



(51) International Patent Classification:

H04W 28/08 (2009.01) H04W 40/24 (2009.01)
H04W 40/12 (2009.01) H04L 12/707 (2013.01)
H04W 40/22 (2009.01) H04W 28/02 (2009.01)

(21) International Application Number:

PCT/US2019/060418

(22) International Filing Date:

08 November 2019 (08.11.2019)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

62/760,000 12 November 2018 (12.11.2018) US
16/676,847 07 November 2019 (07.11.2019) US

(71) Applicant: **QUALCOMM INCORPORATED** [US/US];
ATTN: International IP Administration, 5775 Morehouse
Drive, San Diego, California 92121-1714 (US).

(72) Inventors: **ISLAM, Muhammad Nazmul**; 5775 More-
house Drive, San Diego, California 92121-1714 (US).
GUPTA, Piyush; 5775 Morehouse Drive, San Diego, Cal-
ifornia 92121-1714 (US). **BLESSENT, Luca**; 5775 More-
house Drive, San Diego, California 92121-1714 (US).
LUO, Tao; 5775 Morehouse Drive, San Diego, Cali-

fornia 92121-1714 (US). **HAMPEL, Karl Georg**; 5775
Morehouse Drive, San Diego, California 92121-1714 (US).
ABEDINI, Navid; 5775 Morehouse Drive, San Diego, Cal-
ifornia 92121-1714 (US). **LUO, Jianghong**; 5775 More-
house Drive, San Diego, California 92121-1714 (US).
LI, Junyi; 5775 Morehouse Drive, San Diego, California
92121-1714 (US).

(74) Agent: **SWICKHAMER, Christopher M.**; Holland &
Hart LLP, P.O. Box 11583, Salt Lake City, Utah 84147
(US).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,
HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP,
KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME,
MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,
OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,
SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ,

(54) Title: RESOURCE UTILIZATION BASED EVENT TRIGGERING IN WIRELESS COMMUNICATIONS

(57) Abstract: Methods, systems, and devices for wireless communications are described that support resource utilization based event triggering. A wireless node in a wireless communications system may establish a connection with a core network via a path that includes one or more relay nodes. The wireless node may determine that a network load associated with one or more paths between the wireless node and the core network has changed, or that a difference between two or more network loads of different paths has changed. Based on such a determination, the wireless node may transmit a report to the network. In some cases, the network may receive the report from the wireless node, and may initiate a path change based on the report.

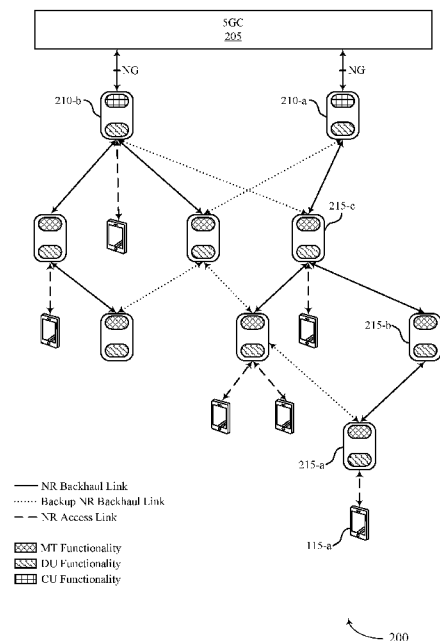


FIG. 2



UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(88) Date of publication of the international search report:

30 July 2020 (30.07.2020)

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2019/060418

A. CLASSIFICATION OF SUBJECT MATTER
 INV. H04W28/08 H04W40/12 H04W40/22 H04W40/24 H04L12/707
 H04W28/02
 ADD.
 According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
 H04W H04L

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	ZTE ET AL: "Discussion on IAB node discovery and selection", 3GPP DRAFT; R2-1817418 DISCUSSION ON IAB NODE DISCOVERY AND SELECTION, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; ; , vol. RAN WG2, no. Spokane, USA; 20181112 - 20181116 2 November 2018 (2018-11-02), XP051481323, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/tsg%5Fran/WG2%5FRL2/TSGR2%5F104/Docs/R2%2D1817418%2Ezip [retrieved on 2018-11-02]	1-6,11
Y	paragraphs [02.1] - [2.2.], [09.3] figures 1, 9.3-1,9.3-2(a) ----- -/--	7-10

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

21 April 2020

Date of mailing of the international search report

29/06/2020

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040,
 Fax: (+31-70) 340-3016

Authorized officer

Kesting, Christiane

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2019/060418

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>LENOVO ET AL: "Parent node selection for IAB access", 3GPP DRAFT; R2-1817169 PARENT NODE SELECTION FOR IAB ACCESS V1, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE</p> <p>, vol. RAN WG2, no. Spokane, USA; 20181112 - 20181116 2 November 2018 (2018-11-02), XP051481087, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/tsg%5Fran/WG2%5FRL2/TSGR2%5F104/Docs/R2%2D1817169%2Ezip [retrieved on 2018-11-02] page 2; figures 2,3</p> <p>-----</p>	1-4,11, 12
Y	<p>KYOCERA CORP: "Rel-10 enhancements for cell load reporting", 3GPP DRAFT; R3-103434, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG3, no. Jacksonville, USA; 20101115, 9 November 2010 (2010-11-09), XP050467361, paragraph [02.2]</p> <p>-----</p>	1-4,11, 12
Y	<p>SAMSUNG ET AL: "F1AP function definition and categorization", 3GPP DRAFT; R3-172246, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE</p> <p>, vol. RAN WG3, no. Qingdao; 20170627 - 20170629 26 June 2017 (2017-06-26), XP051302192, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/Meetings_3GPP_SYNC/RAN3/Docs/ [retrieved on 2017-06-26] paragraph [0003]</p> <p>-----</p>	7-10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2019/060418

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-12

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-12

A method for identifying at least a second path available for the connection with the core network

2. claims: 13-21

A method for configuring the MT function in an IAB node

3. claims: 22-30

A method for transmitting and using one of a mobility report configuration
