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(54) Title: MULTI-STAGE SIDELINK CONTROL INFORMATION

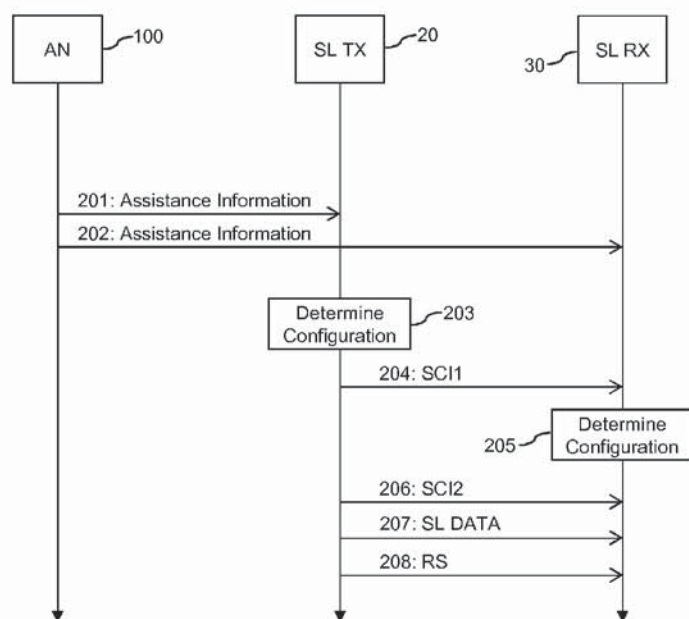


FIG. 2

(57) Abstract: A radio device (30) receives first sidelink control information (204) from a further radio device (20). Based on assistance information stored in the radio device (30) and the received first sidelink control information, the radio device (30) determines a configuration for transmission of second sidelink control information (206). Based on the determined configuration for transmission of the second sidelink control information (206), the radio device receives the second sidelink control information (206) from the further radio device. Based on the received second sidelink control information (206), the radio device receives a sidelink radio transmission from the further radio device (20).

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Published:

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PATENT COOPERATION TREATY

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From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

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ALLEMAGNE



PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(PCT Rule 71.1)

Date of mailing
(day/month/year)

04.06.2020

Applicant's or agent's file reference
32910WO

IMPORTANT NOTIFICATION

International application No.
PCT/EP2018/058706

International filing date (day/month/year)
05.04.2018

Priority date (day/month/year)

Applicant

Telefonaktiebolaget LM Ericsson (Publ)

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

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preliminary examining authority:



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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 32910WO		FOR FURTHER ACTION	See Form PCT/PEA/416
International application No. PCT/EP2018/058706	International filing date (day/month/year) 05.04.2018	Priority date (day/month/year)	
International Patent Classification (IPC) or national classification and IPC INV. H04W76/14			
Applicant Telefonaktiebolaget LM Ericsson (Publ)			
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of <u>10</u> sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. ☒ (sent to the applicant and to the International Bureau) a total of <u>15</u> sheets, as follows: ☒ sheets of the description, claims and/or drawings which have been amended and/or sheets containing rectifications authorized by this Authority, unless those sheets were superseded or cancelled, and any accompanying letters (see Rules 46.5, 66.8, 70.16, 91.2, and Section 607 of the Administrative Instructions). ☐ sheets containing rectifications, where the decision was made by this Authority not to take them into account because they were not authorized by or notified to this Authority at the time when this Authority began to draw up this report, and any accompanying letters (Rules 66.4bis, 70.2(e), 70.16 and 91.2). ☐ superseded sheets and any accompanying letters, where this Authority either considers that the superseding sheets contain an amendment that goes beyond the disclosure in the international application as filed, or the superseding sheets were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in item 4 of Box No. I and the Supplemental Box (see Rule 70.16(b)). b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing, in the form of an Annex C/ST.25 text file, as indicated in the Supplemental Box Relating to Sequence Listing (see paragraph 3ter of Annex C of the Administrative Instructions).			
4. This report contains indications relating to the following items: ☒ Box No. I Basis of the report ☐ Box No. II Priority ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability ☐ Box No. IV Lack of unity of invention ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement ☐ Box No. VI Certain documents cited ☐ Box No. VII Certain defects in the international application ☒ Box No. VIII Certain observations on the international application			
Date of submission of the demand 05.02.2020		Date of completion of this report 04.06.2020	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Fax: +49 89 2399 - 4465		Authorized officer Cankaya, Sukru Telephone No. +49 89 2399-7005	



