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(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.

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(54) **Title:** METHODS FOR TRANSMISSION TO ACHIEVE ROBUST CONTROL AND FEEDBACK PERFORMANCE IN A NETWORK

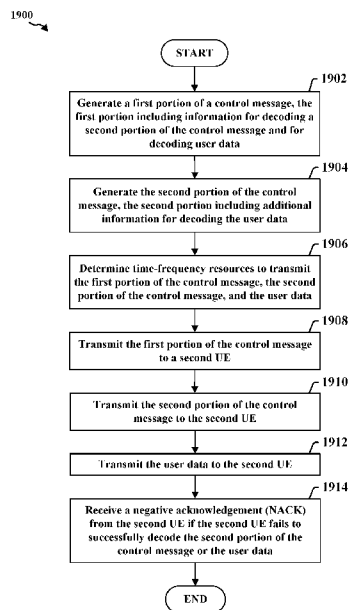


FIG. 19

(57) **Abstract:** Aspects of the disclosure relate to methods for wireless communication. A transmitting device transmits a first portion of a control message to a receiving device. The first portion includes information for decoding a second portion of the control message and for decoding data. The transmitting device then transmits the second portion to the receiving device, the second portion including additional information for decoding the data. Thereafter, the first device transmits the data to the receiving device. The receiving device receives the first portion and the second portion, and decodes the received second portion based on the information included in the first portion. The receiving device then receives the data from the second device if the received second portion is able to be decoded. The receiving device decodes the received data based on the information included in the first portion and the additional information included in the second portion.



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
 INV. H04L1/00 H04L1/18
 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)
 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, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|---|--|
| X | ERICSSON: "On 2-stage PSCCH-I design", 3GPP DRAFT; R1-1811607 ERICSSON - ON 2-STAGE PSCCH-I DESIGN, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE , vol. RAN WG1, no. Chengdu, China; 20181008 - 20181012 28 September 2018 (2018-09-28), XP051519005, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/tsg%5Fran/WG1% 5FRL1/TSGR1%5F94b/Docs/R1%2D1811607%2Ezip [retrieved on 2018-09-28] | 1,2,5, 11,13, 15-17, 19-21, 23-25, 27,28, 30,36, 38, , 40-42, 44-46, 48-50, 52-55, 63,65, 67,68, 70,71, 73,74, 76-79, 87,89, 91,92, |
| | -/-- | |

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents :

| | |
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| "A" document defining the general state of the art which is not considered to be of particular relevance | "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 |
| "E" earlier application or patent but published on or after the international filing date | "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 |
| "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) | "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 |
| "O" document referring to an oral disclosure, use, exhibition or other means | "&" document member of the same patent family |
| "P" document published prior to the international filing date but later than the priority date claimed | |

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| Date of the actual completion of the international search 28 May 2020 | Date of mailing of the international search report 09/06/2020 |
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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|---|---|
| Y | pg. 3, Observation 5 pg. 4, list item 'a' pg. 4, list item 'b' pg. 3, Observation 1 | 94,95, 97,98 3,4, 6-10,12, 14,18, 22,26, 29, 31-35, 37,39, 43,47, 51, 56-62, 64,66, 69,72, 75, 80-86, 88,90, 93,96,99 |
| Y | ----- XIAOMI COMMUNICATIONS: "On support of HARQ for V2x communications", 3GPP DRAFT; R1-1811420, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE , vol. RAN WG1, no. Chengdu, China; 20181008 - 20181012 28 September 2018 (2018-09-28), XP051518824, Retrieved from the Internet: URL: http://www.3gpp.org/ftp/tsg%5Fran/WG1%5FRL1/TSGR1%5F94b/Docs/R1%2D1811420%2Ezip [retrieved on 2018-09-28] | 3,4,29, 32,58, 59,83 |
| A | pg. 1, section 2.1, list item 1 ----- -/-- | 1,2,5, 11,15, 16,19, 20,23, 24,27, 28,36, 40,41, 44,45, 48,49, 52-55, 63,67, 68,70, 71,73, 74, 76-79, 87,91, 92,94, 95,97,98 |

