UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/211,399	11/19/2019	10484915	P51679-US2	8997

27045 7590 10/30/2019

ERICSSON INC.
6300 LEGACY DRIVE
M/S EVR 1-C-11
PLANO, TX 75024

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):

TELEFONAKTIEBOLAGET LM ERICSSON (PUBL), Stockholm, SWEDEN;
Janne PEISA, Espoo, FINLAND;
Icaro L. J. DA SILVA, Solna, SWEDEN;

IR103 (Rev. 10/09)

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (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)

27045 7590 07/17/2019

ERICSSON INC.
6300 LEGACY DRIVE
M/S EVR 1-C-11
PLANO, TX 75024

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 transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

Pam Ewing	(Typed or printed name)
/Pam Ewing/	(Signature)
October 17, 2019	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/211,399	12/06/2018	Janne PEISA	P51679-US2	8997

TITLE OF INVENTION: IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	10/17/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
PATEL, JAY P	2466	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 03-09 or more recent) attached. **Use of a Customer Number is required.**

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

1 _____
2 _____
3 _____

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

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Stockholm, Sweden

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

4a. Fees submitted: ☒ Issue Fee ❑ Publication Fee (if required) ❑ Advance Order - # of Copies _____

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

☒ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 501379

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 /Tim Gerlach/ Date 10-17-19

Typed or printed name Tim Gerlach Registration No. 57,548

Electronic Patent Application Fee Transmittal

Application Number:	16211399
Filing Date:	06-Dec-2018
Title of Invention:	IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER
First Named Inventor/Applicant Name:	Janne PEISA
Filer:	Timothy Robert Gerlach/Pamela Ewing
Attorney Docket Number:	P51679-US2

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	1501	1	1000	1000

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1000**

Electronic Acknowledgement Receipt	
EFS ID:	37481919
Application Number:	16211399
International Application Number:	
Confirmation Number:	8997
Title of Invention:	IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER
First Named Inventor/Applicant Name:	Janne PEISA
Customer Number:	27045
Filer:	Timothy Robert Gerlach/Pamela Ewing
Filer Authorized By:	Timothy Robert Gerlach
Attorney Docket Number:	P51679-US2
Receipt Date:	17-OCT-2019
Filing Date:	06-DEC-2018
Time Stamp:	10:56:11
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$1000
RAM confirmation Number	E20190GA56284067
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	P51679-US2_2019-07-17_19-6615_Issue_Fee_Transmittal.pdf	119362 8ffdeafe72209a5664a38272c8ec67ac3b97300e	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30663 8671f31a0deac1e292a5041e1d1e226cb4e8146f	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	150025		

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

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

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

27045 7590 07/17/2019

ERICSSON INC.
6300 LEGACY DRIVE
M/S EVR 1-C-11
PLANO, TX 75024

EXAMINER
PATEL, JAY P

ART UNIT	PAPER NUMBER
2466	

DATE MAILED: 07/17/2019

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/211,399	12/06/2018	Janne PEISA	P51679-US2	8997

TITLE OF INVENTION: IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	10/17/2019

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: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

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

27045 7590 07/17/2019

ERICSSON INC.
6300 LEGACY DRIVE
M/S EVR 1-C-11
PLANO, TX 75024

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 transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/211,399	12/06/2018	Janne PEISA	P51679-US2	8997

TITLE OF INVENTION: IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	10/17/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
PATEL, JAY P	2466	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 03-09 or more recent) attached. **Use of a Customer Number is required.**

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

1_____
2_____
3_____

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

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). 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. Fees submitted: ❑Issue Fee ❑Publication Fee (if required) ❑Advance Order - # of Copies _____

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

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

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.
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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
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/211,399	12/06/2018	Janne PEISA	P51679-US2	8997

27045 7590 07/17/2019

ERICSSON INC.
6300 LEGACY DRIVE
M/S EVR 1-C-11
PLANO, TX 75024

EXAMINER	
PATEL, JAY P	
ART UNIT	**PAPER NUMBER**
2466	

DATE MAILED: 07/17/2019

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

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

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

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

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

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

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 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. 16/211,399	Applicant(s) PEISA et al.	
	Examiner JAY P PATEL	Art Unit 2466	AIA (FITF) Status Yes

-- 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 the amendment to claims filed on 4/9/2019.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

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

3. ☑ The allowed claim(s) is/are 1-5,7-13 and 15-17 . 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 areply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

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

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

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

Attachment(s)

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

/JAY P PATEL/
Primary Examiner, Art Unit 2466

DETAILED ACTION

Notice of Pre-AIA or AIA Status

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

Allowable Subject Matter

Claims 1-5, 7-13 and 15-17 are allowed.

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

In regards to the claims, the cited prior art fails to teach either individually or in combination the beam related information having common random access configuration information associated with one or more beams and dedicated random access configuration information associated with the one or more beams and identifying at least one beam transmitted from the target cell from among the one or more beams of the target cell based on the identification of the target cell and the access information from the RRC connection reconfiguration message.

Prior art Chen et al. (US Publications 2018/0035470 A1) teaches, UE selecting TTI information in the dedicated message based on random access purpose (see paragraph 148) and also in another separate embodiment the UE selecting common field based on random access purpose (see paragraph 167). The UE can derive start timing offset for transmission through a dedicated message such as RRC reconfiguration message (see paragraph 182).

However, Chen fails to teach the allowable subject matter as stated above.

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 JAY P PATEL whose telephone number is (571)272-3086. The examiner can normally be reached on M-F 9:30-6.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Faruk Hamza can be reached on 571-272-7969. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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

/JAY P PATEL/
Primary Examiner, Art Unit 2466

Notice of References Cited	Application/Control No. 16/211,399	Applicant(s)/Patent Under Reexamination PEISA et al.	
	Examiner JAY P PATEL	Art Unit 2466	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20180035470-A1	02-2018	Chen; Wei-Yu	H04W48/16	1/1
*	B	US-20180359785-A1	12-2018	Chen; Wei-Yu	H04W48/16	1/1
*	C	US-20180034515-A1	02-2018	Guo; Yu-Hsuan	H04B7/043	1/1
*	D	US-20170331670-A1	11-2017	Parkvall; Stefan	H04W52/0274	1/1
*	E	US-20170331577-A1	11-2017	Parkvall; Stefan	H04J11/0079	1/1
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

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

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

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/211,399	PEISA et al.
	Examiner	Art Unit
	JAY P PATEL	2466

CPC - Searched*		
Symbol	Date	Examiner
(H04W36/0072 or H04W36/0077 or H04W36/08 or H04W74/0833); PLUS TEXT	02/01/2019	JPP
(H04W36/0072 or H04W36/0077 or H04W36/08 or H04W74/0833); PLUS TEXT	07/09/2019	JPP

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
EAST(USPAT, USPGPUB, USOCR, FPRS, EPO, JPO, DERWENT, IBM_TDB); PLUS TEXT	01/31/2019	JPP
EAST INVENTORSHIP SEARCH	02/01/2019	JPP
NPL SEARCH ON IP.COM	02/01/2019	JPP
EAST(USPAT, USPGPUB, USOCR, FPRS, EPO, JPO, DERWENT, IBM_TDB); PLUS TEXT	07/09/2019	JPP
EAST INVENTORSHIP SEARCH	07/09/2019	JPP

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
	EAST INTERFERENCE SEARCH	07/09/2019	JPP

/JAY P PATEL/ Primary Examiner, Art Unit 2466	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/211,399	PEISA et al.
	Examiner	Art Unit
	JAY P PATEL	2466

/JAY P PATEL/ Primary Examiner, Art Unit 2466	

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/211,399	PEISA et al.
	Examiner	**Art Unit**
	JAY P PATEL	2466

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

CLAIMS

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

CLAIM		DATE								
Final	Original	02/01/2019	07/09/2019							
	1	✓	=							
	2	✓	=							
	3	✓	=							
	4	✓	=							
	5	✓	=							
	6	✓	-							
	7	✓	=							
	8	✓	=							
	9	✓	=							
	10	✓	=							
	11	✓	=							
	12	✓	=							
	13	✓	=							
	14	✓	-							
	15	✓	=							
	16	✓	=							
	17	✓	=							

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/211,399	PEISA et al.
	Examiner	**Art Unit**
	JAY P PATEL	2466

CPC							
Symbol						**Type**	**Version**
H04W	/	36	/	0072		F	2013-01-01
H04W	/	36	/	0077		I	2013-01-01
H04W	/	36	/	08		A	2013-01-01
H04W	/	74	/	0833		A	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	15	
/JAY P PATEL/ Primary Examiner, Art Unit 2466	09 July 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	9	5

U.S. Patent and Trademark Office — Part of Paper No.: 20190709

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/211,399	PEISA et al.
	Examiner	**Art Unit**
	JAY P PATEL	2466

INTERNATIONAL CLASSIFICATION				
CLAIMED				
H04L	/	12	/	24

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	15	
/JAY P PATEL/ Primary Examiner, Art Unit 2466	09 July 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	9	5

U.S. Patent and Trademark Office — Part of Paper No.: 20190709

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/211,399	PEISA et al.
	Examiner	**Art Unit**
	JAY P PATEL	2466

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

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	15	
/JAY P PATEL/ Primary Examiner, Art Unit 2466	09 July 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	9	5

U.S. Patent and Trademark Office — Part of Paper No.: 20190709

Bibliographic Data

Application No: 16/211,399

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /JAY P PATEL/ (Examiner's Signature) JPP (Initials)

Title: IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/06/2018	370	2466	P51679-US2
RULE			

APPLICANTS

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INVENTORS

Janne PEISA Espoo, FINLAND

Icaro L. J. DA SILVA Solna, SWEDEN

CONTINUING DATA

This application is a CON of PCT/IB2017/056880 11/03/2017

PCT/IB2017/056880 has PRO of 62417714 11/04/2016

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

12/27/2018

STATE OR COUNTRY

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ADDRESS

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M/S EVR 1-C-11
PLANO, TX 75024
UNITED STATES

FILING FEE RECEIVED

$5,860

EAST Search History

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L13	0	(((dedicat$4 with random with access) same (beam$3)) and ((common with random with access) same (beam$3)) and (RRC with (reconfiguration or reconfigured or reconfigu$4))).clm.	US-PGPUB; USPAT	OR	OFF	2019/07/09 15:36

7/9/2019 3:36:35 PM
C:\Users\jpatel1\Documents\EAST\Workspaces\16211399.wsp

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L4	9	(H04W36/0072 or H04W36/0077 or H04W36/08 or H04W74/0833).cpc. and ((dedicat$4 with random with access) same (beam$3)) and ((common with random with access) same (beam$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/07/09 14:50
L5	6	l4 and (@rlad<"20161104" or @ad<"20161104")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/07/09 14:51
L6	4	l5 and (RRC with (reconfiguration or reconfigured or reconfigu$4))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/07/09 14:51
L7	203	((("PEISA") near3 ("Janne"))).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/07/09 14:52
L8	6	L7 and (target with (identifying or identification$1 or id$2)).clm.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/07/09 14:52
L9	106	((("DA") near3 ("SILVA") near3 ("Icaro") near3 ("L") near3 ("J"))).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/07/09 14:52
L10	3	L9 and (target with (identifying or identification$1 or id$2)).clm.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/07/09 14:52
L11	0	L8 and (RRC with (reconfiguration or reconfigured or reconfigu$4)).clm.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/07/09 15:27
L12	0	L10 and (RRC with (reconfiguration or reconfigured or reconfigu$4)).clm.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/07/09 15:27
S24	153	(dedicat$4 with random with access) same (beam$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/07/09 10:56
S25	26	((dedicat$4 with random with access) same (beam$3)) and ((common with random with access) same (beam$3))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/07/09 10:59
S26	15	S25 and (@rlad<"20161104" or	US-PGPUB;	OR	OFF	2019/07/09

		@ad<"20161104")	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			10:59
S27	5	S26 and (RRC with (reconfiguration or reconfigured or reconfigu$4))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/07/09 11:41

7/9/2019 3:35:42 PM
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/211,399	12/06/2018	Janne PEISA	P51679-US2

CONFIRMATION NO. 8997

27045
ERICSSON INC.
6300 LEGACY DRIVE
M/S EVR 1-C-11
PLANO, TX 75024

PUBLICATION NOTICE

Title:IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER

Publication No.US-2019-0110234-A1
Publication Date:04/11/2019

NOTICE OF PUBLICATION OF APPLICATION

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

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

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

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

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s):	Janne Peisa, et al.	§	Group Art Unit:	2466
Application No.	16/211,399	§	Examiner:	Patel, Jay P
Filed:	12/06/2018	§	Confirmation No:	8997

Attorney Docket No: P51679-US2
Customer No.: 27045

For: IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER

Via EFS-Web

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Commissioner for Patents
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Alexandria, VA 22313-1450

CERTIFICATE OF TRANSMISSION BY EFS-WEB

I hereby certify that this paper or fee is being transmitted to the United States Patent and Trademark Office electronically via EFS-Web.

Date: April 9, 2019

Name: Michelle Sanderson

Signature: /Michelle Sanderson/

Response under 37 C.F.R. §1.111

In response to the Non-Final Office action of February 6, 2019 (the *Office Action*), the Applicant submits the following remarks and amendments.

If any extension of time for this Response is required, the Applicant requests that this be considered a petition therefore. The Commissioner is hereby authorized to charge any additional fee to Deposit Account No. 50-1379.

THE CLAIMS

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

Listing of Claims:

1. (Currently Amended) A method performed by a wireless device for handover, the method comprising:

receiving ~~a first handover~~ an RRC connection reconfiguration message from a source network node associated with a source cell, the ~~first handover~~ RRC connection reconfiguration message comprising an identification of a target cell and access information associated with the target cell, wherein the target cell is different than the source cell and comprises one or more beams to be transmitted by the target cell and the access information comprises beam related information that comprises common random access configuration information associated with the one or more beams and dedicated random access configuration information associated with the one or more beams;

identifying at least one beam transmitted from the target cell from among the one or more beams of the target cell based on the identification of the target cell and the access information from the ~~first handover~~ RRC connection reconfiguration message; and

accessing the target cell using the identified at least one beam.

2. (Original) The method of Claim 1, wherein the target cell is associated with a second network node, the second network node being different than the source network node.

3. (Previously Presented) The method of Claim 1, wherein the access information comprises Random Access Channel (RACH) information.

4. (Previously Presented) The method of Claim 1, wherein the target cell has at least two beams and the access information comprises an indication of allowed beams associated with the target cell, the allowed beams comprising fewer than all of the beams of the target cell.

5. (Original) The method of Claim 4, wherein the access information includes a random access preamble mapped to each of the allowed beams of the target cell.

6. (Cancelled)

7. (Previously Presented) The method of Claim 1, wherein accessing the target cell using the identified at least one beam comprises accessing the target cell using a contention based random access procedure.

8. (Previously Presented) The method of Claim 1, wherein accessing the target cell using the identified at least one beam comprises accessing the target cell without first reading system information associated with the target cell.

9. (Currently Amended) A wireless device for handover comprising:

a wireless interface configured to receive ~~a first handover~~ an RRC connection reconfiguration message from a source network node associated with a source cell, the ~~first handover~~ RRC connection reconfiguration message comprising an identification of a target cell and access information associated with the target cell, wherein the target cell is different than the source cell and comprises one or more beams to be transmitted by the target cell and the access information comprises beam related information that comprises common random access configuration information associated with the one or more beams and dedicated random access configuration information associated with the one or more beams;

processing circuitry configured to identify at least one beam transmitted from the target cell from among the one or more beams of the target cell based on the identification of the target cell and the access information from the ~~first handover~~ RRC connection reconfiguration message; and

an input and output interface configured to receive input information and provide output information;

a power source configured to provide power to the wireless interface, processing circuity and input and output interface; and

wherein the wireless interface is further configured to access the target cell using the identified at least one beam.

10. (Original) The wireless device of Claim 9, wherein the target cell is associated with a second network node, the second network node being different than the source network node.

11. (Previously Presented) The wireless device of Claim 9, wherein the access information comprises Random Access Channel (RACH) information.

12. (Previously Presented) The wireless device of Claim 9, wherein the target cell has at least two beams and the access information comprises an indication of allowed beams associated with the target cell, the allowed beams comprising fewer than all of the beams of the target cell.

13. (Original) The wireless device of Claim 12, wherein the access information includes a random access preamble mapped to each of the allowed beams of the target cell.

14. (Cancelled)

15. (Previously Presented) The wireless device of Claim 9, wherein the wireless interface configured to access the target cell using the identified at least one beam is configured to access the target cell using a contention based random access procedure.

16. (Previously Presented) The wireless device of Claim 9, wherein the wireless interface configured to access the target cell using the identified at least one beam is configured to access the target cell without first reading system information associated with the target cell.

17. (Currently Amended) A wireless communication system for handover, the system comprising:

at least two network nodes;

at least one wireless device wirelessly connected to a first of the at least two network nodes;

wherein the first network node is configured to:

determine access information associated with a second of the at least two network nodes for the at least one wireless device; and

prepare the access information associated with the second network node to be transmitted to the at least one wireless device; and

wherein the at least one wireless device is configured to:

receive ~~a handover~~ an RRC connection reconfiguration message from the first network node, the handover message comprising an identification associated with the second network node and the access information associated with the second network node and comprises beam related information that comprises common random access configuration information associated with the one or more beams and dedicated random access configuration information associated with the one or more beams;

identify and select at least one beam from the second network node; and

access the second network node using the identified and selected at least one beam based on the access information from the handover message.