**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/EP2018/058706

Box No. I Basis of the report

1. With regard to the **language**, this report is based on
- ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3(a) and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4(a))
 - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a) and (b))
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-51 as originally filed

Claims, Numbers

1-67 filed in electronic form on

24-04-2020

Drawings, Sheets

1/8-8/8 as originally filed

- ☐ a sequence listing - see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since either they are considered to go beyond the disclosure as filed, or they were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in the Supplemental Box (Rules 70.2(c) and (c-bis)):
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
5. ☐ This report has been established:
- ☐ taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rules 66.1(d-bis) and 70.2(e)).
 - ☐ without taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91(Rules 66.4bis and 70.2(e)).

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/EP2018/058706

6. ☒ With regard to top-up searches (Rules 66.1 *ter* and 70.2(f)):
- ☒ A top-up search was carried out by this Authority on 18.05.2020 (all discovered documents are listed in the Supplemental Box Relating to Top-up Search).
 - ☐ Additional relevant documents have been discovered during the top-up search.
 - ☐ No top-up search was carried out by this Authority because it would serve no useful purpose.
7. ☐ Supplementary international search report(s) from Authority(ies) has/have been received and taken into account in establishing this report (Rule 45bis.8(b) and (c)).

* If item 4 applies, some or all of those sheets may be marked "superseded".

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>1-67</u>
	No: Claims	
Inventive step (IS)	Yes: Claims	<u>1-67</u>
	No: Claims	
Industrial applicability (IA)	Yes: Claims	<u>1-67</u>
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

1 **Re Item V**

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

- D1 US 2018/049260 A1 (AMINAKA HIROAKI [JP] ET AL) 15 February 2018 (2018-02-15)
- D2 US 2018/049084 A1 (LEE YOUNGDAE [KR] ET AL) 15 February 2018 (2018-02-15)

- 2 **D1** is regarded as being the prior art closest to the subject-matter of the independent claims **1, 19, 37, 53, 56, 59, 62, 64, 65**.

Claims 1 (method), 53 (apparatus) deal with the receiving end, where claims 19 (method), 56 (apparatus) deal with the sending end, where the invention is symmetrically implemented by these interrelated ends.

Claim 62 seeks protection for a system, where claims 64, 65 seek protection for a computer program and computer program product, respectively.

Claims **1, 19, 37, 53, 56, 59, 62, 64, 65** are new (Article 33(2) PCT) and inventive (Article 33(3) PCT) as argued below.

- 2.1 Present **claim 1** discloses (the references in parentheses applying to **D1**):

A method of controlling sidelink radio transmissions in a wireless communication network, the method comprising:

a radio device receiving first sidelink control information from a further radio device, (Paragraph 61: " As with the relay UE 1, the remote UE 2 also starts the sidelink communication in the partial coverage in accordance with the pre-configured radio parameter(s), The pre-configured radio parameter(s) held by the relay UE 1 includes the same or corresponding configuration as that held by the remote UE 2."**;** **Paragraph 77:** "....when the sidelink communication (e.g., direct discovery) with the remote UE 2 in accordance with the pre-

configured parameter(s) (pre-configured radio parameter(s)) has succeeded, the relay UE 1 starts the sidelink communication (e.g., direct communication) with the remote UE 2 in accordance with a radio parameter(s) that is specified by the eNodeB 31 in the PLMN 100."; **Paragraph 87:** "For example, the relay UE 1 may transmit, on the sidelink in accordance with the pre-configured radio parameter, a broadcast channel (PSBCH) indicating the radio parameter specified by the eNodeB 31. In this case, the remote UE 2 may receive the PSBCH from the relay UE 1 in accordance with the pre-configured radio parameter,"; **Figures 5, 8 // COMMENT:** The "relay UE 1" is the "further radio device" of the claim; the "remote UE 2" is the "radio device" of the claim; and the "radio parameter specified by the eNodeB 31" of D1 is the "first sidelink control information" of the claim, where the "pre-configured radio parameters" of D1 is the "assistance data" of the claim as disclosed in the next step) ~~the first sidelink control information comprising information for sensing-based allocation of radio resources for a sidelink radio transmission;~~