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2019/059455

| 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>ERICSSON: "Support of Unicast, Groupcast and Broadcast on the NR Sidelink", 3GPP DRAFT; R1-1811591 ERICSSON - SUPPORT OF UC, GC, BC, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE</p> <p>, vol. RAN WG1, no. Chengdu, China; 20181001 28 September 2018 (2018-09-28), XP051518989, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/tsg%5Fran/WG1%5FRL1/TSGR1%5F94b/Docs/R1%2D1811591%2Ezip [retrieved on 2018-09-28] pg. 2, section 2.1 pg. 1, list item 2</p> <p>-----</p> | 3,29,58 |
| Y | <p>ERICSSON: "On Mode 2 Resource Allocation for NR Sidelink", 3GPP DRAFT; R1-1811594 ERICSSON - RESOURCE ALLOCATION, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE</p> <p>, vol. RAN WG1, no. Chengdu, China; 20181008 - 20181012 28 September 2018 (2018-09-28), XP051518992, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/tsg%5Fran/WG1%5FRL1/TSGR1%5F94b/Docs/R1%2D1811594%2Ezip [retrieved on 2018-09-28] pg. 6</p> <p>-----</p> | 8-10, 33-35, 60-62, 82,84-86 |
| Y | <p>ERICSSON: "Physical layer structures of NR V2X", 3GPP DRAFT; R1-1811592 ERICSSON - PHYSICAL LAYER STRUCTURES OF NR V2X, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ;</p> <p>, vol. RAN WG1, no. Chengdu, China; 20181008 - 20181012 28 September 2018 (2018-09-28), XP051518990, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/tsg%5Fran/WG1%5FRL1/TSGR1%5F94b/Docs/R1%2D1811592%2Ezip [retrieved on 2018-09-28] pg. 8, last line, pg. 9, par. 1</p> <p>-----</p> <p style="text-align: center;">-/--</p> | 6,18,22, 26,43, 47,51, 56,69, 72,75, 80,81, 93,96,99 |

INTERNATIONAL SEARCH REPORT

International application No

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| 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>MEDIATEK INC: "Physical layer structure for NR sidelink", 3GPP DRAFT; R1-1810453 PHYSICAL LAYER STRUCTURE FOR NR SIDELINK, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE</p> <p>, vol. RAN WG1, no. Chengdu, China; 20181008 - 20181012 29 September 2018 (2018-09-29), XP051517862, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/tsg%5Fran/WG1%5FRL1/TSGR1%5F94b/Docs/R1%2D1810453%2Ezip [retrieved on 2018-09-29] pg. 6, par. below Proposal 6</p> <p>-----</p> | 7,31,57 |
| Y | <p>CATT: "Support of unicast, groupcast and broadcast in NR sidelink", 3GPP DRAFT; R1-1810539, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE</p> <p>, vol. RAN WG1, no. Chengdu, China; 20181008 - 20181012 29 September 2018 (2018-09-29), XP051517947, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/tsg%5Fran/WG1%5FRL1/TSGR1%5F94b/Docs/R1%2D1810539%2Ezip [retrieved on 2018-09-29] pg. 7, section 2.3.4</p> <p>-----</p> | 12,37, 64,88 |
| Y | <p>CATT: "Motivation for Study Item on Non-orthogonal Multiple Access for NR", 3GPP DRAFT; RP-170407 MOTIVATION FOR SI ON NOMA FOR NR, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE</p> <p>, vol. TSG RAN, no. Dubrovnik, Croatia; 20170306 - 20170309 18 March 2018 (2018-03-18), XP051507088, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/tsg%5Fran/TSG%5FRAN/TSGR%5F75/Docs/RP%2D170407%2Ezip [retrieved on 2018-03-18] slide 9 slide 11</p> <p>-----</p> | 14,39, 66,90 |

INTERNATIONAL SEARCH REPORT

International application No.
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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.:

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, 2, 4, 5, 11, 13, 15-17, 19-21, 23-25, 27, 28, 30, 32, 36, 38, 40-42, 44-46, 48-50, 52-55, 59, 63, 65, 67, 68, 70, 71, 73, 74, 76-79, 83, 87, 89, 91, 92, 94, 95, 97, 98(completely); 3, 29, 58(partially)

transmission priority of user data indication

2. claims: 8-10, 33-35, 60-62, 82, 84-86(completely); 3, 29, 58(partially)

destination/source/link identifier indication

3. claims: 6, 18, 22, 26, 43, 47, 51, 56, 69, 72, 75, 80, 81, 93, 96, 99

NACK based feedback corresponding to user data

4. claims: 7, 31, 57

NACK based feedback corresponding to a portion of control data

5. claims: 12, 37, 64, 88

different MCS corresponding to different portions of control data

6. claims: 14, 39, 66, 90

using MA signatures to distinguishing control data corresponding to different UEs