18-33. (Cancelled)

* * *

REMARKS

1.) Claim Amendments

The Applicant has amended Claims 1, 9 and 17 and has canceled Claims 6 and 14. Accordingly, Claims 1-5, 7-13, and 15-17 are pending in the application. The Applicant respectfully submits no new matter has been added. Favorable reconsideration of the Application is respectfully requested in view of the foregoing amendments and the following remarks.

2.) Interview Summary

The Applicant appreciates Examiner Patel's participation in the Examiner Interview conducted on March 27, 2019. During the interview the § 103 rejection was discussed. The Applicant proposed amending the claims to clarify that the access information includes common and dedicated random access configuration information that is associated with the beams. The common and dedicated random access configuration information has a well understood meaning that is not equivalent to access information for omnidirectional or directional signals.

In particular, the access configuration for an omnidirectional signal can be dedicated or common, as can the access configuration for a directional signal. The distinction between common and dedicated access information is with respect to who can use provided access information. That is, common random access information is available to any UE that can use it. Common random access information is used for contention based random access (e.g., a UE will have to contend for the resources with other UEs). Dedicated random access is reserved for a specific UE. It is used for contention free random access (e.g., the UE does not have to contend with another UE for those resources). *See e.g., 3G Evolution: HSPA and LTE for Mobile Broadband*, Erik Dahlman, Stegan Parkval, Johan Skold, Per Beming (2008) pages 434-435; and *3GPP TS 36.331 V13.0.0* (2015-12) pages 307-308.

3.) Claim Rejections – 35 U.S.C. § 103(a)

The *Office Action* rejects Claims 1-17 under 35 U.S.C. § 103(a) as allegedly being unpatentable over *Ryoo, et al.* (US 2017/0257780) in view of *Dai, et al.* (US 2015/0071250). For at least the reasons provided below, the Applicant respectfully traverses these rejections.

In order to advance prosecution, the Applicant has amended the independent Claims. As amended, Claim 1 recites, among other things, "receiving an RRC connection reconfiguration message . . . [that comprises] access information . . . that comprises common random access configuration information associated with the one or more beams and dedicated random access configuration information associated with the one or more beams." Nowhere is this disclosed, taught or suggested in the proposed combination.

Some of the elements of amended Claim 1 were previously recited in Claim 6 (now cancelled). In rejecting Claim 6 the *Office Action* contends "*Ryoo* . . . shows the directional (dedicated) RACH response and the figure 2C shows the omnidirectional response)." *Office Action*, pages 4-5. However, the Applicant submits that as currently amended, *Ryoo* and *Dai* fail to teach or suggest the claimed invention. For example, an omnidirectional signal radiates in all directions and is thus not a directional beam. Thus, even if it were assumed that access information for an omnidirectional signal could be construed to be common access information, the access information for the omnidirectional signal is clearly not associated with a beam. Thus the omnidirectional access information disclosed in *Ryoo* cannot be the claimed "common random access configuration information associated with the one or more beams."

Applicant further submits that one skilled in the art would understand that the term "dedicated" as used in the claim term "dedicated random access configuration" indicates random access configuration information that is dedicated to a particular wireless device (as opposed to being commonly available to any device). That is, the dedicated random access configuration information associated with the one or more beams would indicate that the one or more beams can be accessed by the wireless

device using dedicated resources without having to contend for those resources with other wireless devices.

By receiving the two types of configuration information, the wireless device is able to perform the claimed identifying step by identifying a beam from among both common and dedicated beams. This can be useful due to the directional nature of beams that can create some uncertainty as to which particular beam may be best suited for a particular wireless device.

Accordingly, for at least the reasons provided above, the Applicant respectfully submits that Claim 1, and all claims depending therefrom, are allowable over the proposed combination. For at least certain analogous reasons, the Applicant respectfully submits that Claims 9, 17 and all claims depending therefrom, are also allowable. The Applicant thus respectfully requests allowance of all pending claims.

CONCLUSION

In view of the foregoing remarks, the Applicant believes all of the claims currently pending in the Application to be in a condition for allowance. The Applicant, therefore, respectfully requests that the Examiner withdraw all rejections and issue a Notice of Allowance for all pending claims.

The Applicant requests a telephonic interview if the Examiner has any questions or requires any additional information that would further or expedite the prosecution of the Application.

Respectfully submitted,

/Tim Gerlach/

Tim Gerlach
Registration No. 57,548

Date: 4-9-19

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6300 Legacy Drive, M/S EVR 1-C-11
Plano, Texas 75024

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Electronic Acknowledgement Receipt	
EFS ID:	35668454
Application Number:	16211399
International Application Number:	
Confirmation Number:	8997
Title of Invention:	IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER
First Named Inventor/Applicant Name:	Janne PEISA
Customer Number:	27045
Filer:	Whitman Burns/Michelle Sanderson
Filer Authorized By:	Whitman Burns
Attorney Docket Number:	P51679-US2
Receipt Date:	09-APR-2019
Filing Date:	06-DEC-2018
Time Stamp:	12:10:46
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		P51679-US2_2019-04-09_19-6555_Response_to_NFOA_dated_2019-01-06.pdf	131982 02f06db52522c0d6e7dd8de06b4c83b4a525e7c2	yes	10

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	10
Warnings:			
Information:			
	Total Files Size (in bytes):	131982	

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

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

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/211,399	Filing Date 12/06/2018	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	04/09/2019	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 15	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x $460 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ 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.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/FREDERICK E BRISCOE/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

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

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

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/211,399	12/06/2018	Janne PEISA	P51679-US2	8997

27045 7590 04/02/2019

ERICSSON INC.
6300 LEGACY DRIVE
M/S EVR 1-C-11
PLANO, TX 75024

EXAMINER	
PATEL, JAY P	

ART UNIT	PAPER NUMBER
2466	

NOTIFICATION DATE	DELIVERY MODE
04/02/2019	ELECTRONIC

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

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

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

michelle.sanderson@ericsson.com
pam.ewing@ericsson.com

Applicant-Initiated Interview Summary	**Application No.** 16/211,399	**Applicant(s)** PEISA et al.	
	Examiner JAY P PATEL	**Art Unit** 2466	**AIA (FITF) Status** Yes

All participants (applicant, applicants representative, PTO personnel):

(1) JAY P. PATEL. (3) _____.

(2) Tim Gerlach. (4) _____.

Date of Interview: 28 March 2019.

Type: ☑ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☐ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☑103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1 and 6.

Identification of prior art discussed: See Continuation Sheet.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Mr. Gerlach specifically conveyed to the examiner that omni directed beams or directional beams do not necessarily corresponding to a common or dedicated beams specifically. In other words, omni directional beams can be dedicated or common and the same is true for directional beams. The examiner agreed to take this point into consideration and take a decision on the matter when an official response is actually filed..

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☑ Attachment

/JAY P PATEL/ Primary Examiner, Art Unit 2466	

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiners responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicants correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,-
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicants record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiners version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, Interview Record OK on the paper recording the substance of the interview along with the date and the examiners initials.

Continuation of Identification of prior art discussed: Ryoo

Doc Code: M865 or FAI.REQ.INTV

PTOL-413A (08-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Applicant Initiated Interview Request Form

Application No.: 16/211,399 First Named Applicant: Janne Peisa
Examiner: Jay P Patel Art Unit: 2466 Status of Application: Non-Final Office Action

Tentative Participants:
(1) Tim Gerlach **(2)** Jay P Patel
(3) _____ **(4)** _____

Proposed Date of Interview: 3-27-19 **Proposed Time:** 2:00 PM (EST) **(AM/PM)**

Type of Interview Requested:
(1) [✓] Telephonic (2) [ ] Personal (3) [ ] Video Conference

Exhibit To Be Shown or Demonstrated: [ ] YES [ ] NO
If yes, provide brief description: _____

Issues To Be Discussed

Issues (Rej., Obj., etc)	Claims/ Fig. #s	Prior Art	Discussed	Agreed	Not Agreed
(1) 103	1		[ ]	[ ]	[ ]
(2)			[ ]	[ ]	[ ]
(3)			[ ]	[ ]	[ ]
(4)			[ ]	[ ]	[ ]

[ ] Continuation Sheet Attached [ ] Proposed Amendment or Arguments Attached
Brief Description of Arguments to be Presented: Discuss proposed amendment provided below

An interview was conducted on the above-identified application on _____

NOTE: This form should be completed and filed by applicant in advance of the interview (see MPEP § 713.01). If this form is signed by a registered practitioner not of record, the Office will accept this as an indication that he or she is authorized to conduct an interview on behalf of the principal (37 CFR 1.32(a)(3)) pursuant to 37 CFR 1.34. This is not a power of attorney to any above named practitioner. See the Instruction Sheet for this form, which is incorporated by reference. By signing this form, applicant or practitioner is certifying that he or she has read the Instruction Sheet. After the interview is conducted, applicant is advised to file a statement of the substance of this interview (37 CFR 1.133(b)) as soon as possible. This application will not be delayed from issue because of applicant's failure to submit a written record of this interview.

/Tim Gerlach/
Applicant/Applicant's Representative Signature

Examiner/SPE Signature

Tim Gerlach
Typed/Printed Name of Applicant or Representative

57,548
Registration Number, if applicable

PTOL-413A (08-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Instruction Sheet for:
APPLICANT INITIATED INTERVIEW REQUEST FORM

(Not to be Submitted to the USPTO)

1. If this form is signed by a registered practitioner not of record, the authority to submit the Applicant Initiated Interview Request Form is pursuant to limited authority to act in a representative capacity under 37 CFR 1.34 and further proof of authority to act in a representative capacity may be required. *See* 37 CFR 1.34.

   The Office will accept the signed form as an indication that the registered practitioner not of record is authorized to conduct an interview on behalf of the principal in pursuant to 37 CFR 1.34.

   For more information, see the "Conducting an Interview with a Registered Practitioner Acting in a Representative Capacity" notice which is available on the USPTO Web site at: http://www.uspto.gov/patents/law/notices/2010.jsp.

2. This is not a power of attorney to any named practitioner. Accordingly, any registered practitioner not of record named on the form does not have authority to sign a request to change the correspondence address, a request for express abandonment, a disclaimer, a power of attorney, or other document requiring the signature of the applicant, assignee of the entire interest or an attorney of record. If appropriate, a separate power of attorney to the named practitioner should be executed and filed in the US Patent and Trademark Office.

3. Any interview concerning an unpublished application under 35 U.S.C. § 122(b) with a registered practitioner not of record, pursuant to 37 CFR 1.34, will be conducted based on the information and files supplied by the practitioner in view of the confidentiality requirements of 35 U.S.C. § 122(a).

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.

1. (Previously Presented) A method performed by a wireless device for handover, the method comprising:

receiving ~~a first handover~~ an RRC connection reconfiguration message from a source network node associated with a source cell, the first handover message comprising an identification of a target cell and access information associated with the target cell, wherein the target cell is different than the source cell and comprises one or more beams to be transmitted by the target cell and the access information comprises beam related information that comprises common random access configuration information associated with the one or more beams and dedicated random access configuration associated with the one or more beams;

identifying at least one beam transmitted from the target cell from among the one or more beams of the target cell based on the identification of the target cell and the access information from the first handover message; and

accessing the target cell using the identified at least one beam.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/211,399	12/06/2018	Janne PEISA	P51679-US2	8997

27045 7590 02/06/2019

ERICSSON INC.
6300 LEGACY DRIVE
M/S EVR 1-C-11
PLANO, TX 75024

EXAMINER	
PATEL, JAY P	

ART UNIT	PAPER NUMBER
2466	

NOTIFICATION DATE	DELIVERY MODE
02/06/2019	ELECTRONIC

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

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

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

michelle.sanderson@ericsson.com
pam.ewing@ericsson.com

Office Action Summary	**Application No.** 16/211,399	**Applicant(s)** PEISA et al.	
	Examiner JAY P PATEL	**Art Unit** 2466	**AIA Status** Yes

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

Period for Reply

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

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

Status

1)☑ Responsive to communication(s) filed on 12/6/2018.

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

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

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

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

Disposition of Claims*

5) ☑ Claim(s) 1-17 is/are pending in the application.

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

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-17 is/are rejected.

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

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

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

Application Papers

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

11)☑ The drawing(s) filed on 12/6/2018 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

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

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

Priority under 35 U.S.C. § 119

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

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

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

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

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

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

Attachment(s)

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

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

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

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

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

Claim Rejections - 35 USC § 103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

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

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

Claims 1-17 are rejected under 35 U.S.C. 103 as being unpatentable over Ryoo et al. (US Publication 2017/257780 A1) further in view of Dai et al. (US Publication 2015/0071250 A1).

1. In regards to claims 1, 9 and 17, Ryoo et al. (US Publication 2017/257780 A1) teaches, A method performed by a wireless device for handover (see paragraph 46, also see paragraph 151; transmission beam and reception beam recommendation when handing over a communication channel; see paragraph 159; the DRB2 is handed over

from a macro-cell to a small cell), the method comprising: receiving a first handover message from a source network node associated with a source cell (see paragraph 158; see steps 902-904), the first handover message comprising an access information associated with the target cell (paragraph 102, RRC connection reconfiguration message containing the RACH configuration information regarding the small cell enb; see paragraph 159; the transmission beam reordering request is included in an RRC connection reconfiguration message; see paragraph 168; the recommendation information contained in the RRC connection reconfiguration message), wherein the target cell is different than the source cell (the target cell is mentioned throughout Ryoo as the small cell; the source cell is a macro cell) and comprises one or more beams (see paragraph 71 on page 6 and figure 4A, step 401) and the access information comprises beam related information (see paragraph 159; the transmission beam reordering request in included in an RRC connection reconfiguration message; see paragraph 168; the recommendation information contained in the RRC connection reconfiguration message); identifying at least one beam from among the one or more beams of the target cell based on the identification of the target cell and the access information from the first handover message (see paragraph 160); and accessing the target cell (625) using the identified at least one beam (see paragraph 160; the UE implicitly carries out different RACH transmission using the reordered transmission beams).

2. In further regards to claim 1, Ryoo fails to teach, the first handover message comprising an identification of a target cell.

3. Dai et al. (US Publication 2015/0071250 A1) however teaches a handover message including the identifier of the target base station (see paragraph 77).

4. Therefore, it would have been obvious for one of ordinary skill in the art before the effectively filing date of the present application to incorporate the identification information of the target base station as taught by Dai into the teachings of Ryoo. The motivation to do so would be to efficiently carry out a handover by having a quick and known recognition of the target base station.

5. In regards to claims 2 and 10, Ryoo teaches wherein the target cell is associated with a second network node, the second network node being different than the source network node (see figure 1 for example with macro enb 101 and other small enbs 111, 112, etc.).

6. In regards to claims 3 and 11, Ryoo teaches, wherein the access information comprises Random Access Channel (RACH) information (see paragraph 102).

7. In regards to claims 4 and 12, Ryoo teaches, wherein the target cell has at least two beams and the access information comprises an indication of allowed beams associated with the target cell, the allowed beams comprising fewer than all of the beams of the target cell (see paragraphs 115 and 118).

8. In regards to claims 5 and 13, Ryoo teaches, wherein the access information includes a random access preamble mapped to each of the allowed beams of the target cell (see paragraphs 71-72).

9. In regards to claims 6 and 14, Ryoo implies, wherein the access information includes common random access configuration information and dedicated random access resources for the allowed beams (see figures 2B and 2C; the figure 2B shows

the directional (dedicated) RACH response and the figure 2C shows the omni-directional response).

10. In regards to claims 7 and 15, Ryoo teaches, wherein accessing the target cell using the identified at least one beam comprises accessing the target cell using a contention based random access procedure (see paragraph 133).