~~based on assistance information stored in the radio device and the received first sidelink control information, the radio device determining a configuration for transmission of second sidelink control information;~~

~~based on the determined configuration for transmission of the second sidelink control information, the radio device receiving the second sidelink control information from the further radio device; and~~

~~based on the received second sidelink control information, the radio device receiving the sidelink radio transmission from the further radio device.~~

2.1.1 Therefore, claim 1 is novel over D1 (Article 33(2) PCT).

- 2.2 D1 at most discloses the feature the "first sidelink control information" which is represented by the feature "radio parameter(s) that is specified by the eNodeB 31" of D1, wherein the sidelink radio transmission is then received based on said "radio parameter(s) that is specified by the eNodeB 31".

D1 neither discloses nor foresees a "second sidelink control information".

The "first sidelink control information" and the "second sidelink control information" are not simply chunks of a whole data. The "first sidelink control information" is used to configure the reception (or transmission) of the "second sidelink control information". Such a method is not obvious from D1.

- 2.2.1 The **problem to be solved** is, therefore, how to provide a more flexibility for sidelink radio transmission.

As the solution, claim 1 discloses the "second sidelink control information", where the "first sidelink control information" may prepare an UE for reception of a more complex sidelink configuration information (being said "second sidelink control information").

In D1, only said "radio parameter(s) that is specified by the eNodeB 31" is used for preparing the UE for sidelink radio transmission.

Furthermore, claim 1 discloses the feature "sensing-based allocation of radio resources", where this feature is a known term from the standards and provides extra flexibility beside the "second sidelink control information", whereby the radio devices become more autonomous for sidelink communication resource allocation. D1 is also silent about said "sensing-based allocation of radio resources".

D2 only provides background information.

Therefore, the subject-matter of claim 1 is not obvious from D1 and so inventive (Article 33(3) PCT).

- 3 Dependent claims 2-18, 20-36, 54, 55, 57, 58, 63 as such also meet the requirements of the PCT with respect to novelty and inventive step.

4 (Notwithstanding the minor clarity objection given below, and also in section VIII) Independent **claims 37, 59, 66, 67** seek protection for the network side (where claims 1, 19, 37, 53, 56, 59, 62, 64, 65 seek protection for the User Equipment side).

4.1 The following minor exemplary amendments (underlined) are suggested for claim 59 to clarify the technical effect of "sidelink radio transmission" and to clarify the technical effect of "second sidelink control information":

-**"the assistance information relating first sidelink control information to a configuration for transmission of second sidelink control information, to be used for a sidelink radio transmission...."** [for support of the suggested amendment, see claim 1. Otherwise, it would not be clear how said "sidelink radio transmission" is established and also it would not be clear for what purpose said "second sidelink control information" will be used]

-**"....for sensing-based allocation of radio resources for the sidelink radio transmission from the first...."**

4.2 The closest prior art for **claim 59** is **D1** (the references in parentheses applying to D1):

A node (**Paragraph 82:**" In Block 806, the relay UE 1 receives the radio configuration for direct communication from the eNodeB 31, The radio configuration for direct communication specifies radio resources to lie used for direct communication ("; **Paragraph 92:**" Similar to the first and second embodiments, the relay UE 1 according to this embodiment is configured to receive a activation request for the sidelink communication from the PLMN 100 when it is in coverage of the PLMN 100" // **COMMENT-1:** *The "eNodeB/PLMN" of D1 corresponds to the "node" of the claim*) **for a wireless communication network, the node being configured to:**

- **provide assistance information to a first radio device** (**Paragraph 82:**" In Block 806, the relay UE 1 receives the radio configuration for direct communication from the eNodeB 31,

The radio configuration for direct communication specifies radio resources to lie used for direct communication (";
Paragraph 92:" Similar to the first and second embodiments, the relay UE 1 according to this embodiment is configured to receive a activation request for the sidelink communication from the PLMN 100 when it is in coverage of the PLMN 100....In this embodiment, however, this activation request includes an indication indicating which of the pre-configured radio parameter in the relay UE 1 and the remote UE 2 (hereinafter referred to as a first radio parameter) and the radio parameter specified by the eNodeB 31 (hereinafter referred to as a second radio parameter) should be used for the sidelink communication in the partial coverage" // **COMMENT-2:** *The "relay UE 1" of D1 corresponds to the "first radio device" of the claim. The eNodeB of D1 either sends an indication to the relay UE 1 to dictate which one of the preconfigured parameters to be used OR transmits radio parameters (which will be used instead of said preconfigured parameters)) ; and*

