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(54) Title: ACKNOWLEDGEMENT FEEDBACK FOR SIDELINK COMMUNICATIONS

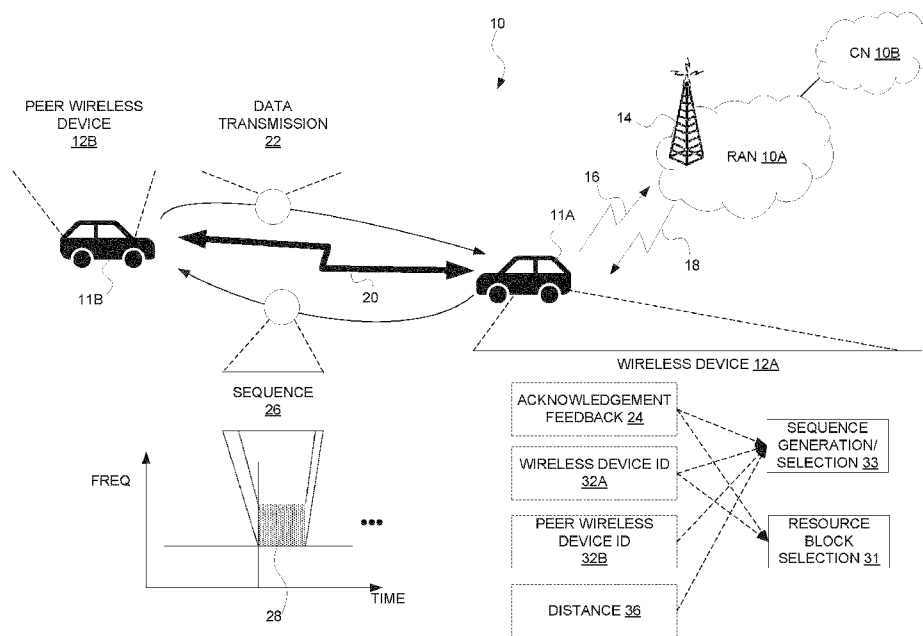


FIGURE 1

(57) Abstract: A wireless device (12A) receives a data transmission (22) from a peer wireless device (12B) on a sidelink (20) between the wireless device (12A) and the peer wireless device (12B). The wireless device (12A) transmits, to the peer wireless device (12B), a sequence (26) that is based on an identity (32B) of the peer wireless device (12B). Transmission of the sequence (26) conveys acknowledgement feedback (24) for the data transmission (22).

TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

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A. CLASSIFICATION OF SUBJECT MATTER
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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)
H04J 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, COMPENDEX, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2019/044667 A1 (GUO LI [US] ET AL) 7 February 2019 (2019-02-07)	1,2,6,8, 9,21,26, 27,35, 36,42, 43, 48-52, 58,59 3-5,7, 22-25
Y	paragraph [0109] paragraph [0219] - paragraph [0222]; figure 17 paragraphs [0224], [0249] - [0250] ----- -/--	



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

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"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

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Name and mailing address of the ISA/

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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	HUAWEI ET AL: "Sidelink physical layer procedures for NR V2X", 3GPP DRAFT; R1-1906008, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE , vol. RAN WG1, no. Reno, USA; 20190513 - 20190517 13 May 2019 (2019-05-13), XP051727465, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/Meetings%5F3GP P%5FSYNC/RAN1/Docs/R1%2D1906008%2Ezip [retrieved on 2019-05-13] page 8, paragraph 2.4.2.1 -----	3-5,7, 22-25
X	WO 2018/137452 A1 (HUAWEI TECH CO LTD [CN]) 2 August 2018 (2018-08-02)	10-14, 28-30, 37,38, 44,45, 53,54, 60,61 64-72
Y	abstract -& EP 3 553 985 A1 (HUAWEI TECH CO LTD [CN]) 16 October 2019 (2019-10-16) paragraphs [0003], [0058] - [0062], [0081], [0101] - [0104]; figure 7 -----	15,31, 64-72
Y	ITL: "Discussion on NR V2X HARQ mechanism", 3GPP DRAFT; R1-1901146 V2X HARQ PROCEDURE, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE , vol. RAN WG1, no. Taipei, Taiwan; 20190121 - 20190125 20 January 2019 (2019-01-20), XP051593990, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/Meetings%5F3GP P%5FSYNC/RAN1/Docs/R1%2D1901146%2Ezip [retrieved on 2019-01-20] page 1, paragraph 1 ----- -/--	15,31