11. In regards to claims 8 and 16, Ryoo teaches, wherein accessing the target cell using the identified at least one beam comprises accessing the target cell without first reading system information associated with the target cell (see figure 5, the macro enb determines to add the small cell without reading the information from the small cell directly; instead it is done based on the report from the UE).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAY P PATEL whose telephone number is (571)272-3086. The examiner can normally be reached on M-F 9:30-6.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Faruk Hamza can be reached on 571-272-7969. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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

/JAY P PATEL/
Primary Examiner, Art Unit 2466

Notice of References Cited	Application/Control No. 16/211,399	Applicant(s)/Patent Under Reexamination PEISA et al.	
	Examiner JAY P PATEL	Art Unit 2466	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20160381699-A1	12-2016	Rubin; Harvey	H04L67/2809	370/329
*	B	US-20150079945-A1	03-2015	Rubin; Harvey	H04W12/08	455/411
*	C	US-20120122459-A1	05-2012	Wu; Xiaobo	H04W36/0022	455/437
*	D	US-20150071250-A1	03-2015	DAI; Mingzeng	H04W36/38	370/331
*	E	US-20170257780-A1	09-2017	Ryoo; Sunheui	H04W16/28	1/1
*	F	US-20140228032-A1	08-2014	Jung; Sung Hoon	H04W8/02	455/436
*	G	US-20110310845-A1	12-2011	Jung; Sung-Hoon	H04W36/385	370/331
	H					
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FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

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

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

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/211,399	PEISA et al.
	Examiner	**Art Unit**
	JAY P PATEL	2466

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

CLAIMS

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

CLAIM		DATE								
Final	Original	02/01/2019								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
	9	✓								
	10	✓								
	11	✓								
	12	✓								
	13	✓								
	14	✓								
	15	✓								
	16	✓								
	17	✓								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/211,399	PEISA et al.
	Examiner	Art Unit
	JAY P PATEL	2466

CPC - Searched*		
Symbol	Date	Examiner
(H04W36/0072 or H04W36/0077 or H04W36/08 or H04W74/0833); PLUS TEXT	02/01/2019	JPP

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
EAST(USPAT, USPGPUB, USOCR, FPRS, EPO, JPO, DERWENT, IBM_TDB); PLUS TEXT	01/31/2019	JPP
EAST INVENTORSHIP SEARCH	02/01/2019	JPP
NPL SEARCH ON IP.COM	02/01/2019	JPP

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

Bibliographic Data

Application No: 16/211,399

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /JAY P PATEL/ (Examiner's Signature) JPP (Initials)

Title: IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/06/2018	370	2466	P51679-US2
RULE			

APPLICANTS

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INVENTORS

Janne PEISA Espoo, FINLAND

Icaro L. J. DA SILVA Solna, SWEDEN

CONTINUING DATA

This application is a CON of PCT/IB2017/056880 11/03/2017

PCT/IB2017/056880 has PRO of 62417714 11/04/2016

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

12/27/2018

STATE OR COUNTRY

FINLAND

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M/S EVR 1-C-11
PLANO, TX 75024
UNITED STATES

FILING FEE RECEIVED

$5,860

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L3	2	"20170257780".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/02/01 11:23
L4	2	L3 and (RACH)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/02/01 11:33
L5	0	L3 and (random same preamble same beam$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/02/01 11:46
L6	1	L3 and (preamble same beam$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/02/01 11:46
L7	0	L3 and (common with access)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/02/01 11:49
L8	0	L3 and (common same dedicated)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/02/01 11:50
L9	0	L3 and (common)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/02/01 11:50
L10	1	L3 and (content$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/02/01 11:51
L11	0	L3 and (dedicated)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/02/01 11:54
L12	194	(handover adj message) same (target with (identifying or identification$1 or id$2))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/02/01 12:00

L13	187	L12 and (@rlad<"20161104" or @ad<"20161104")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/02/01 12:00
L14	0	L13 and (common with random) and (dedicated with random)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/02/01 12:00
L15	4	(H04W36/0072 or H04W36/0077 or H04W36/08 or H04W74/0833).cpc. and ((handover adj message) same (target with (identifying or identification$1 or id$2))) and (RACH)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/02/01 12:30
L16	4	L15 and (@rlad<"20161104" or @ad<"20161104")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/02/01 12:30
L17	201	((("PEISA") near3 ("Janne"))).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/01 12:31
L18	81	((("DA") near3 ("SILVA") near3 ("Icaro") near3 ("L") near3 ("J"))).INV.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/01 12:31
L19	5	L17 and (target with (identifying or identification$1 or id$2)).clm.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/01 12:34
L20	2	L18 and (target with (identifying or identification$1 or id$2)).clm.	US-PGPUB; USPAT; USOCR	OR	OFF	2019/02/01 12:34
S1	10	"2016043502"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/01/31 12:03
S2	1	"15551209"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/01/31 12:07
S3	3	"15511209"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/01/31 12:07
S4	194	(handover adj message) same (target with (identifying or identification$1 or id$2))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/01/31 13:54
S5	187	S4 and (@rlad<"20161104" or @ad<"20161104")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/01/31 13:59

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PTO/SB/08a (01-10)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	
First Named Inventor	Janne Peisa
Art Unit	
Examiner Name	
Attorney Docket Number	P51679-US2

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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	1	2016043502	WO	A1	2016-03-24	Samsung Electronics Co., Ltd.		

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]

/JAY P PATEL/ 02/01/2019

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	
	First Named Inventor	Janne Peisa
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P51679-US2

	1	3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification (Release 14), 3GPP TS 36.331 V14.0.0 (September 2016).	
	2	3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2 (Release 14), 3GPP TS 36.300 V14.0.0 (September 2016).	
	3	ERICSSON, Inter-cell Handover in NR, R2-168730, 3GPP TSG-RAN WG2 Meeting #96, Reno, Nevada, USA, 14th-18th November 2016.	

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EXAMINER SIGNATURE

Examiner Signature	/JAY P PATEL/	Date Considered	02/01/2019

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

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

EFS Web 2.1.17

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	
	First Named Inventor	Janne Peisa
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P51679-US2

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

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

Signature	/Tim Gerlach/	Date (YYYY-MM-DD)	2018-12-06
Name/Print	Tim Gerlach	Registration Number	57,548

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour 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.**

02/01/2019

/JAY P PATEL/

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

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

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

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

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

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

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

/JAY P PATEL/ 02/01/2019

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/211,399	12/06/2018	Janne PEISA	P51679-US2

CONFIRMATION NO. 8997

27045
ERICSSON INC.
6300 LEGACY DRIVE
M/S EVR 1-C-11
PLANO, TX 75024

POA ACCEPTANCE LETTER

OC000000105190156

Date Mailed: 01/22/2019

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/11/2019.

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

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**.

/mteklemichael/

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/211,399	12/06/2018	Janne PEISA	P51679-US2	8997

27045 7590 01/18/2019

ERICSSON INC.
6300 LEGACY DRIVE
M/S EVR 1-C-11
PLANO, TX 75024

EXAMINER	
ART UNIT	PAPER NUMBER
1646	

NOTIFICATION DATE	DELIVERY MODE
01/18/2019	ELECTRONIC

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

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

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

michelle.sanderson@ericsson.com
pam.ewing@ericsson.com

Decision Granting Request for Prioritized Examination (Track I)	**Application No.** 16/211,399	**Applicant(s)** PEISA et al.	
	Examiner CHERYL P GIBSON BAYLOR	**Art Unit** OPET	**AIA (First Inventor to File) Status** Yes

1. THE REQUEST FILED 06 December 2018 IS **GRANTED** .

The above-identified application has met the requirements for prioritized examination

A. ☑ for an original nonprovisional application (Track I).
B. ☐ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination**. The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:

A. filing a **petition for extension of time** to extend the time period for filing a reply;

B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims** , or a multiple dependent claim;

C. filing a **request for continued examination** ;

D. filing a notice of appeal;

E. filing a request for suspension of action;

F. mailing of a notice of allowance;

G. mailing of a final Office action;

H. completion of examination as defined in 37 CFR 41.102; or

I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to CHERYL GIBSON BAYLOR at (571)272-3213. In his/her absence, calls may be directed to Petition Help Desk at (571) 272-3282.

/CHERYL GIBSON BAYLOR/ Paralegal Specialist, OPET	

Electronic Acknowledgement Receipt

EFS ID:	34836688
Application Number:	16211399
International Application Number:	
Confirmation Number:	8997
Title of Invention:	IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER
First Named Inventor/Applicant Name:	Janne PEISA
Customer Number:	27045
Filer:	Roger Scott Burleigh/Michelle Sanderson
Filer Authorized By:	Roger Scott Burleigh
Attorney Docket Number:	P51679-US2
Receipt Date:	11-JAN-2019
Filing Date:	06-DEC-2018
Time Stamp:	17:32:29
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	P51679-US2_2019-01-11_POA__.pdf	1952945 f157b7fea701e4540280863a0189fd1e973c d8f1	no	3

Warnings:

Information:	
Total Files Size (in bytes):	1952945

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

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

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

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

I hereby appoint:

■ Practitioners associated with Customer Number: 27045

OR

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

Name	Registration Number	Name	Registration Number

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

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

■ The address associated with Customer Number: 27045

OR

☐

Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address: TELEFONAKTIEBOLAGET L M ERICSSON (PUBL)
S-164 83 Stockholm, Sweden

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

SIGNATURE of Assignee of Record

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

Signature	/Roger S. Burleigh/	Date	2019-01-11
Name	Roger S. Burleigh	Telephone	469-266-1071
Title			

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

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

PTO/AIA/96 (08-12)
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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)

Application No./Patent No.: 16/211,399 Filed/Issue Date: December 6, 2018

Titled: IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER

TELEFONAKTIEBOLAGET L M ERICSSON (PUBL), a Swedish Corporation

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

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

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

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

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

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

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

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

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

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

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

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

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

1. From: Janne Peisa To: OY L M ERICSSON AB

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

   Reel 047690, Frame 0408, or for which a copy thereof is attached.

2. From: OY L M ERICSSON AB To: TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)

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

   Reel 047690, Frame 0613, or for which a copy thereof is attached.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: **Icaro L. J. da Silva** To: **TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)**

The document was recorded in the United States Patent and Trademark Office at
Reel 047690, Frame 0374, or for which a copy thereof is attached.

4. From: ..... To: .....

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5. From: ..... To: .....

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

6. From: ..... To: .....

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

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)

By: .....
Nina Macpherson
Sr. Vice President & General Counsel

By: .....
Christina Petersson
Vice President

[Page 2 of 2]

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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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
16/211,399	12/06/2018	1646	1720	P51679-US2	17	3

CONFIRMATION NO. 8997

FILING RECEIPT

27045
ERICSSON INC.
6300 LEGACY DRIVE
M/S EVR 1-C-11
PLANO, TX 75024

OC000000104726704

Date Mailed: 12/31/2018

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)

Janne PEISA, Espoo, FINLAND;
Icaro L. J. DA SILVA, Solna, SWEDEN;

Applicant(s)

TELEFONAKTIEBOLAGET LM ERICSSON (PUBL), Stockholm, SWEDEN;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of PCT/IB2017/056880 11/03/2017
which claims benefit of 62/417,714 11/04/2016

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 Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 12/27/2018

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/211,399**

Projected Publication Date: 04/11/2019

Non-Publication Request: No

Early Publication Request: No
Title

IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER

Preliminary Class

530

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.

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

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

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Title 35, United States Code, Section 184

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: 16/211,399

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760
TOTAL CLAIMS (37 CFR 1.16(i))	17 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*				x 460 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1720

APPLICATION AS AMENDED - PART II

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

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

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

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

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventors:	Janne Peisa, et al.	§	Group Art Unit:	Not Yet Assigned
		§		
Application No:	Not Yet Assigned	§	Examiner:	Not Yet Assigned
		§		
Filed:	Not Yet Assigned	§		

For: IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER

Via EFS-Web

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313.1450

CERTIFICATE OF TRANSMISSION BY EFS-WEB

I hereby certify that this paper or fee is being transmitted to the United States Patent and Trademark Office electronically via EFS-Web.

Date: December 6, 2018

Name: Michelle Sanderson

Signature: /Michelle Sanderson/

Dear Sir:

PRELIMINARY AMENDMENT

Please amend the application as follows prior to the substantive examination thereof:

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

Amendments to the Claims are reflected in the listing of claims which begins on page 3 of this paper.

Remarks begin on page 8 of this paper.

AMENDMENTS TO THE SPECIFICATION

Please add the following new paragraph on page 1 after the title:

RELATED APPLICATIONS

This application is a continuation of International Application No. PCT/IB2017/056880, filed November 3, 2017, which claims the benefit of U.S. Application No. 62/417,714, filed November 4, 2016, the disclosures of which are fully incorporated herein by reference.

Please replace the abstract from the International Application with the following rewritten new abstract, a clean version is attached hereto on a separate sheet.

In accordance with particular embodiments, there is disclosed herein a method performed by a wireless device for handover. The method comprises receiving a first handover message ~~(615)~~ from a source network node associated with a source cell. The first handover message comprises an identification of a target cell and access information associated with the target cell. The target cell is different than the source cell and comprises one or more beams. The method also includes identifying at least one beam ~~(620)~~ from among the one or more beams of the target cell. The at least one beam is identified based on the identification of the target cell and the access information from the first handover message. The method further includes accessing the target cell ~~(625)~~ using the identified at least one beam.

AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Currently Amended) A method performed by a wireless device for handover, the method comprising:

receiving a first handover message ~~(615)~~ from a source network node associated with a source cell, the first handover message comprising an identification of a target cell and access information associated with the target cell, wherein the target cell is different than the source cell and comprises one or more beams and the access information comprises beam related information;

identifying at least one beam ~~(620)~~ from among the one or more beams of the target cell based on the identification of the target cell and the access information from the first handover message; and

accessing the target cell ~~(625)~~ using the identified at least one beam.

2. (Original) The method of Claim 1, wherein the target cell is associated with a second network node, the second network node being different than the source network node.

3. (Currently Amended) The method of ~~any of Claims 1-2~~Claim 1, wherein the access information comprises Random Access Channel (RACH) information.

4. (Currently Amended) The method of ~~any of Claims 1-3~~Claim 1, wherein the target cell has at least two beams and the access information comprises an indication of allowed beams associated with the target cell, the allowed beams comprising fewer than all of the beams of the target cell.

5. (Original) The method of Claim 4, wherein the access information includes a random access preamble mapped to each of the allowed beams of the target cell.

6. (Currently Amended) The method of ~~any of Claims 4-5~~Claim 4, wherein the access information includes common random access configuration information and dedicated random access resources for the allowed beams.

7. (Currently Amended) The method of ~~any of Claims 1-6~~Claim 1, wherein accessing the target cell ~~(625)~~ using the identified at least one beam comprises accessing the target cell using a contention based random access procedure.

8. (Currently Amended) The method of ~~any of Claims 1-7~~Claim 1, wherein accessing the target cell ~~(625)~~ using the identified at least one beam comprises accessing the target cell without first reading system information associated with the target cell.

9. (Currently Amended) A wireless device for handover comprising:

a wireless interface ~~(211, 310)~~ configured to receive a first handover message from a source network node associated with a source cell, the first handover message comprising an identification of a target cell and access information associated with the target cell, wherein the target cell is different than the source cell and comprises one or more beams;

processing circuitry ~~(212, 315)~~ configured to identify at least one beam from among the one or more beams of the target cell based on the identification of the target cell and the access information from the first handover message; and

an input and output interface ~~(320, 325)~~ configured to receive input information and provide output information;

a power source ~~(335)~~ configured to provide power to the wireless interface, processing circuity and input and output interface; and

wherein the wireless interface ~~(211, 310)~~ is further configured to access the target cell using the identified at least one beam.

10. (Original) The wireless device of Claim 9, wherein the target cell is associated with a second network node, the second network node being different than the source network node.

11. (Currently Amended) The wireless device of ~~any of Claims 9-10~~Claim 9, wherein the access information comprises Random Access Channel (RACH) information.

12. (Currently Amended) The wireless device of ~~any of Claims 9-11~~Claim 9, wherein the target cell has at least two beams and the access information comprises an indication of allowed beams associated with the target cell, the allowed beams comprising fewer than all of the beams of the target cell.

13. (Original) The wireless device of Claim 12, wherein the access information includes a random access preamble mapped to each of the allowed beams of the target cell.

14. (Currently Amended) The wireless device of ~~any of Claims 12-13~~Claim 12, wherein the access information includes common random access configuration information and dedicated random access resources for the allowed beams.

15. (Currently Amended) The wireless device of ~~any of Claims 9-14~~Claim 9, wherein the wireless interface ~~(211, 310)~~ configured to access the target cell using the identified at least one beam is configured to access the target cell using a contention based random access procedure.

16. (Currently Amended) The wireless device of ~~any of Claims 9-15~~Claim 9, wherein the wireless interface ~~(211, 310)~~ configured to access the target cell using the identified at least one beam is configured to access the target cell without first reading system information associated with the target cell.

17. (Currently Amended) A wireless communication system for handover, the system comprising:

at least two network nodes ~~(220, 220a)~~;

at least one wireless device ~~(210)~~ wirelessly connected to a first of the at least two network nodes;

wherein the first network node~~(220)~~ is configured to:

determine access information associated with a second of the at least two network nodes for the at least one wireless device; and

prepare the access information associated with the second network node to be transmitted to the at least one wireless device; and

wherein the at least one wireless device ~~(210)~~ is configured to:

receive a handover message from the first network node, the handover message comprising an identification associated with the second network node and the access information associated with the second network node;

identify and select at least one beam from the second network node; and

access the second network node using the identified and selected at least one beam based on the access information from the handover message.

18-33. (Cancelled)

REMARKS

Claims 1-17, which were pending in the PCT, remain in this application. Claims 18-33 have been canceled. Claims 1, 3, 4, 6-9, 11-12, and 14-17 have been amended to remove unnecessary parenthetical references and to delete multiple claim dependencies. No new matter has been added.

Respectfully submitted,

/Tim Gerlach/

Tim Gerlach
Registration No. 57,548

Date: 12-6-18

Ericsson Inc.
6300 Legacy Drive, M/S EVR 1-C-11
Plano, Texas 75024

(469) 266-7137
tim.gerlach@ericsson.com

ABSTRACT

Please replace the current Abstract with the following:

In accordance with particular embodiments, there is disclosed herein a method performed by a wireless device for handover. The method comprises receiving a first handover message ~~(615)~~ from a source network node associated with a source cell. The first handover message comprises an identification of a target cell and access information associated with the target cell. The target cell is different than the source cell and comprises one or more beams. The method also includes identifying at least one beam ~~(620)~~ from among the one or more beams of the target cell. The at least one beam is identified based on the identification of the target cell and the access information from the first handover message. The method further includes accessing the target cell ~~(625)~~ using the identified at least one beam.