~~provide the assistance information to a second radio device,
the assistance information relating first sidelink control information to a
configuration for transmission of second sidelink control information,~~

[[to be used for a sidelink radio transmission, from the first radio device to the second radio device, *the first sidelink control information being transmitted from the first radio device to the second radio device and comprising information for sensing-based allocation of radio resources for the sidelink radio transmission from the first radio device to the second radio device]]*--->>> **These are out-of-scope features. However, they further qualify the technical effect of the "assistance information" and do not injure the novelty & inventiveness of the claimed node. So, they are allowed in the claim.**

4.3 Therefore, claim 59 is novel over D1 (Article 33(2) PCT).

- 4.4 As argued above in section "COMMENT-2", D1 sends the "radio parameters" only to the "relay UE 1" (the eNodeB can logically not transmit the radio parameters to UE-2, since the UE-2 is out-of-coverage).

These radio parameters tell the relay UE-1 what resources to use for the sidelink radio transmission with the UE-2.

D1 neither discloses nor foresees relating a first sidelink control information to a second sidelink control information transmitted between the UEs in any manner.

The "node" of claim 59 on the other hand, is configured to provide "assistance data" which is used for relating said "first sidelink control information" to the "first sidelink control information" (see also the explanations given above in **sections 2.2 and 2.2.1** for the technical effect of "first & second sidelink control information").

So, the node of claim 59 is neither disclosed nor rendered obvious in D1.

The stated problem and solution above in section 2.1.1 is also valid for claim 59, where the interrelated claim 59 solves the stated problem from the network side's perspective.

D2 only provides background information.

Therefore, the subject-matter of claim 59 is not obvious from D1 and so inventive (Article 33(3) PCT).

- 4.5 The above given positive arguments for claim 59 are also valid for the corresponding independent **claims 37, 66, 67**.

The exemplary amendments (underlined) that are suggested for claim 59 are also valid for claim 37 (where the order of the wording in claim 37 is different).

- 5 Dependent claims 38-52, 60, 61 as such also meet the requirements of the PCT with respect to novelty and inventive step.

Re Item VIII

Certain observations on the international application

- 6 The application does not meet the requirements of Article 6 PCT.
- 6.1 Claim 59 is expected to read (underlined exemplary amendments as given and argued above in section 4.1):

".....the assistance information relating first sidelink control information to a configuration for transmission of second sidelink control information, to be used for a sidelink radio transmission, from the first radio device to the second radio device, the first sidelink control information being transmitted from the first radio device to the second radio device and comprising information for sensing-based allocation of radio resources for the sidelink radio transmission from the first radio device to the second radio device".

- 6.2 Claim 59 is expected to read (underlined exemplary amendment as given above):

"..., to a configuration for transmission of second sidelink control information, to be used for said sidelink radio transmission, from the first radio device.....".

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Unser Zeichen

Our Ref.

32910WO FB/MS/ab

Bitte in der Antwort angeben
Please refer to in your reply

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³ auch Consulente in Brevetti

April 24, 2020

Re: International Patent Application No. PCT/EP2018/058706
Telefonaktiebolaget LM Ericsson (publ)

In response to the Written Opinion issued on March 4, 2020.

I.

Enclosed new claims 1 to 67 are filed as a replacement for the present set of claims on file. A working copy of the new claims, including marked changes as compared to the present claims, is enclosed as well.

As can be seen, the newly filed claims correspond to the present claims, with amendments in new claims 37 and 59.

New claim 37 was amended by specifying that the steps of providing the assistance information are performed by a node of the wireless communication network. Accordingly, the claim was aligned with claim 59 and the originally filed description on

page 27, lines 27 to 31.

New claim 59 was amended by replacing the term "radio device (100)" by "node (100)", so that the claim now consistently defines functionalities of a node for a wireless communication network. Further, new claim 59 was amended to clarify that it is the first side link control information which comprises the information for sensing-based allocation of radio resources.

II.

As regards the objections under items 4.1 and 4.2 of the Written Opinion, it is respectfully submitted that these are overcome by the amendments in the newly filed claims.

III.

Concerning patentability, the Written Opinion raised objections as to a lack of inventiveness or independent claims 37, 59, 66, and 67. These objections were based on assuming that the assistance information of the claimed solution may be identified with the "pre-configured radio parameter(s)" of D1.