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2020/072857

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	HUAWEI ET AL: "Sidelink physical layer structure for NR V2X", 3GPP DRAFT; R1-1906007, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE , vol. RAN WG1 17 May 2019 (2019-05-17), pages 1-18, XP051708049, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/tsg%5Fran/WG1%5FRL1/TSGR1%5F97/Docs/R1%2D1906007%2Ezip [retrieved on 2019-05-04]	16, 32-34, 39,46, 47,55, 62,63
Y	pages 1, 12 -----	64-72
X	SPREADTRUM COMMUNICATIONS: "Discussion on physical layer procedures for sidelink", 3GPP DRAFT; R1-1906362 DISCUSSION ON PHYSICAL LAYER PROCEDURES FOR SIDELINK FINAL, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPO , vol. RAN WG1, no. Reno, USA; 20190513 - 20190517 13 May 2019 (2019-05-13), XP051727812, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/Meetings%5F3GP%5FSYNC/RAN1/Docs/R1%2D1906362%2Ezip [retrieved on 2019-05-13] pages 2, 4 -----	17,40, 56,64
X	SPREADTRUM COMMUNICATIONS: "Discussion on NR V2X physical layer procedure", 3GPP DRAFT; R1-1902724 DISCUSSION ON NR V2X PHYSICAL LAYER PROCEDURE FINAL, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CED , vol. RAN WG1, no. Athens, Greece; 20190225 - 20190301 16 February 2019 (2019-02-16), XP051600419, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/tsg%5Fran/WG1%5FRL1/TSGR1%5F96/Docs/R1%2D1902724%2Ezip [retrieved on 2019-02-16] page 3, paragraph 2.1.3 - page 4 ----- -/--	17-20, 40,41, 56,57

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2020/072857

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	NTT DOCOMO ET AL: "Sidelink physical layer procedure for NR V2X", 3GPP DRAFT; R1-1902799 SL PHY PROCEDURE FINAL, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE , vol. RAN WG1, no. Athens, Greece; 20190225 - 20190301 16 February 2019 (2019-02-16), XP051600494, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/tsg%5Fran/WG1%5FRL1/TSGR1%5F96/Docs/R1%2D1902799%2Ezip [retrieved on 2019-02-16] page 1 - last line page 7 -----	64-72

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2020/072857

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: 1-9, 21-27, 35, 36, 42, 43, 48-52, 58, 59

a method/apparatus further comprising transmitting, to the peer wireless device, a sequence that is based on an identity of the peer wireless device;

2. claims: 10-15, 28-31, 37, 38, 44, 45, 53, 54, 60, 61

a method/apparatus further comprising: selecting a resource block in which to transmit the sequence, wherein the resource block is selected based on an identity of the wireless device; and transmitting the sequence to the peer wireless device on the selected resource block;

3. claims: 16, 32-34, 39, 46, 47, 55, 62, 63

a method/apparatus further comprising:
transmitting the sequence to the peer wireless device on the same subchannel as the subchannel on which the data transmission was received;

4. claims: 17-20, 40, 41, 56, 57, 64-72

a method comprising: determining, from among multiple acknowledgement feedback operations to be performed in the same time slot, a subset of the multiple acknowledgement feedback operations to perform in the time slot, based on one or more rules that assign respective priorities to the multiple acknowledgment feedback operations; and performing (1010), in the time slot, the acknowledgment feedback operations included in the determined subset.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2020/072857

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