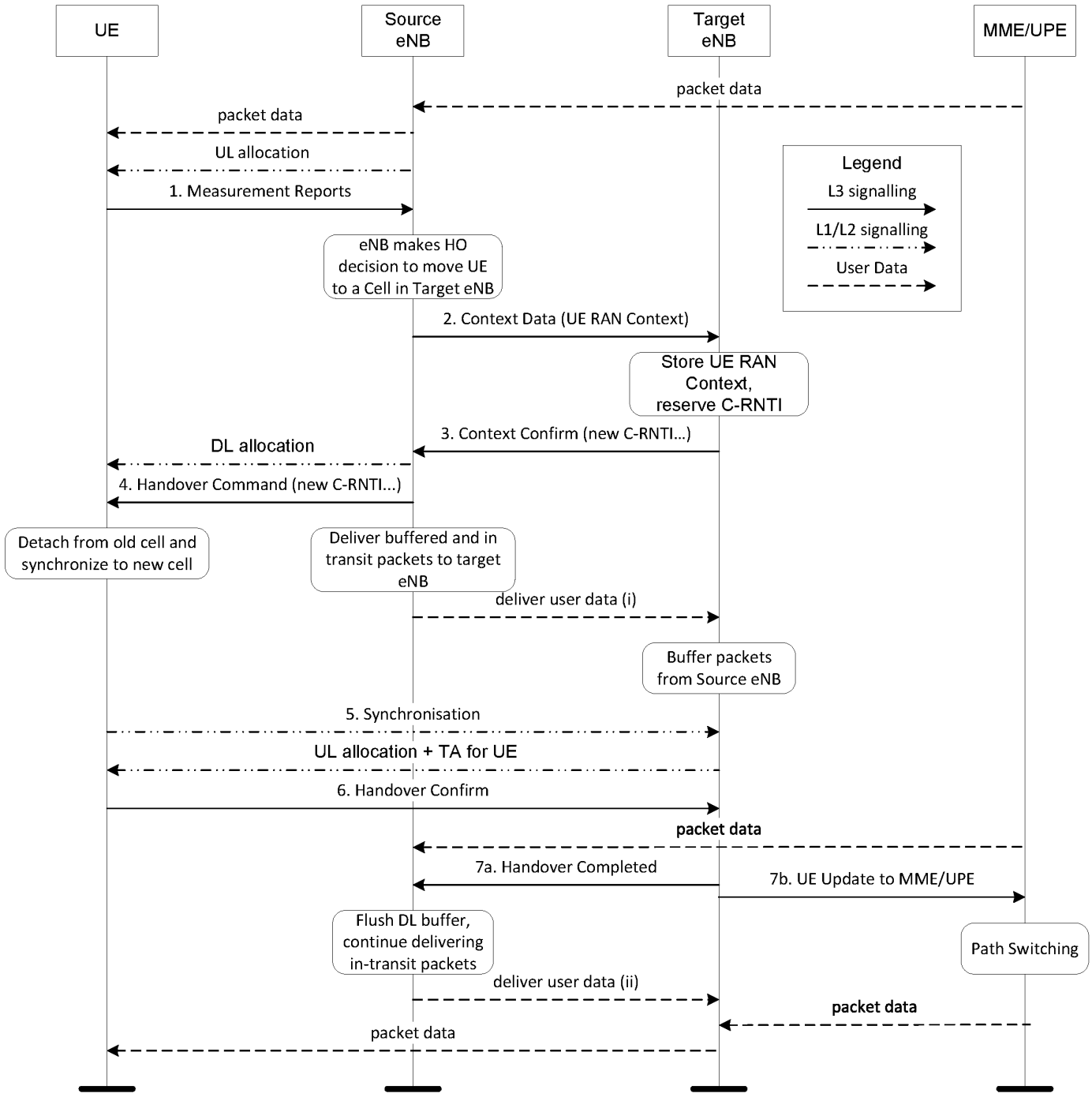


Figure 1

(prior art)

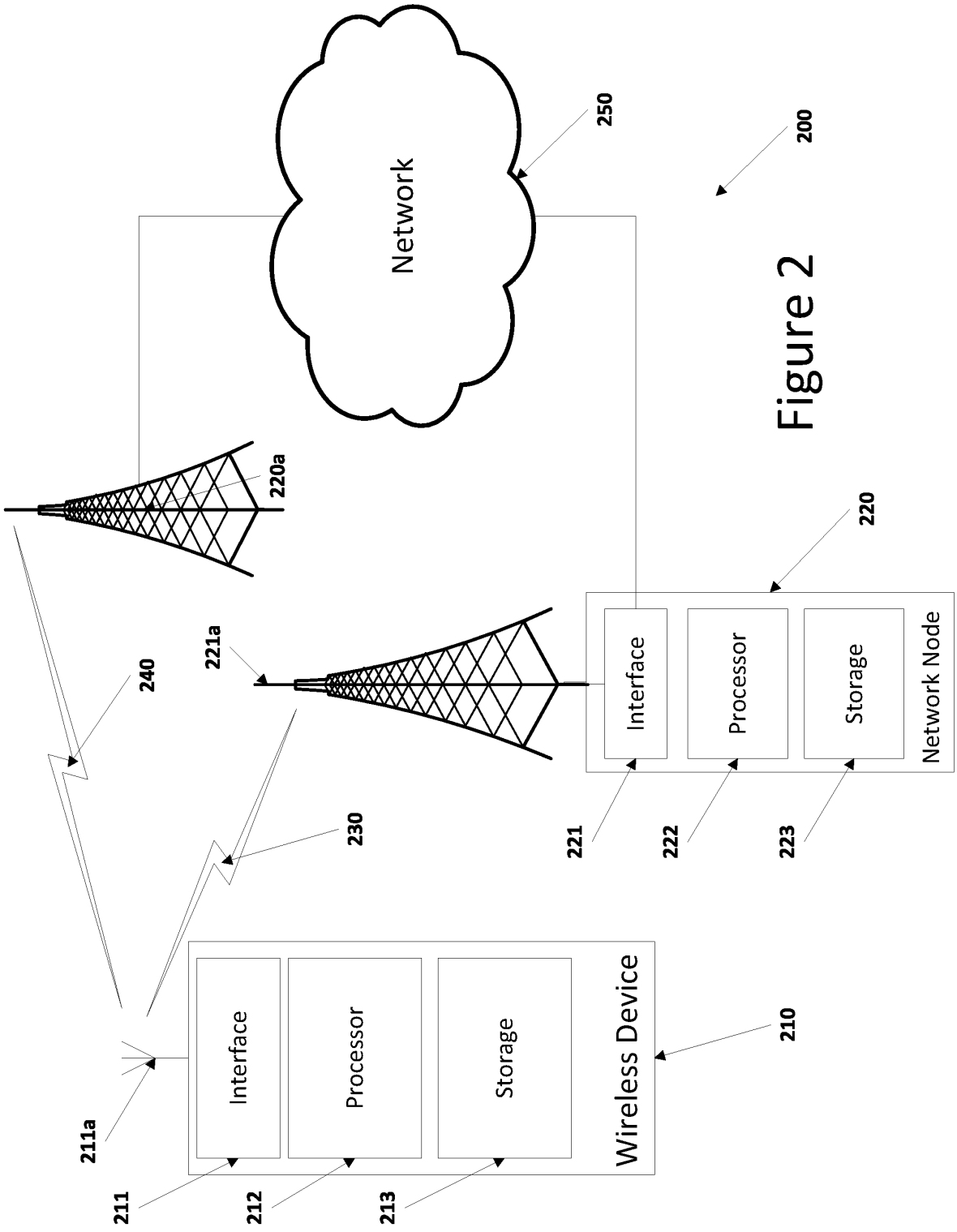

Network
250
200
220a
221a
240
230
220
Interface
Processor
Storage
Network Node
221
222
223
211a
Interface
Processor
Storage
Wireless Device
210
211
212
213

Figure 2

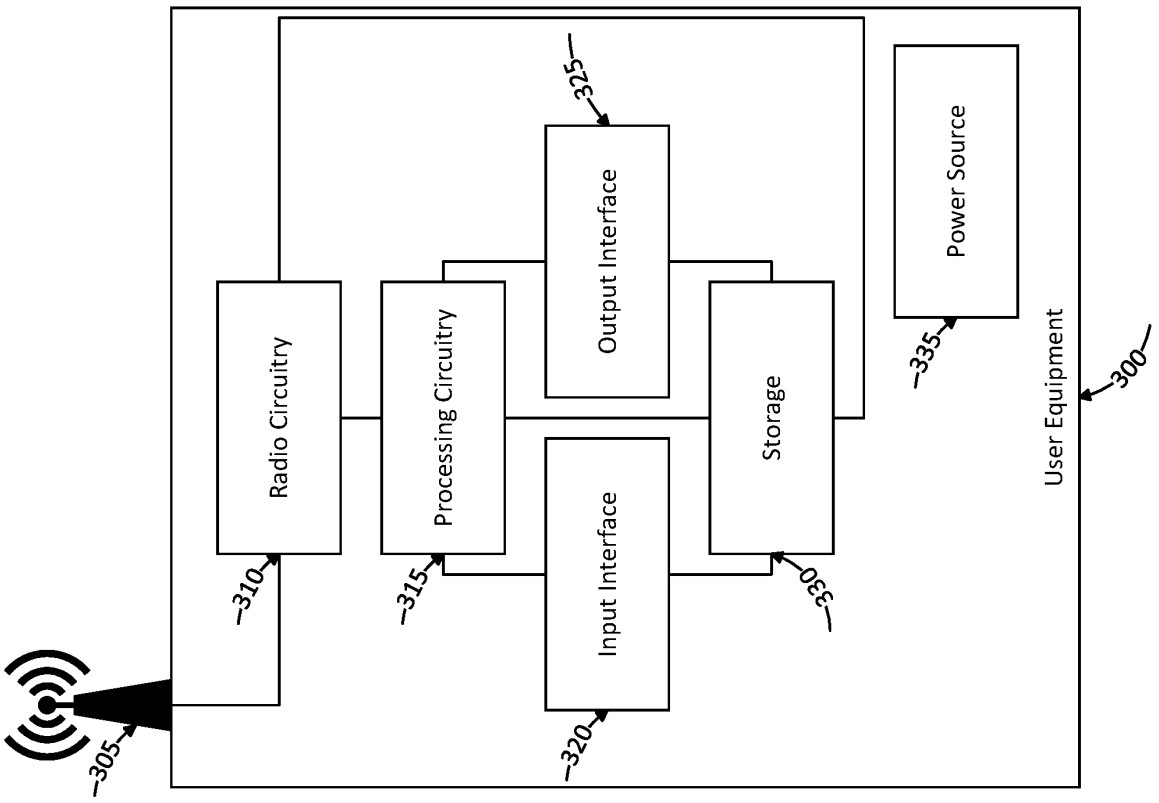

305
310
Radio Circuitry
315
Processing Circuitry
320
Input Interface
325
Output Interface
330
Storage
335
Power Source
User Equipment
300

Figure 3

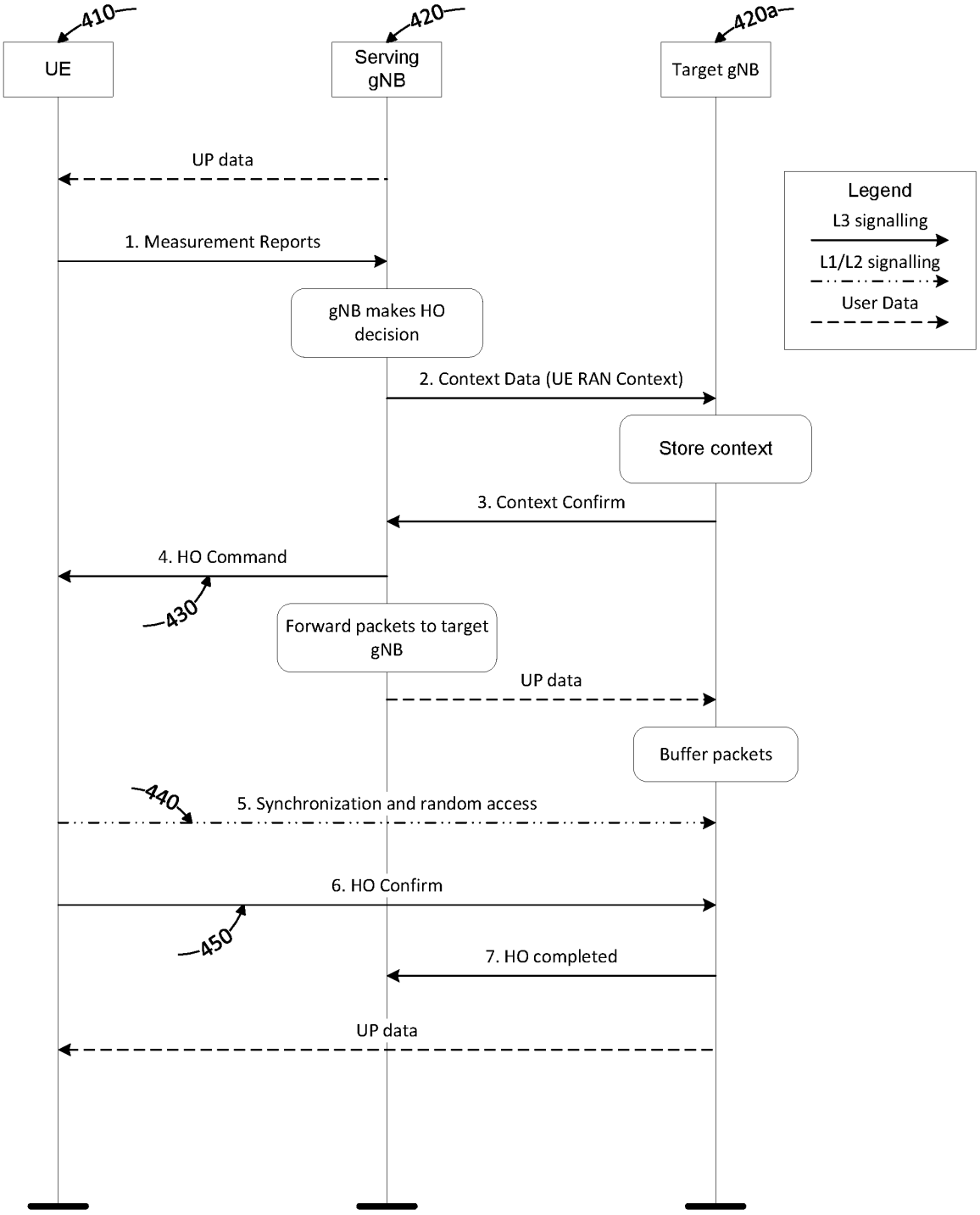

410
420
420a
UE
Serving gNB
Target gNB
UP data
Legend
L3 signalling
L1/L2 signalling
User Data
1. Measurement Reports
gNB makes HO decision
2. Context Data (UE RAN Context)
Store context
3. Context Confirm
4. HO Command
430
Forward packets to target gNB
UP data
Buffer packets
440
5. Synchronization and random access
6. HO Confirm
450
7. HO completed
UP data

