fd89e307a1d91b054e5c759bd1b9e23f6b83	no	5
Warnings:					
Information:					
6	Specification	Specification.pdf	981658 a080f4b845f5ca17a52309b89b9983dc3710ad0c	no	34
Warnings:					
Information:					
7	Drawings-only black and white line drawings	Drawings.pdf	167293 e420bf780b8949b5075c6f880bf59a77fda678d	no	9
Warnings:					
Information:					

8	Preliminary Amendment	PreliminaryAmendment.pdf	257333 40adeb0d727aa042e0449b7f924644449ba f2487	no	13
Warnings:					
Information:					
9	Fee Worksheet (SB06)	fee-info.pdf	38564 eccfb22a4e5c322b1ff161d5baaf89f597f50 39d	no	2
Warnings:					
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Total Files Size (in bytes):			2022001		
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 14/793,941		Filing Date 07/08/2015		<input type="checkbox"/> To be Mailed	
ENTITY: <input checked="" type="checkbox"/> LARGE <input type="checkbox"/> SMALL <input type="checkbox"/> MICRO									
APPLICATION AS FILED – PART I									
(Column 1)		(Column 2)							
FOR	NUMBER FILED	NUMBER EXTRA		RATE (\$)		FEE (\$)			
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A					
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A					
<input type="checkbox"/> 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 \$ =					
<input type="checkbox"/> 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).								
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))									
* If the difference in column 1 is less than zero, enter "0" in column 2.						TOTAL			
APPLICATION AS AMENDED – PART II									
(Column 1)		(Column 2)		(Column 3)					
AMENDMENT	07/08/2015	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 48	Minus	** 48	= 0	X \$80 =		0	
	Independent (37 CFR 1.16(h))	* 9	Minus	***9	= 0	X \$420 =		0	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))								
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE		0	
(Column 1)		(Column 2)		(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =			
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =			
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))								
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE			
<p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.</p> <p>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".</p> <p>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".</p> <p>The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.</p>									

LIE
/NICOLE LOVE-HENSLEY/

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