The applicant respectfully disagrees. In particular, claims 37 and 59 specify that the node provides the assistance information to the radio devices. Accordingly, the claims define a specific functionality of the node.

Further, the claims also define characteristics of the assistance information, namely that the assistance information relates the first side link control information to the second side link control information, with the first side link control information being transmitted from the first radio device to the second radio device and comprising information for sensing-based allocation of radio resources for a side link radio transmission from the first radio device to the second radio device.

By specifying these characteristics of the assistance information, the claims also

further specify the functionality of the node providing the assistance information to the radio devices.

Under item 4.1.1, the Written Opinion argued that "the information for sensing-based location" would not belong to the scope of protection of claim 59, because the "first side link control information" would not be a feature of the claimed node.

The applicant respectfully disagrees. In particular, as explained above, claim 59 specifies a functionality of the node, namely providing the assistance information with the characteristics defined in the claim. In this way, also the "information for sensing-based allocation" comprised in the first side link control information is part of the functionalities of the node specified in the claim and may not be disregarded when assessing patentability of the claimed node. Moreover, it also has to be taken into account that utilizing the assistance information to relate the first side link control information, which comprises the information for sensing-based allocation, to a configuration for transmission off the second side link control information, provides a technical effect over the teachings of D1, namely enabling the second radio device to receive more complex side link control information and providing extra flexibility by enabling a more autonomous resource allocation for side link communication between the first radio device and the second radio device. This is also acknowledged under item 2.2.1 of the Written Opinion.

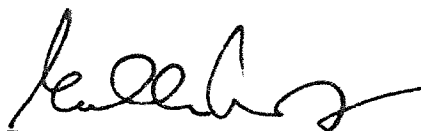
Accordingly, the assistance information defined in claims 37 and 59 differs significantly from the "radio parameter(s)" and provides benefits which are not indicated or otherwise suggested by D1.

Consequently, also the subject matter of new claims 37 and 59 must be considered as involving an inventive step over the available prior art.

IV.

In view of the above, it is respectfully requested that the objections raised in the Written Opinion be withdrawn and the allowability of the claims be acknowledged in

the International Preliminary Report on Patentability. If this request cannot be followed, it is respectfully requested that the undersigned representative be contacted for a telephone consultation (in accordance with the "Notice from the European Patent Office dated August 31, 2011, concerning the issuance of a second Written Opinion in the proceedings under Chapter II PCT").

A handwritten signature in black ink, appearing to read 'Markku Schwarz', written in a cursive style.

Dr. Markku Schwarz
European Patent Attorney

Encl.

New claims 1 to 67 (clean copy and working copy)

- 1 -

Claims

1. A method of controlling sidelink radio transmissions in a wireless communication network, the method comprising:
- 5 a radio device (30) receiving first sidelink control information (204) from a further radio device (20), the first sidelink control information (204) comprising information for sensing-based allocation of radio resources for a sidelink radio transmission (207, 208);
based on assistance information stored in the radio device (30) and the received first sidelink control information (204), the radio device (30) determining a configuration for transmission of
10 second sidelink control information (206);
based on the determined configuration for transmission of the second sidelink control information (206), the radio device (30) receiving the second sidelink control information (206) from the further radio device (20); and
based on the received second sidelink control information (206), the radio device (30) receiving
15 the sidelink radio transmission (207, 208) from the further radio device (20).
2. The method according to claim 1,
wherein the assistance information defines multiple candidate configurations for transmission of the second sidelink control information (206); and
20 wherein the first sidelink control information (204) identifies the configuration for transmission of the second sidelink control information (206) among the candidate configurations.
3. The method according to claim 2,
wherein the first sidelink control information (204) comprises an index identifying the
25 configuration for transmission of the second sidelink control information (206) among the candidate configurations.
4. The method according to any one of the preceding claims,
wherein the second sidelink control information (206) comprises information indicating at least
30 one of: radio resources to be used for the sidelink radio transmission (207, 208), a modulation and/or coding scheme to be used for the sidelink radio transmission (207, 208), one or more retransmission parameters of the sidelink radio transmission (207, 208), and a priority level of the sidelink radio transmission (207, 208).
- 35 5. The method according to any one of the preceding claims,
wherein a first part of the configuration for transmission of the second sidelink control information (206) is defined by the first sidelink control information (204) and a second part of

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the configuration for transmission of the second sidelink control information (206) is defined by the assistance information.