Figure 4

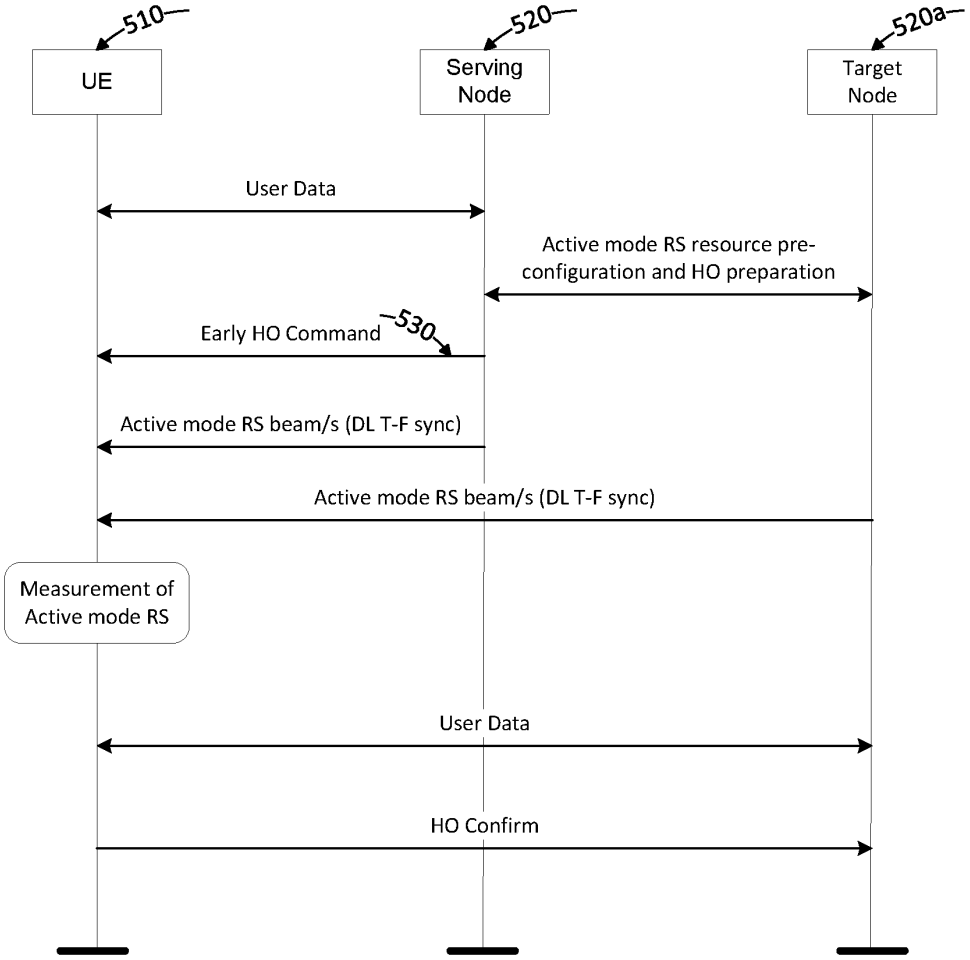
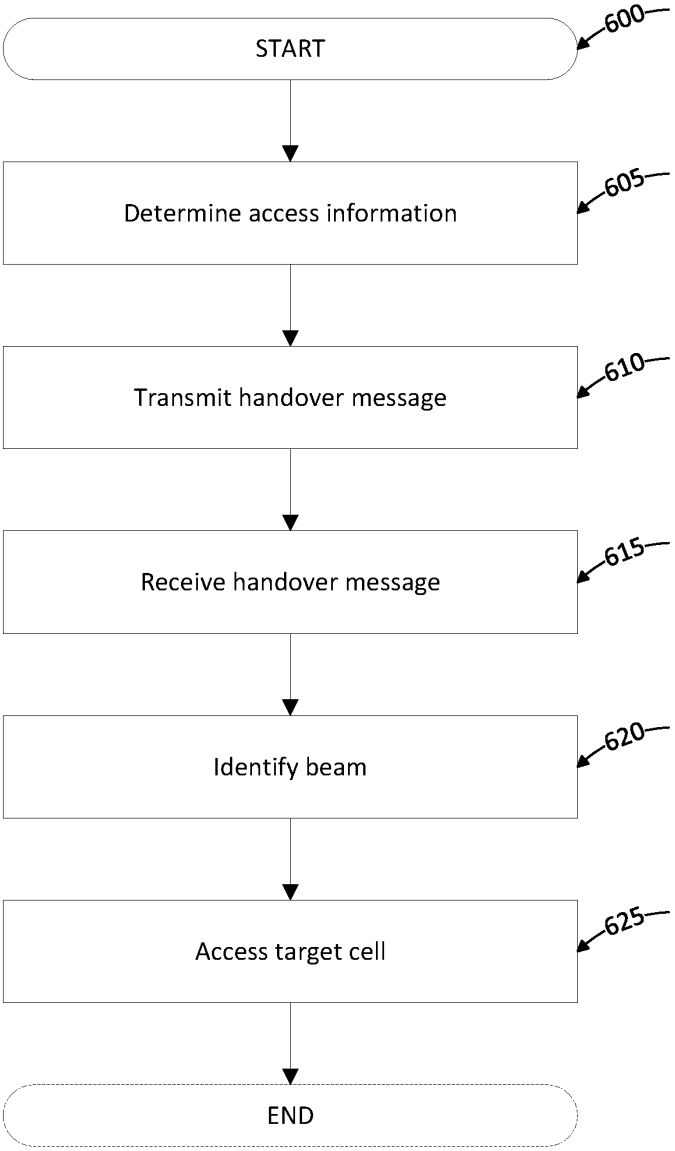

510
520
520a
UE
Serving Node
Target Node
User Data
Active mode RS resource pre-configuration and HO preparation
Early HO Command
530
Active mode RS beam/s (DL T-F sync)
Active mode RS beam/s (DL T-F sync)
Measurement of Active mode RS
User Data
HO Confirm

Figure 5

Figure 6


START
600
Determine access information
605
Transmit handover message
610
Receive handover message
615
Identify beam
620
Access target cell
625
END

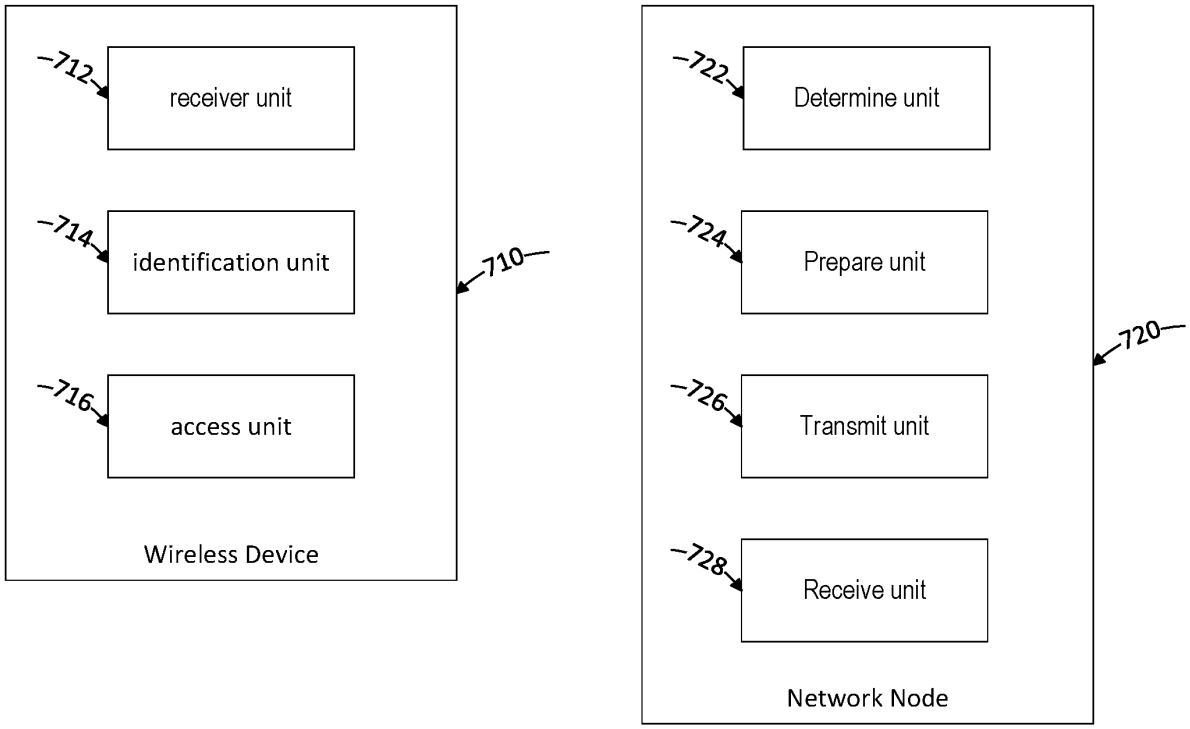

712
receiver unit
714
identification unit
716
access unit
Wireless Device
710
722
Determine unit
724
Prepare unit
726
Transmit unit
728
Receive unit
Network Node
720

Figure 7

Replaces PTO/AIA/01 (06-12)

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)	Attorney Docket Number	P51679 WO1

Title of Invention	Baseline Handover Procedure

As the below named inventor, I hereby declare that:

This declaration is directed to:

☐ The attached application, or

☒ United States application or PCT international application number PCT/IB2017/056880, filed on November 03, 2017

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.

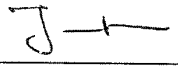
I have reviewed and understand the contents of the above identified application, including the claims, as amended by any amendment specifically referred to above.

I am aware of the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

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.

LEGAL NAME OF INVENTOR

Inventor: Janne Peisa Date (Optional):

Signature: 

Replaces PTO/AIA/01 (06-12)

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)	Attorney Docket Number	P51679 WO1

Title of Invention	Baseline Handover Procedure

As the below named inventor, I hereby declare that:

This declaration is directed to:

☐ The attached application, or

☒ United States application or PCT international application number PCT/IB2017/056880, filed on November 03, 2017

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 above identified application, including the claims, as amended by any amendment specifically referred to above.

I am aware of the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

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.

LEGAL NAME OF INVENTOR

Inventor: Icaro L. J. da Silva Date (Optional):

Signature: Icaro Silva 6th April 2018

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	P51679-US2
	Application Number	
Title of Invention	IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER	

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

Secrecy Order 37 CFR 5.2:

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

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Janne		PEISA	

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

City	Espoo	Country of Residence [i]	FI

Mailing Address of Inventor:

Address 1	Koivunlehväkuja 3
Address 2	
City	Espoo
State/Province	
Postal Code	FI-02130
Country [i]	FI

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Icaro L. J.		DA SILVA	

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

City	Solna	Country of Residence [i]	SE

Mailing Address of Inventor:

Address 1	Bergshamra Alle 175
Address 2	
City	Solna
State/Province	
Postal Code	SE-170 77
Country [i]	SE

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

Correspondence Information:

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	P51679-US2
	Application Number	
Title of Invention	IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER	

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	27045		
Email Address	patent.development@ericsson.com	Add Email	Remove Email

Application Information:

Title of the Invention	IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER		
Attorney Docket Number	P51679-US2	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	7	**Suggested Figure for Publication (if any)**	

Filing By Reference:

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

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

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

Publication Information:

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

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

Representative Information:

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

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	27045		

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	P51679-US2
	Application Number	
Title of Invention	IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER	

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	PCT/IB2017/056880	2017-11-03
Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
PCT/IB2017/056880	Claims benefit of provisional	62/417714	2016-11-04

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

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. 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(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

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

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

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

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	P51679-US2
	Application Number	
Title of Invention	IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is 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 State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	P51679-US2
	Application Number	
Title of Invention	IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER	

Applicant Information:

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

Applicant 1 Remove

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

Clear

● Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

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

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)		
Mailing Address Information For Applicant:			
Address 1	SE-164 83		
Address 2			
City	Stockholm	**State/Province**	
Country	SE	Postal Code	SE-164 83
Phone Number		Fax Number	
Email Address	patent.development@ericsson.com		

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

Assignee Information including Non-Applicant Assignee Information:

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	P51679-US2
	Application Number	
Title of Invention	IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Tim Gerlach/			Date (YYYY-MM-DD)	2018-12-06
First Name	Tim	Last Name	Gerlach	Registration Number	57548

Additional Signature may be generated within this form by selecting the Add button. Add

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

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	P51679-US2
	Application Number	
Title of Invention	IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER	

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

Privacy Act Statement

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

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

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

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

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

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

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

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

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

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

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

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	
First Named Inventor	Janne Peisa
Art Unit	
Examiner Name	
Attorney Docket Number	P51679-US2

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Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	
	First Named Inventor	Janne Peisa
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P51679-US2

	1	3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification (Release 14), 3GPP TS 36.331 V14.0.0 (September 2016).	
	2	3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2 (Release 14), 3GPP TS 36.300 V14.0.0 (September 2016).	
	3	ERICSSON, Inter-cell Handover in NR, R2-168730, 3GPP TSG-RAN WG2 Meeting #96, Reno, Nevada, USA, 14th-18th November 2016.	

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	Application Number	
	Filing Date	
	First Named Inventor	Janne Peisa
	Art Unit	
	Examiner Name	
	Attorney Docket Number	P51679-US2

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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

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OR

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Signature	/Tim Gerlach/	Date (YYYY-MM-DD)	2018-12-06
Name/Print	Tim Gerlach	Registration Number	57,548

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Electronic Patent Application Fee Transmittal	
Application Number:	
Filing Date:	
Title of Invention:	IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER
First Named Inventor/Applicant Name:	Janne PEISA
Filer:	Roger Scott Burleigh/Michelle Sanderson
Attorney Docket Number:	P51679-US2
Filed as Large Entity	

Filing Fees for Track I Prioritized Examination - Nonprovisional Application under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	300	300
UTILITY SEARCH FEE	1111	1	660	660
UTILITY EXAMINATION FEE	1311	1	760	760
REQUEST FOR PRIORITIZED EXAMINATION	1817	1	4000	4000
Pages:				
Claims:				
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
PROCESSING FEE, EXCEPT PROV. APPLS.	1830	1	140	140
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**5860**

Electronic Acknowledgement Receipt	
EFS ID:	34501930
Application Number:	16211399
International Application Number:	
Confirmation Number:	8997
Title of Invention:	IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER
First Named Inventor/Applicant Name:	Janne PEISA
Customer Number:	27045
Filer:	Roger Scott Burleigh/Michelle Sanderson
Filer Authorized By:	Roger Scott Burleigh
Attorney Docket Number:	P51679-US2
Receipt Date:	06-DEC-2018
Filing Date:	
Time Stamp:	11:16:01
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$5860
RAM confirmation Number	120618INTEFSW00021024501379
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	TrackOne Request	P51679-US2_2018-12-06_18-6619_Track_One_Request.pdf	126296 bcda650dffdc9ffb174fe8b7b89422a0302db0d0	no	2
Warnings:					
Information:					
2		P51679-US2_2018-12-06_18-6619_Application.pdf	164309 c46e38a2ce70d3d7faf0d8e0ec972d06d597584f	yes	28

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Specification	1	21
	Claims	22	27
	Abstract	28	28

Warnings:					
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3		P51679-US2_2018-12-06_18-6619_Preliminary_Amendment.pdf	83351 b0360488eb00846776c3258684558cd47f3ba817	yes	9

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Preliminary Amendment	1	1
	Specification	2	2
	Claims	3	7
	Applicant Arguments/Remarks Made in an Amendment	8	8

	Abstract		9	9	
Warnings:					
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4	Drawings-only black and white line drawings	P51679-US2_2018-12-06_18-6619_Drawings.pdf	369313 02502ee6ada085d429fde793b16dcb8a116d6e65	no	7
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Information:					
5	Oath or Declaration filed	P51679-US2_2018-12-06_18-6619_Declaration.pdf	507633 afc8e5bb75ebeeca8dc78657ec704444e04f39b4	no	2
Warnings:					
Information:					
6	Application Data Sheet	P51679-US2_2018-12-06_18-6619_ADS.pdf	1793499 88cdf4e2976891bfc94a354d67786349011701l4	no	8
Warnings:					
Information:					
7	Information Disclosure Statement (IDS) Form (SB08)	P51679-US2_2018-12-06_18-6619_IDS.pdf	612506 ff835a7d6bd6cc80165aa296f3eb3643172c2b57	no	4
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8	Foreign Reference	Refs_WO2016043502.pdf	1060783 48966fe5989d50bd3bbe2ac4449db6c6eecf1d50	no	54
Warnings:					
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9	Non Patent Literature	Refs_3GPP_TS_36_331__1_of_7.pdf	2028881 fa6d69dc32ca2aff138441f84908ff7bb3a76e0a	no	92
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10	Non Patent Literature	Refs_3GPP_TS_36_331__2_of_7.pdf	1854609 6e01c6e92a3e0c4fbf24f155a28d2e16c3ecfa1a	no	92
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11	Non Patent Literature	Refs_3GPP_TS_36_331__3_of_7.pdf	2547887 2ec65520f8b1db0fae717bb41b8b9a179b54d5fb	no	92
Warnings:					
Information:					
12	Non Patent Literature	Refs_3GPP_TS_36_331__4_of_7.pdf	3122729 c384d898ef137db692e481ca51b318be5fbc7916	no	92
Warnings:					
Information:					
13	Non Patent Literature	Refs_3GPP_TS_36_331__5_of_7.pdf	2878789 3835c13106ec8b32c5f99fecef6dd6d8e90eb108	no	92
Warnings:					
Information:					
14	Non Patent Literature	Refs_3GPP_TS_36_331__6_of_7.pdf	2802451 a5ca5907112f1c612ba44a3a96e1096de54fedf4	no	92
Warnings:					
Information:					
15	Non Patent Literature	Refs_3GPP_TS_36_331__7_of_7.pdf	2557215 81a15b8b4349f7742763793b07e867597078b2a4	no	92
Warnings:					
Information:					
16	Non Patent Literature	Refs_3GPP_TS_36_300__1_of_3.pdf	2192669 0b0e68fa5022a8b48a6d9395310b1fa9c95c4f61	no	104
Warnings:					
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17	Non Patent Literature	Refs_3GPP_TS_36_300__2_of_3.pdf	2273897 463db2b71f7bdc8a93475eeb92b25b16179bc01c	no	104
Warnings:					
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18	Non Patent Literature	Refs_3GPP_TS_36_300__3_of_3.pdf	2282839 62bfe908c7a0cd814aa6b343dabce7bdbad5429a	no	106
Warnings:					
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19	Non Patent Literature	Refs_Inter-cell_Handover_in_NR.pdf	143993 1edd8aa6a2761b4c394d9287d2fc4f1e18177e60	no	7
Warnings:					
Information:					
20	Fee Worksheet (SB06)	fee-info.pdf	40328 203f502e1dd25bb844f4c1b8c8ac8779e5ec4121	no	2
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		Total Files Size (in bytes):	29443977		

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Doc Code: TRACK1.REQ
Document Description: TrackOne Request

PTO/AIA/424 (04-14)

CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION UNDER 37 CFR 1.102(e) (Page 1 of 1)

First Named Inventor:	Janne Peisa	Nonprovisional Application Number (if known):	
Title of Invention:	IDENTIFYING A BEAM FOR ACCESSING A TARGET CELL OF A WIRELESS HANOVER		

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.

1. The processing fee set forth in 37 CFR 1.17(i)(1) and the prioritized examination fee set forth in 37 CFR 1.17(c) have been filed with the request. The publication fee requirement is met because that fee, set forth in 37 CFR 1.18(d), is currently $0. The basic filing fee, search fee, and examination fee are filed with the request or have been already been paid. I understand that any required excess claims fees or application size fee must be paid for the application.

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3. The applicable box is checked below:

I. ☑ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)

i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.

---OR---

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ii. An executed inventor's oath or declaration under 37 CFR 1.63 or 37 CFR 1.64 for each inventor, **or** the application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) is filed with the application.

II. ☐ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)

i. A request for continued examination has been filed with, or prior to, this form.
ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
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v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

Signature /Tim Gerlach/	Date 2018-12-06
Name (Print/Typed) Tim Gerlach	Practitioner Registration Number 57,548

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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.
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WIRELESS HANDOVER

TECHNICAL FIELD

Embodiments presented herein relate to wireless handover, and in particular to methods, network nodes, wireless devices, computer programs, or computer program products for wireless handover.

BACKGROUND

One of the design goals of the New Radio (NR) for 5G wireless communication is to support operation on high frequencies (e.g., 28 GHz), where massive beamforming is needed to maintain adequate radio coverage. This has an impact on a number of system functions, including mobility procedures such as handover (HO). The HO procedure used in legacy long term evolution (LTE) (e.g., 4G wireless communication) is depicted in Figure 1.

In legacy wireless communication systems, the user equipment (UE) has been configured with event based report triggering criteria. Once a triggering criterion has been met, the UE sends a measurement report to the source eNB (the eNB to which the UE is currently connected) via radio resource control (RRC). The measurement reporting parameters provided by the network aim to minimize both ping-pong as well as handover failures. For intra-frequency mobility this is typically achieved by configuring an A3 measurement event so that a report is triggered when a neighbour cell is found to be a few dB better than the serving cell. Due to measurement errors in bad radio conditions and due to the necessary filtering, the actual difference in signal strength may be worse than anticipated by the configured event threshold. A consequence of this is that many measurement reports and the subsequent mobility related RRC signalling are exchanged in challenging radio conditions and are hence error prone.

The mechanisms designed in LTE for mobility do not provide sufficient mechanisms for mobility in beam based systems. In particular, in a beam-based system like NR, and especially in higher frequency bands, the serving radio link to the UE may become impaired much more rapidly than in conventional LTE deployments. As the UE is moving out of the current serving beam coverage area, it may not be possible to conduct RRC signalling via the serving node to complete the HO procedure.

SUMMARY

An object of embodiments herein is to provide mobility mechanisms, such as handover, that support beam based systems. According to certain embodiments, a method performed by a wireless device for handover includes receiving a first handover message from a source network node associated with a source cell. The first handover message includes an identification of a target cell and access information associated with the target cell. The target cell is different than the source cell and comprises one or more beams. The access information includes beam related information. The method also includes identifying at least one beam from among the one or more beams of the target cell based on the identification of the target cell and the access information from the first handover message. The method additionally includes accessing the target cell using the identified at least one beam.

In some embodiments, the target cell is associated with a second network node that is different than the source network node. In certain embodiments, the access information comprises Random Access Channel (RACH) information. In particular embodiments the target cell has at least two beams. In such embodiments, the access information may comprise an indication of allowed beams associated with the target cell. The allowed beams may be fewer than all of the beams of the target cell. In some embodiments, the access information may include a random access preamble that is mapped to each of the allowed beams of the target cell. In certain embodiments, the access information includes common random access configuration information and dedicated random access resources for the allowed beams. In certain embodiments, accessing the target cell using the identified at least one beam may comprise accessing the target cell using a contention based random access procedure. In particular embodiments, accessing the target cell using the identified at least one beam may comprise accessing the target cell without first reading system information associated with the target cell.

According to certain embodiments, a wireless device for handover includes a wireless interface configured to receive a first handover message from a source network node. The source network node is associated with a source cell. The first handover message includes an identification of a target cell and access information associated with the target cell. The target cell is different than the source cell and comprises one or more beams. The wireless device also includes processing circuitry configured to identify at least one beam from among the one or more beams of the target cell based on the identification of the target cell and the access information from the first handover message. The wireless device also includes an input and output interface that is configured to receive input information and provide output information. The wireless device further includes a power source that is configured to provide power to the wireless interface, processing circuity and input and output interface. The wireless interface is further configured to access the target cell using the identified at least one beam.

In accordance with certain embodiments, a wireless communication system for handover includes at least two network nodes. The wireless communication system also includes at least one

wireless device wirelessly connected to a first of the at least two network nodes. The first network node is configured to determine access information associated with a second of the at least two network nodes for the at least one wireless device. The first network node is also configured to prepare the access information associated with the second network node to be transmitted to the at least one wireless device. The at least one wireless device is configured to receive a handover message from the first network node. The handover message comprising an identification associated with the second network node and the access information associated with the second network node. The at least one wireless device is also configured to identify and select at least one beam from the second network node. The at least one wireless device is further configured to access the second network node using the identified and selected at least one beam based on the access information from the handover message.

In accordance with certain embodiments, a wireless device for handover comprises a processor and computer readable storage media. The storage media contains instructions that are executable by the processor. When the instructions are executed, the wireless device is operative to receive a first handover message from a source network node associated with a source cell. The first handover message comprises an identification of a target cell and access information associated with the target cell. The target cell is different than the source cell and comprises one or more beams. The wireless device is also operative to identify at least one beam from among the one or more beams of the target cell based on the identification of the target cell and the access information from the first handover message. The wireless device is additionally operative to access the target cell using the identified at least one beam.

In accordance with some embodiments, a wireless device for handover comprises a receiver unit configured to receive a first handover message from a source network node associated with a source cell. The first handover message comprises an identification of a target cell and access information associated with the target cell. The target cell is different than the source cell and comprises one or more beams. The wireless device also comprises an identification unit configured to identify at least one beam from among the one or more beams of the target cell based on the identification of the target cell and the access information from the first handover message. The wireless device further includes an access unit configured to access the target cell using the identified at least one beam.

Advantageously one or more embodiments provide additional information in the contents of the handover command related to target beams in neighbouring cells. Additionally, one or more embodiments provide an extension of the synchronization and random access procedure to allow for the selection of a beam in the target cell. Certain embodiments further provide the ability to associate the handover command with a condition (e.g., RRCConnectionReconfiguration with mobilityControlInfo). As soon as the UE determines the condition to be fulfilled, it executes the handover in accordance with the handover command.

Generally, all terms used in the claims are to be interpreted according to their ordinary meaning in the technical field, unless explicitly defined otherwise herein. All references to "a/an/the element, apparatus, component, means, step, etc." are to be interpreted openly as referring to at least one instance of the element, apparatus, component, means, step, etc., unless explicitly stated otherwise. The steps of any method disclosed herein do not have to be performed in the exact order disclosed, unless explicitly stated.

It is to be noted that any feature of any of the above embodiments may be applied to any other embodiment, wherever appropriate. Likewise, any advantage of any of the embodiments herein may apply to the other embodiments, and vice versa. Other objectives, features and advantages of the enclosed embodiments will be apparent from the following detailed disclosure, attached claims, and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Particular embodiments are now described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 illustrates a signalling diagram for active mode mobility in legacy LTE wireless communication systems;

Figure 2 illustrates a block diagram of a wireless network in accordance with particular embodiments;

Figure 3 illustrates a block diagram of a user equipment in accordance with particular embodiments;

Figure 4 illustrates a signalling diagram of a handover in accordance with particular embodiments;

Figure 5 illustrates a signalling diagram of a conditional handover execution based on downlink received signal measurements, in accordance with particular embodiments;

Figure 6 illustrates a flowchart of a method for wireless handover, in accordance with particular embodiments; and

Figure 7 illustrates a block diagram of the functional units of a wireless device and a network node, in accordance with particular embodiments.

DETAILED DESCRIPTION

Some of the embodiments contemplated by the claims will now be described more fully hereinafter with reference to the accompanying drawings. Other embodiments, however, are contained within the scope of the claims and the claims should not be construed as limited to only the embodiments set forth herein; rather, these embodiments are provided by way of example so that this disclosure will assist in conveying the inventive concept to those skilled in the art. Like numbers refer to like elements throughout the description.

Although the embodiments described herein may be implemented in any appropriate type of system using any suitable components, particular embodiments described herein may be implemented in a wireless network such as the example wireless communication network illustrated in Figure 2. In the example embodiment illustrated in Figure 2, the wireless communication network provides communication and other types of services to one or more wireless devices. In the illustrated embodiment, the wireless communication network includes network nodes 220 and 220a that facilitate wireless device 210's access to and/or use of the services provided by and through the wireless communication network. The wireless communication network may further include any additional elements suitable to support communication between wireless devices or between a wireless device and another communication device, such as a landline telephone.

Network 250 may comprise one or more backbone networks, IP networks, public switched telephone networks (PSTNs), packet data networks, optical networks, wide area networks (WANs), local area networks (LANs), wireless local area networks (WLANs), wired networks, wireless networks, metropolitan area networks, and other networks to enable communication between devices.

The wireless communication network may represent any type of communication, telecommunication, data, cellular, and/or radio network or other type of system. In particular embodiments, the wireless communication network may be configured to operate according to specific standards or other types of predefined rules or procedures. Thus, particular embodiments of the wireless communication network may implement communication standards, such as Global System for Mobile Communications (GSM), Universal Mobile Telecommunications System (UMTS), Long Term Evolution (LTE), and/or other suitable 2G, 3G, 4G, or 5G standards; wireless local area network (WLAN) standards, such as the IEEE 802.11 standards; and/or any other appropriate wireless communication standard, such as the Worldwide Interoperability for Microwave Access (WiMax), Bluetooth, and/or ZigBee standards.

Figure 2 illustrates a wireless network comprising a more detailed view of network node 220 and wireless device (WD) 210, in accordance with a particular embodiment. For simplicity, Figure 2 only depicts network 250, network nodes 220 and 220a, and WD 210. The detailed view of network node 220 comprises the hardware components of interface 221, antenna 221a (may be referred to collectively

as an interface or a wireless interface), processor 222, and storage 223. Similarly, the detailed view of WD 210 comprises the hardware components of interface 211 and antenna 211a (may be referred to collectively as interface or wireless interface) processor 212, and storage 213. These components may work together in order to provide network node and/or wireless device functionality, such as providing wireless connections in a wireless network and/or facilitating in the handover of wireless connections in a beam based network. In different embodiments, the wireless network may comprise any number of wired or wireless networks, network nodes, base stations, controllers, wireless devices, relay stations, and/or any other components that may facilitate or participate in the communication of data and/or signals whether via wired or wireless connections.

A network node may refer to equipment capable, configured, arranged and/or operable to communicate directly or indirectly with a wireless device and/or with other equipment in the wireless communication network that enable and/or provide wireless access to the wireless device or which provide some service to a wireless device that has accessed the wireless communication network. Examples of network nodes include, but are not limited to, access points (APs), in particular radio access points, and base stations (BSs), such as radio base stations. Particular examples of radio base stations include Node Bs, and evolved Node Bs (eNBs). Base stations may be categorized based on the amount of coverage they provide (or, stated differently, their transmit power level) and may then also be referred to as femto base stations, pico base stations, micro base stations, or macro base stations. A network node may also include one or more (or all) parts of a distributed radio base station such as centralized digital units and/or remote radio units (RRUs), sometimes referred to as Remote Radio Heads (RRHs). Such remote radio units may or may not be integrated with an antenna as an antenna integrated radio. Parts of a distributed radio base station may also be referred to as nodes in a distributed antenna system (DAS). As a particular non-limiting example, a base station may be a relay node or a relay donor node controlling a relay node.

Yet further examples of network nodes include multi-standard radio (MSR) radio equipment such as MSR BSs, network controllers such as radio network controllers (RNCs) or base station controllers (BSCs), base transceiver stations (BTSs), transmission points, transmission nodes, Multi-cell/multicast Coordination Entities (MCEs), core network nodes (e.g., MSCs, MMEs), O&M nodes, OSS nodes, SON nodes, positioning nodes (e.g., E-SMLCs), and/or MDTs.

In Figure 2, the components of network node 220 are depicted as single boxes located within a single larger box. In practice however, a network node may comprise multiple different physical components that make up a single illustrated component (e.g., interface 221 may comprise terminals for coupling wires for a wired connection and a radio transceiver for a wireless connection). As another example, network node 220 may be a virtual network node in which multiple different physically separate components interact to provide the functionality of network node 220 (e.g., processor 222 may comprise

three separate processors located in three separate enclosures, where each processor is responsible for a different function for a particular instance of network node 220). Similarly, network node 220 may be composed of multiple physically separate components (e.g., a NodeB component and a RNC component, a BTS component and a BSC component, etc.), which may each have their own respective processor, storage, and interface components. In certain scenarios in which network node 220 comprises multiple separate components (e.g., BTS and BSC components), one or more of the separate components may be shared among several network nodes. For example, a single RNC may control multiple NodeB's. In such a scenario, each unique NodeB and RNC pair may be considered a separate network node. In some embodiments, network node 220 may be configured to support multiple radio access technologies (RATs). In such embodiments, some components may be duplicated (e.g., separate storage 223 for the different RATs) and some components may be reused (e.g., the same antenna 221a may be shared by the RATs).

Processor 222 may be a combination of one or more of a microprocessor, controller, microcontroller, central processing unit, digital signal processor, application specific integrated circuit, field programmable gate array, or any other suitable computing device, resource, or combination of hardware and software and/or encoded logic operable to provide, either alone or in conjunction with other network node 220 components, such as storage 223, network node 220 functionality. For example, processor 222 may execute instructions stored in storage 223. Such functionality may include providing various wireless features discussed herein to a wireless device, such as WD 210, including any of the features or benefits disclosed herein.

Storage 223 may comprise any form of non-transitory volatile or non-volatile computer readable memory including, without limitation, persistent storage, solid state memory, remotely mounted memory, magnetic media, optical media, random access memory (RAM), read-only memory (ROM), removable media, or any other suitable local or remote memory component. Storage 223 may store any suitable instructions, data or information, including software and/or encoded logic, utilized by network node 220. Storage 223 may be used to store any calculations made by processor 222 and/or any data received via interface 221.

Network node 220 also comprises interface 221 which may be used in the wired or wireless communication of signalling and/or data between network node 220, network 250, and/or WD 210. For example, interface 221 may perform any formatting, coding, or translating that may be needed to allow network node 220 to send and receive data from network 250 over a wired connection. Interface 221 may also include a radio transmitter and/or receiver that may be coupled to or a part of antenna 221a. The radio may receive digital data that is to be sent out to other network nodes or WDs via wireless connections. The radio may convert the digital data into a radio signal having the appropriate channel

and bandwidth parameters. The radio signal may then be transmitted via antenna 221a to the appropriate recipient (e.g., WD 210). The radio signal may comprise one or more beams.

Antenna 221a may be any type of antenna capable of transmitting and receiving data and/or signals wirelessly. In some embodiments, antenna 221a may comprise one or more omni-directional, sector or panel antennas operable to transmit/receive radio signals between, for example, 1 GHz and 100 GHz. An omni-directional antenna may be used to transmit/receive radio signals in any direction, a sector antenna may be used to transmit/receive radio signals from devices within a particular area, and a panel antenna may be a line of sight antenna used to transmit/receive radio signals in a relatively straight line.

A wireless device (WD) may refer to a device capable, configured, arranged and/or operable to communicate wirelessly with network nodes and/or other wireless devices. Communicating wirelessly may involve transmitting and/or receiving wireless signals using electromagnetic signals, radio waves, infrared signals, and/or other types of signals suitable for conveying information through air. In particular embodiments, a wireless device may be configured to transmit and/or receive information without direct human interaction. For instance, a wireless device may be designed to transmit information to a network on a predetermined schedule, when triggered by an internal or external event, or in response to requests from the network. Examples of wireless devices include, but are not limited to, user equipment (UE) such as smart phones. Further examples include wireless cameras, wireless-enabled tablet computers, laptop-embedded equipment (LEE), laptop-mounted equipment (LME), USB dongles, and/or wireless customer-premises equipment (CPE). In some embodiments, a wireless device may support device-to-device (D2D) communication, for example by implementing a 3GPP standard for sidelink communication, and may in this case be referred to as a D2D communication device.

As one specific example, a wireless device may represent a UE configured for communication in accordance with one or more communication standards promulgated by the 3rd Generation Partnership Project (3GPP), such as 3GPP's GSM, UMTS, LTE, and/or 5G standards. A UE may not necessarily have a "user" in the sense of a human user who owns and/or operates the relevant device. Instead, a UE may represent a device that is intended for sale to, or operation by, a human user but that may not initially be associated with a specific human user, such as smart sensors or smart meters. The features, functionality, steps, and benefits described with respect to a WD may be equally applicable to a UE and vice versa.

As yet another specific example, in an Internet of Things (IoT) scenario, a wireless device may represent a machine or other device that performs monitoring and/or measurements, and transmits the results of such monitoring and/or measurements to another wireless device and/or a network node. The wireless device may in this case be a machine-to-machine (M2M) device, which may in a 3GPP context be referred to as a machine-type communication (MTC) device. As one particular example, the wireless

device may be a UE implementing the 3GPP narrow band internet of things (NB-IoT) standard. Particular examples of such machines or devices are sensors, metering devices such as power meters, industrial machinery, or home or personal appliances, e.g. refrigerators, televisions, personal wearables such as watches etc. In other scenarios, a wireless device may represent a vehicle or other equipment that is capable of monitoring and/or reporting on its operational status or other functions associated with its operation.

A wireless device as described above may represent the endpoint of a wireless connection, in which case the device may be referred to as a wireless terminal. Furthermore, a wireless device as described above may be mobile, in which case it may also be referred to as a mobile device or a mobile terminal.

As depicted in Figure 2, WD 210 may be any type of wireless device described above including a wireless endpoint, mobile station, mobile phone, wireless local loop phone, smartphone, user equipment, desktop computer, PDA, cell phone, tablet, laptop, VoIP phone or handset, which is able to wirelessly send and receive data and/or signals to and from a network node, such as network nodes 220 or 220a and/or other WDs. Like network node 220, the components of WD 210 are depicted as single boxes located within a single larger box, however in practice a wireless device may comprises multiple different physical components that make up a single illustrated component (e.g., storage 213 may comprise multiple discrete microchips, each microchip representing a portion of the total storage capacity). Additionally, in some embodiments, some components may be remote from WD 210 (e.g., storage 213 may comprise some local storage and some cloud based storage capacity).

Processor 212 may be a combination of one or more of a microprocessor, controller, microcontroller, central processing unit, digital signal processor, application specific integrated circuit, field programmable gate array, or any other suitable computing device, resource, or combination of hardware and, software and/or encoded logic operable to provide, either alone or in combination with other WD 210 components, such as storage 213, WD 210 functionality. Such functionality may include providing various wireless features discussed herein, including any of the features or benefits disclosed herein.

Storage 213 may be any form of volatile or non-volatile memory including, without limitation, persistent storage, solid state memory, remotely mounted memory, magnetic media, optical media, random access memory (RAM), read-only memory (ROM), removable media, or any other suitable local or remote memory component. Storage 213 may store any suitable data, instructions, or information, including software and encoded logic, utilized by WD 210. Storage 213 may be used to store any calculations made by processor 212 and/or any data received via interface 211.

Interface 211 may be used in the wireless communication of signalling and/or data between WD 210 and network node 220. For example, interface 211 may perform any formatting, coding, or

translating that may be needed to allow WD 210 to send and receive data from network node 220 over a wireless connection. Interface 211 may also include a radio transmitter and/or receiver that may be coupled to or a part of antenna 211a. The radio may receive digital data that is to be sent out to network node 220 via a wireless connection. The radio may convert the digital data into a radio signal having the appropriate channel and bandwidth parameters. The radio signal may then be transmitted via antenna 211a to network node 220.

Antenna 211a may be any type of antenna capable of transmitting and receiving data and/or signals wirelessly. In some embodiments, antenna 211a may comprise one or more omni-directional, sector or panel antennas operable to transmit/receive radio signals between 1 GHz and 100 GHz. For simplicity, antenna 211a may be considered a part of interface 211 to the extent that a wireless signal is being used.

Figure 3 illustrate a block diagram of a UE. As shown in Figure 3, UE 300 is an example wireless device. UE 300 includes an antenna 305, radio front-end circuitry 310, processing circuitry 315, input interface 320, output interface 325, a computer-readable storage 330, and power source 335. Antenna 305 may include one or more antennas or antenna arrays, and is configured to send and/or receive wireless signals, and is connected to radio front-end circuitry 310. In certain alternative embodiments, UE 300 may not include antenna 305, and antenna 305 may instead be separate from UE 300 and be connectable to UE 300 through an interface or port.

The radio front-end circuitry 310 may comprise various filters and amplifiers, is connected to antenna 305 and processing circuitry 315, and is configured to condition signals communicated between antenna 305 and processing circuitry 315. In certain alternative embodiments, UE 300 may not include radio front-end circuitry 310, and processing circuitry 315 may instead be connected to antenna 305 without radio front-end circuitry 310.

Processing circuitry 315 may include one or more of radio frequency (RF) transceiver circuitry, baseband processing circuitry, and application processing circuitry. In some embodiments, the RF transceiver circuitry, baseband processing circuitry, and application processing circuitry may be on separate chips or sets of chips. In alternative embodiments, part or all of the baseband processing circuitry and application processing circuitry may be combined into one chip or set of chips, and the RF transceiver circuitry may be on a separate chips or sets of chips. In still alternative embodiments, part or all of the RF transceiver circuitry and baseband processing circuitry may be on the same chip or set of chips, and the application processing circuitry may be on a separate chip or set of chips. In yet other alternative embodiments, part or all of the RF transceiver circuitry, baseband processing circuitry, and application processing circuitry may be combined in the same chip or set of chips. Processing circuitry 315 may include, for example, one or more central processing units (CPUs), one or more

microprocessors, one or more application specific integrated circuits (ASICs), and/or one or more field programmable gate arrays (FPGAs).

In particular embodiments, some or all of the functionality described herein as being provided by a wireless device or UE may be provided by processing circuitry 315 executing instructions stored on a computer-readable storage medium 330. In alternative embodiments, some or all of the functionality may be provided by processing circuitry 315 without executing instructions stored on a computer-readable medium, such as in a hard-wired manner. In any of those particular embodiments, whether executing instructions stored on a computer-readable storage medium or not, the processing circuitry can be said to be configured to perform the described functionality. The benefits provided by such functionality are not limited to the processing circuitry 315 alone or to other components of UE 300, but are enjoyed by the wireless device as a whole, and/or by end users and the wireless network generally.

Antenna 305, radio front-end circuitry 310, and/or processing circuitry 315 may be configured to perform any receiving operations described herein as being performed by a wireless device. Any information, data and/or signals may be received from a network node and/or another wireless device.

The processing circuitry 315 may be configured to perform any determining operations described herein as being performed by a wireless device or UE. Determining as performed by processing circuitry 315 may include processing information obtained by the processing circuitry 315 by, for example, converting the obtained information into other information, comparing the obtained information or converted information to information stored in the wireless device, and/or performing one or more operations based on the obtained information or converted information, and as a result of said processing making a determination.

Antenna 305, radio front-end circuitry 310, and/or processing circuitry 315 may be configured to perform any transmitting or receiving operations described herein as being performed by a wireless device. Any information, data and/or signals may be transmitted or received to a network node and/or another wireless device or UE. These components may be referred to collectively as an interface when used it the transmitting or receiving of data and/or signals

Computer-readable storage medium 330 is generally operable to store instructions, such as a computer program, software, an application including one or more of logic, rules, code, tables, etc. and/or other instructions capable of being executed by a processor. Examples of computer-readable storage medium 330 include computer memory (for example, Random Access Memory (RAM) or Read Only Memory (ROM)), mass storage media (for example, a hard disk), removable storage media (for example, a Compact Disk (CD) or a Digital Video Disk (DVD)), and/or any other volatile or non-volatile, non-transitory computer-readable and/or computer-executable memory devices that store information, data, and/or instructions that may be used by processing circuitry 315. In some embodiments, processing circuitry 315 and computer-readable storage medium 330 may be considered to be integrated.

Shown in Figure 3, but not in Figure 2, are input interface 320 and output interface 325. These may be configured to receive input information and provide output information. For example, a user associated with WD 210 may use input interface 320 to select audio or video content to be streamed to WD 210 for playback on output interface 325. The streamed content may be streamed to WD 210 as WD 210 moves between geographic areas associated with the source cell to the target cell.

As illustrated, UE 300 includes input interface 320. Input interface 320, may comprise any devices and circuits configured to allow input of information into UE 300, and are connected to processing circuitry 315 to allow processing circuitry 315 to process the input information. For example, input interface 320 may include a microphone, a proximity or other sensor, keys/buttons, a touch display, one or more cameras, a USB port, or other input elements.

Output interface 325 may comprise any devices and circuits configured to allow output of information from UE 300, and are connected to processing circuitry 315 to allow processing circuitry 315 to output information from UE 300. For example, output interface 315 may include a speaker, a display, vibrating circuitry, a USB port, a headphone interface, or other output elements. Using one or more input interface 320 and output interface 325, UE 300 may communicate with end users and/or the wireless network, and allow them to benefit from the functionality described herein.

Shown in Figure 3, but not in Figure 2, WD 210 may also comprise power source 335. Power source 335 may be configured to provide power to the various components of WD 210, such as wireless interface 211, processing circuity 212, storage 213, input interface 320, output interface 325 and any other components of WD 210 that rely on electrical power to operate.

As illustrated, UE 300 includes power source 335. Power source 335 may comprise power management circuitry. Power source 335 may receive power from a power supply, which may either be comprised in, or be external to, power source 335. For example, UE 300 may comprise a power supply in the form of a battery or battery pack which is connected to, or integrated in, power source 335. Other types of power sources, such as photovoltaic devices, may also be used. As a further example, UE 300 may be connectable to an external power supply (such as an electricity outlet) via an input circuitry or interface such as an electrical cable, whereby the external power supply supplies power to power source 335. Power source 335 may be connected to radio front-end circuitry 310, processing circuitry 315, and/or computer-readable storage medium 330 and be configured to supply UE 300, including processing circuitry 315, with power for performing the functionality described herein.

UE 300 may also include multiple sets of processing circuitry 315, computer-readable storage medium 330, radio circuitry 310, and/or antenna 305 for different wireless technologies integrated into wireless device 300, such as, for example, GSM, WCDMA, LTE, NR, Wi-Fi, or Bluetooth wireless technologies. These wireless technologies may be integrated into the same or different chips or sets of chips s and other components within wireless device 300.

Alternative embodiments of UE 300 may include additional components beyond those shown in Figure 3 that may be responsible for providing certain aspects of the UE's functionality, including any of the functionality described herein and/or any functionality necessary to support the solution described herein.

The following description may help illustrate how the components of Figures 2 and 3 may work to provide the features and benefits of wireless handover of certain embodiments disclosed herein. For simplicity, the description below will focus on the components of Figure 2, but is equally applicable with the corresponding components of Figure 3. In the scenario described below, network node 220 may be referred to as a source network node because it is WD 210's current source for wireless access. Source network node 220 may be associated with one or more cells. Each cell is associated with, and provides wireless coverage for, a particular geographic area. The cell currently being used by WD 210 may be referred to as a source cell while the cell to which WD 210 is to be handed over may be referred to as a target cell. While it may be that both the source cell and the target cell are provided by the same network node, for purposes of simplicity herein it may be assumed that the source cell is associated with network node 220 and the target cell is associated with network node 220a. It may also be assumed that target network node 220a uses a plurality of beams in providing wireless coverage within the target cell.

Interface 211 may comprise a wireless interface suitable for sending and receiving data, messages, signaling and/or other information (collectively "data") over an air interface. In certain embodiments, wireless interface 211 may be configured to receive a first handover message from network node 220. In certain embodiments, the first handover message may include multiple pieces of information that can be used by WD 210 in the handover from the source cell to the target cell. For example, the handover message may include an identification of the target cell and access information associated with the target cell, such as information related to the beams provided by target network node 220a for the target cell. The beams provided may include all the beams associated with the target cell, or a subset thereof. The subset may be a predetermined subset (e.g., certain beams reserved for handover) or selected based on one or more conditions (e.g., current load of the beams associated with the target cell). In some embodiments, the access information may be Random Access Channel (RACH) information associated with the target cell. In some embodiments, the access information may include a random access preamble mapped to each of the allowed beams of the target cell. In some embodiments, the access information may include common random access configuration information and dedicated random access resources for the allowed beams. The allowed beams may be those beams which WD 210 will be allowed to use to access the target cell. The allowed beams may be a subset of the beams associated with the target cell or the available beams associated with the target cell.

The handover message may be determined and transmitted by source network node 220. More specifically, interface 221 of source network node 220 may receive certain information from target network node 220a (e.g., available beams, allowed beams, configuration/synchronization information for the beams, etc.). Processing circuitry 222 may then use the information along with information from WD 210 to determine the access information that is to be included in the handover message provided to WD 210.

Processing circuitry 212 of wireless device 210 may be used to identify at least one beam from among the one or more beams of the target cell. If only one beam is provided, then that may be the identified beam, if more than one beam is provide, processor 212 may determine the beam best suited for WD 210. The beam(s) may be identified based on the identification of the target cell and the access information from the first handover message. In some embodiments and/or scenarios, the beam(s) may be identified based on measurements made of the beams provided by the target network node. The measurements may be made on any/all beams received by interface 211 or on certain specified beams. The beams may be specified in any of a variety of different ways such as in a message provided to WD 210, preconfigured and stored in storage 213, or otherwise provided to WD 210. In some embodiments the specified beams may be fewer than all of the beams of the target cell or fewer than all of the beams detectable by WD 210. In some embodiments, WD 210 may measure one or more characteristics of the beams of the target cell and then send a report to source network node 220 via interface 211. The information from the report may be used in identifying the beams.

Once processing circuitry 212 has selected the appropriate beam, and any other handover pre-requisites have been satisfied, wireless interface 211 may be configured to access the target cell using the identified at least one beam. In some embodiments wireless interface 211 may access the target cell using a contention based random access procedure. This access may be based on information received in the handover message. In some embodiments, wireless interface 211 may access the target cell without having to first read system information associated with the target cell (e.g., random access parameters or RACH). That is, source node 220 may include sufficient details in the access information to allow WD 210 to access the target cell without needing that information from target node 220a.

The components described above with respect to Figures 2 and 3 may be used to modify the legacy mobility procedure (illustrated in Figure 1). Figure 4 illustrates a signalling diagram of the handover procedure in accordance with particular embodiments. The order of the signals is similar to the legacy procedure however the information and how it is determined and used is different. Depending on the embodiment, these differences can be discussed based on the information contained in handover command 430 and the corresponding synchronization and random access procedure 440. The devices illustrated in Figure 4 may, in some embodiments, comprise similar components and provide similar

functionality as described above wherein UE 410 may correspond to WD 210, serving gNB 420 may correspond to network node 220 and target gNB 420a may correspond to network node 220a.

In some embodiments, with respect to providing UE 410 with an identity of target gNB 420a, HO command 430 may include only the cell identity associated with target gNB 420a. The cell identity can be signalled either explicitly or implicitly via, for example, mobility reference signal (MRS) configuration. HO command 430 may comprise RRCConnectionReconfiguration and mobilityControlInfo. Once the cell identity is received by an interface of UE 410 and processed, a processor therein may select any beam with the correct cell identity detected by the interface of UE 410. UE 410 then reads the random access parameters from system information and uses those for the initial synchronization and random access 440 on the selected beam. In some embodiments, the random access may be a contention based random access procedure. These embodiments have the benefit of requiring a relatively small amount of signalling and network configuration in HO command 430 but may result in a handover failure if there are other users competing for the random access at the same time.

In some embodiments, in addition to the cell identity of target gNB 420a, HO command 430 may further include physical random access channel (PRACH) configuration information for the target cell. This information may be explicitly signalled in HO command 430, or it may be derived from other parameters, such as via configuration of mobility reference signals. Depending on the scenario and/or embodiment, multiple PRACH configurations may be provided to enable different random access (RA) parameters for different beams or beam groups. An interface of UE 410 may receive HO command 430 and a processor of UE 410 may then autonomously select a beam associated with the correct cell identity. UE 410 then uses the provided PRACH parameters from HO command 430 for the initial synchronization and random access 440 on the selected beam. This has the benefit of allowing the network to provide a dedicated handover configuration for UE 410, but requires some additional configuration and signalling as part of HO command 430.

In some embodiments, in addition to the cell identity and PRACH configuration information of target gNB 420a, HO command 430 may further include a list of allowed beams from target gNB 420a. The list of allowed beams may comprise a list of beam IDs. The list of beam IDs may be fewer than all the beams associated with target gNB 420a. This target cell information (including the list of beams) may be explicitly signalled, or may be derived from other parameters, such as configuration of mobility reference signals. Depending on the scenario and/or embodiment multiple PRACH configurations may be provided to enable different RA parameters for different beams or beam groups. HO command 430 is received by an interface of UE 410 and then a processor of UE 410 may autonomously select a beam from the list of allowed beams associated with the correct cell identity. UE 410 may then use the random access parameters from HO command 430 and uses those for the initial synchronization and random access 440 on the selected beam. This has the benefit of allowing the network to provide a dedicated

handover configuration for UE 410, and limiting the number of possible beams UE 410 may select from, but requires again additional configuration and signalling. Additionally, in some scenarios, UE 410 may end up in a non-optimal beam if the optimal beam is not on the list of allowed beams provided in HO command 430.

In some embodiments, in addition to the cell identity and PRACH configuration information of target gNB 420a, HO command 430 may include an indication of a single allowed beam. This target cell information may be explicitly signalled, or may be derived from other parameters, such as configuration of mobility reference signals. An interface of UE 410 may receive HO command 430. Because there is only the one allowed beam, a processor of UE 410 does not need to make a selection of a beam, rather the processor of UE 410 synchronizes to the provided beam with the correct cell identity based on the beam ID provided in HO command 430. UE 410 then uses the random access parameters from HO command 430 for the initial synchronization and random access 440. This has the benefit of allowing the network to provide a dedicated handover configuration for UE 410 and explicitly assigning the user to a particular beam, but it requires additional configuration and signalling and may be more likely to result in the UE ending up in a non-optimal beam.

In some embodiments, in addition to the cell identity, PRACH configuration information, and list of allowed beams, HO command 430 may also comprise a mapping between the allowed beams and a RA preamble (or some other part of access configuration). This information may be explicitly signalled, or may be derived from other parameters, such as configuration of MRS. An interface of UE 410 may receive HO command 430 and then a processor of UE 410 may autonomously select a beam with the correct cell identity from the list of allowed beam IDs and set the random access preamble value to the value corresponding to the selected beam identifier. UE 410 may then use the PRACH configuration information and RA preamble corresponding to the selected beam in the initial synchronization and random access 440. This has the benefit of allowing the network to provide a dedicated handover configuration for UE 410, limiting the number of possible beams UE 410 may select from, and allowing the network to immediately detect which beam the UE has selected, but requires again additional configuration and signalling and may result in UE 410 using a non-optimal beam.

Figure 5 illustrates a signalling diagram of a conditional handover execution based on downlink received signal measurements, in accordance with particular embodiments. In some scenarios involving legacy systems, the probability of hand over failure could increase due to the dependency on the RRC signalling transmissions from the source cell at a time when the UE has already moved into the coverage area of the target cell. To avoid the undesired dependence on the serving radio link at the time (and radio conditions) where the UE should execute the handover, certain embodiments may provide the RRC signalling 530 to UE 510 earlier. For example, the RRC signalling 530 may be sent prior to the occurrence of a triggering event which would trigger sending RRC signalling in legacy systems. This

may be done, for example, by associating the handover with a condition; when the condition is fulfilled, UE 510 may execute the handover in accordance with the information provided in HO command 530.

One such condition which might trigger handover could be that the reference signal of the target cell or beam becomes "x" dB stronger than the reference signal of the serving cell or beam. The threshold used in a preceding measurement reporting event could then be chosen lower than the one in the handover execution condition. This may allow the serving cell to prepare the handover upon reception of an early measurement report and to provide the RRCConnectionReconfiguration with mobilityControlInfo at a time when the radio link between the source network node and the UE is still stable. The execution of the handover is done at a later point in time (and threshold) that is considered optimal for the handover execution.

Although Figure 5 depicts an example with just serving node 520 and a single target node 520a. In practice there may often be many cells or beams from many nodes that UE 510 may have reported as possible candidates based on its preceding RRM measurements. The RAN may then have the freedom to issue conditional handover instructions for several candidate network nodes. The RRCConnectionReconfiguration for each of those candidates may differ. For example, in terms of the HO execution condition (RS to measure and threshold to exceed) as well as in terms of the RA preamble (denoted Uplink Signature Signal) to be sent when a condition is met. It may for example increase the HO success rate if the UE indicates by means of different RA preambles, which of the candidate target beams it selected (e.g., which beam fulfilled the HO execution condition).

In some embodiments, the RRCConnectionReconfiguration for the early HO command could for example, also comprise a configuration for sending UL reference signals (similar to RA preambles) that both the serving as well as the neighbour nodes attempt to receive. The network could determine the most suitable cell based on the observed uplink signals and issue a downlink reference signal upon which the UE executes the pre-conditioned HO command. A UE aiming to support URLLC with extremely short HO interruption could be configured to maintain the data exchange with the source node while establishing the data exchange with the target node. As noted in a prior study, this may require additional hardware elements in the UE and may therefore not be supported by all UEs.

Figure 6 illustrates a flowchart of a method for wireless handover, in accordance with particular embodiments. The method begins at step 600. Each step will include an indication of the device performing the step in the embodiment illustrated in Figure 6. The indicated device is provided for ease of explanation, it is not necessarily required that the specified device perform the indicated step. In other embodiments, different devices may be used to perform one or more of the steps. The devices mentioned in Figure 6 include a wireless device, a source network node and a target network node. The source network node is the network node providing wireless service to the wireless device at the start of the method. This service is provided in a source cell. The target network node is the network node to

which the wireless device is to be handed over. The target network node provides wireless service in a target cell. In some scenarios, the source cell and the target cell may be provided by the same physical network node (e.g., a MSR network node).

At step 605 the source network node determines the relevant access information for the target cell. The target cell is different than the source cell and includes one or more beams. The access information may be determined based on information provided by the target network node. In some embodiments, the access information may be specific to a particular UE or it may be generic such that it is applicable to any UE (or it may be general information that can be used create UE specific access information). In particular embodiments, the access information may comprise an indication of allowed beams. In some embodiments, the access information includes a random access preamble mapped to each of the allowed beams of the target cell. In certain embodiments, the access information includes common random access configuration information and dedicated random access resources for the allowed beams.

At step 610 the source network node transmits a handover message that includes information that can be used by the wireless device to access the target cell. For example, the handover message may include an identification of the target cell. As another example, the handover message may also include access information comprising beam related information associated with the target cell. In some embodiments, the access information may comprise Random Access Channel (RACH) information. In some embodiments, the beam related information may relate to fewer than all of the available beams of the target cell.

At step 615 the wireless device receives the handover message from the source network node. In some embodiments, the handover message may received in response to a triggering event (e.g., source signal quality falls below threshold, target signal quality exceeds threshold, etc.). This timing may be similar to legacy timing in terms of when the handover message is sent. In some embodiments, the handover message may received prior to the triggering event occurring. This may allow the source network node to provide the wireless device with the access informitno for the target cell at a time when the signal quality between the source network node and the wireless device is better (as compared to waiting for the triggering event to occur).

At step 620 the wireless device identifies at least one beam from the target cell based on the information in the handover message (e.g., the identification of the target cell and the access information associated with the target cell). In some embodiments, the wireless device may identify a beam based on one or more quality characteristics of the available/allowed beams associated with the target cell. In some scenarios, only one beam may have been provided, in which the wireless device simply selects the provided beam.

At step 625 the wireless device accesses the target cell using the identified at least one beam. The target cell may be accessed based on the access information received in the handover message received at step 615. The target cell may be accessed without the wireless device having to first read system information associated with the target cell. In some embodiments, accessing the target cell using the identified at least one beam may comprise accessing the target cell using a contention based random access procedure.

The steps described above are merely illustrative of certain embodiments. It is not required that all embodiments incorporate all the steps above nor that the steps be performed in the exact order depicted in Figure 6. Furthermore, some embodiments may include steps not illustrated in Figure 6. For example, in some embodiments, the wireless device may provide the source network node with an indication of a signal quality associated with one or more beams from the target node.

Figure 7 illustrates a block diagram of the functional units of a wireless device and a network node in accordance with particular embodiments. In particular, there is depicted the functional units of a particular wireless device 710 and network node 720. Other embodiments may include more, fewer, or different functional units. Moreover, a single depicted unit may represent multiple similar units. For example, determine unit 722 may represent multiple determine units configured to make different determinations. The units may comprise software, computer programs, sub-routines, libraries, source code, or any other form of executable instructions that are run by, for example, a processor. In this Figure 7, wireless device 710 comprises receiver unit 712, identification unit 714, and access unit 716; and network node 720 comprises determine unit 722, prepare unit 724, transmit unit 726, and receive unit 728.

Starting with the components of WD 710, receiver unit 712 is configured to receive a first handover message from a source network node associated with a source cell. The first handover message comprises an identification of a target cell and access information associated with the target cell. In some embodiments there may be more than 2 potential target cells. The target cell is different than the source cell and comprises one or more beams. In some embodiments, the target cell is associated with a second network node that is different than the source network node. In some embodiments, the access information comprises Random Access Channel (RACH) information. In certain embodiments, the target cell has at least two beams and the access information comprises an indication of allowed beams associated with the target cell. In such embodiments, the allowed beams may be fewer than all of the beams of the target cell. In particular embodiments, the access information includes a random access preamble mapped to each of the allowed beams of the target cell. In some embodiments, the access information includes common random access configuration information and dedicated random access resources for the allowed beams.

Identification unit 714 is configured to identify at least one beam from among the one or more beams of the target cell based on the identification of the target cell and the access information from the first handover message.

Access unit 716 is configured to access the target cell using the identified at least one beam. In some embodiments, access unit 716 is further configured to access the target cell using a contention based random access procedure. In certain embodiments, access unit 716 is further configured to access the target cell without first reading system information associated with the target cell.

Now looking at network node 720, determine unit 722 is configured to determine access information associated with a second network node for the at least one wireless device. The access information may be determined from information received from the target cell. In some embodiments, the information from the target cell may be combined with information stored by network node 720 to determine the access information associated with the second network node.

Prepare unit 724 is configured to prepare the access information associated with the second network node to be transmitted to a wireless device, such as wireless device 710.

Transmit unit 726 is configured to transmit the access information to the wireless device.

Receive unit 728 is configured to receive access information from the other network node. The received access information is to be sent to the wireless device with or without modification to the access information made by network node 720 (e.g., network node may simply forward access information provided by the target cell or it may modify the information provided by the target cell).

Any appropriate steps, methods, or functions may be performed through a computer program product that may, for example, be executed by the components and equipment illustrated in one or more of the figures above. For example, storage 223 may comprise computer readable means on which a computer program can be stored. The computer program may include instructions which cause processor 222 (and any operatively coupled entities and devices, such as interface 221 and storage 223) to execute methods according to embodiments described herein. The computer program and/or computer program product may thus provide means for performing any steps herein disclosed.

Certain aspects of the inventive concept have mainly been described above with reference to a few embodiments. However, as is readily appreciated by a person skilled in the art, embodiments other than the ones disclosed above are equally possible and within the scope of the inventive concept. Similarly, while a number of different combinations have been discussed, all possible combinations have not been disclosed. One skilled in the art would appreciate that other combinations exist and are within the scope of the inventive concept. Moreover, as is understood by the skilled person, the herein disclosed embodiments are as such applicable also to other standards and communication systems and any feature from a particular figure disclosed in connection with other features may be applicable to any other figure and or combined with different features.

CLAIMS

1. A method performed by a wireless device for handover, the method comprising:

receiving a first handover message (615) from a source network node associated with a source cell, the first handover message comprising an identification of a target cell and access information associated with the target cell, wherein the target cell is different than the source cell and comprises one or more beams and the access information comprises beam related information;

identifying at least one beam (620) from among the one or more beams of the target cell based on the identification of the target cell and the access information from the first handover message; and

accessing the target cell (625) using the identified at least one beam.

2. The method of Claim 1, wherein the target cell is associated with a second network node, the second network node being different than the source network node.

3. The method of any of Claims 1-2, wherein the access information comprises Random Access Channel (RACH) information.

4. The method of any of Claims 1-3, wherein the target cell has at least two beams and the access information comprises an indication of allowed beams associated with the target cell, the allowed beams comprising fewer than all of the beams of the target cell.

5. The method of Claim 4, wherein the access information includes a random access preamble mapped to each of the allowed beams of the target cell.

6. The method of any of Claims 4-5, wherein the access information includes common random access configuration information and dedicated random access resources for the allowed beams.

7. The method of any of Claims 1-6, wherein accessing the target cell (625) using the identified at least one beam comprises accessing the target cell using a contention based random access procedure.

8. The method of any of Claims 1-7, wherein accessing the target cell (625) using the identified at least one beam comprises accessing the target cell without first reading system information associated with the target cell.

9. A wireless device for handover comprising:

a wireless interface (211, 310) configured to receive a first handover message from a source network node associated with a source cell, the first handover message comprising an identification of a target cell and access information associated with the target cell, wherein the target cell is different than the source cell and comprises one or more beams;

processing circuitry (212, 315) configured to identify at least one beam from among the one or more beams of the target cell based on the identification of the target cell and the access information from the first handover message; and

an input and output interface (320, 325) configured to receive input information and provide output information;

a power source (335) configured to provide power to the wireless interface, processing circuity and input and output interface; and

wherein the wireless interface (211, 310) is further configured to access the target cell using the identified at least one beam.

10. The wireless device of Claim 9, wherein the target cell is associated with a second network node, the second network node being different than the source network node.

11. The wireless device of any of Claims 9-10, wherein the access information comprises Random Access Channel (RACH) information.

12. The wireless device of any of Claims 9-11, wherein the target cell has at least two beams and the access information comprises an indication of allowed beams associated with the target cell, the allowed beams comprising fewer than all of the beams of the target cell.

13. The wireless device of Claim 12, wherein the access information includes a random access preamble mapped to each of the allowed beams of the target cell.

14. The wireless device of any of Claims 12-13, wherein the access information includes common random access configuration information and dedicated random access resources for the allowed beams.

15. The wireless device of any of Claims 9-14, wherein the wireless interface (211, 310) configured to access the target cell using the identified at least one beam is configured to access the target cell using a contention based random access procedure.

16. The wireless device of any of Claims 9-15, wherein the wireless interface (211, 310) configured to access the target cell using the identified at least one beam is configured to access the target cell without first reading system information associated with the target cell.

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17. A wireless communication system for handover, the system comprising:

at least two network nodes (220, 220a);

at least one wireless device (210) wirelessly connected to a first of the at least two network nodes;

wherein the first network node(220) is configured to:

determine access information associated with a second of the at least two network nodes for the at least one wireless device; and

prepare the access information associated with the second network node to be transmitted to the at least one wireless device; and

wherein the at least one wireless device (210) is configured to:

receive a handover message from the first network node, the handover message comprising an identification associated with the second network node and the access information associated with the second network node;

identify and select at least one beam from the second network node; and

access the second network node using the identified and selected at least one beam based on the access information from the handover message.

18. A wireless device (210) for handover comprising a processor (212) and computer readable storage media (213), the storage media containing instructions executable by the processor, whereby the wireless device is operative to:

receive a first handover message (430) from a source network node associated with a source cell, the first handover message comprising an identification of a target cell and access information associated with the target cell, wherein the target cell is different than the source cell and comprises one or more beams;

identify at least one beam from among the one or more beams of the target cell based on the identification of the target cell and the access information from the first handover message; and

access the target cell (440) using the identified at least one beam.

19. The wireless device of Claim 18, wherein the target cell is associated with a second network node, the second network node being different than the source network node.

20. The wireless device of any of Claims 18-19, wherein the access information comprises Random Access Channel (RACH) information.

21. The wireless device of any of Claims 18-20, wherein the target cell has at least two beams and the access information comprises an indication of allowed beams associated with the target cell, the allowed beams comprising fewer than all of the beams of the target cell.

22. The wireless device of Claim 21, wherein the access information includes a random access preamble mapped to each of the allowed beams of the target cell.

23. The wireless device of any of Claims 21-22, wherein the access information includes common random access configuration information and dedicated random access resources for the allowed beams.

24. The wireless device of any of Claims 18-23, wherein the wireless device is further configured to access the target cell using a contention based random access procedure.

25. The wireless device of any of Claims 18-24, wherein the wireless device is further configured to access the target cell using the identified at least one beam without first reading system information associated with the target cell.

26. A wireless device for handover, the wireless device comprising:

a receiver unit (712) configured to receive a first handover message from a source network node associated with a source cell, the first handover message comprising an identification of a target cell and access information associated with the target cell, wherein the target cell is different than the source cell and comprises one or more beams;

an identification unit (714) configured to identify at least one beam from among the one or more beams of the target cell based on the identification of the target cell and the access information from the first handover message; and

an access unit (716) configured to access the target cell using the identified at least one beam.

27. The wireless device of Claim 26, wherein the target cell is associated with a second network node, the second network node being different than the source network node.

28. The wireless device of any of Claims 26-27, wherein the access information comprises Random Access Channel (RACH) information.

29. The wireless device of any of Claims 26-28, wherein the target cell has at least two beams and the access information comprises an indication of allowed beams associated with the target cell, the allowed beams comprising fewer than all of the beams of the target cell.

30. The wireless device of Claim 29, wherein the access information includes a random access preamble mapped to each of the allowed beams of the target cell.

31. The wireless device of any of Claims 29-30, wherein the access information includes common random access configuration information and dedicated random access resources for the allowed beams.

32. The wireless device of any of Claims 26-31, wherein access unit (716) is further configured to access the target cell using a contention based random access procedure.

33. The wireless device of any of Claims 26-32, wherein the access unit (716) is further configured to access the target cell without first reading system information associated with the target cell.

ABSTRACT

In accordance with particular embodiments, there is disclosed herein a method performed by a wireless device for handover. The method comprises receiving a first handover message (615) from a source network node associated with a source cell. The first handover message comprises an identification of a target cell and access information associated with the target cell. The target cell is different than the source cell and comprises one or more beams. The method also includes identifying at least one beam (620) from among the one or more beams of the target cell. The at least one beam is identified based on the identification of the target cell and the access information from the first handover message. The method further includes accessing the target cell (625) using the identified at least one beam.