6. The method according to any one of the preceding claims,

5 wherein the configuration for transmission of the second sidelink control information (206) defines radio resources forming a search space for transmission of the second sidelink control information (206).

7. The method according to claim 6,

10 wherein the configuration for transmission of the second sidelink control information (206) defines radio resources forming multiple search spaces for transmission of the second sidelink control information (206) and a priority order of the multiple search spaces.

8. The method according to any one of the preceding claims,

15 wherein the configuration for transmission of the second sidelink control information (206) defines a format for transmission of the second sidelink control information (206).

9. The method according to any one of the preceding claims,

20 wherein the configuration for transmission of the second sidelink control information (206) defines an aggregation level for transmission of the second sidelink control information (206).

10. The method according to any one of the preceding claims,

25 wherein the configuration for transmission of the second sidelink control information (206) defines a modulation and/or coding scheme for transmission of the second sidelink control information (206).

11. The method according to any one of the preceding claims,

30 wherein at least one of the first sidelink control information (204) and the second sidelink control information (206) comprises a common error detection code for checking integrity of both the first sidelink control information (204) and the second sidelink control information (206).

12. The method according to any one of the preceding claims, comprising:

35 the radio device (30) receiving at least a part of the assistance information from a node (100) of the wireless communication network; and
the radio device (30) storing the received assistance information.

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13. The method according to claim 12, comprising:

the radio device (30) receiving the at least part of the assistance information in response to the radio device (30) entering a service area of the node (100).

5 14. The method according to any one of the preceding claims, comprising:

the radio device (30) receiving at least a part of the assistance information from the further radio device (20).

15. The method according to claim 14, comprising:

10 the radio device (30) receiving the at least part of the assistance information in response to the radio device (30) entering a radio coverage area of the further radio device (20).

16. The method according to any one of claims 12 to 15, comprising:

15 the radio device (30) receiving the at least part of the assistance information in response to a request (306; 313) from the radio device (30).

17. The method according to any one of the preceding claims,

wherein the sidelink radio transmission (207, 208) comprises a transmission on a data channel.

20 18. The method according to any one of the preceding claims,

wherein the sidelink radio transmission (207, 208) comprises a transmission of one or more reference signals.

25 19. A method of controlling sidelink radio transmissions in a wireless communication network, the method comprising:

based on assistance information stored in a radio device (20), the radio device (20) determining first sidelink control information (204), the assistance information relating the first sidelink control information (204) to a configuration for transmission of second sidelink control information (206), and the first sidelink control information (204) comprising information for
30 sensing-based allocation of radio resources for a sidelink radio transmission (207, 208); the radio device (20) sending the first sidelink control information (204) to a further radio device (30);

based on the configuration, the radio device (20) sending the second sidelink control information (206) to the further radio device (30); and

35 based on the second sidelink control information (206), the radio device (20) sending the sidelink radio transmission (207, 208) to the further radio device (30).

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20. The method according to claim 19,
wherein the assistance information defines multiple candidate configurations for transmission
of the second sidelink control information (206); and
wherein the first sidelink control information (204) identifies the configuration for transmission
5 of the second sidelink control information (206) among the candidate configurations.

21. The method according to claim 20,
wherein the first sidelink control information (204) comprises an index identifying the
configuration for transmission of the second sidelink control information (206) among the
10 candidate configurations.

22. The method according to any one of claims 19 to 21,
wherein the second sidelink control information (206) comprises information indicating at least
one of: radio resources to be used for the sidelink radio transmission (207, 208), a modulation
15 and/or coding scheme to be used for the sidelink radio transmission (207, 208), one or more
retransmission parameters of the sidelink radio transmission (207, 208), and a priority level of
the sidelink radio transmission (207, 208).

23. The method according to any one of claims 19 to 22,
20 wherein a first part of the configuration for transmission of the second sidelink control
information (206) is defined by the first sidelink control information (204) and a second part of
the configuration for transmission of the second sidelink control information (206) is defined by
the assistance information.

24. The method according to any one of claims 19 to 23,
25 wherein the configuration for transmission of the second sidelink control information (206)
defines radio resources forming a search space for transmission of the second sidelink control
information (206).

25. The method according to claim 24,
30 wherein the configuration for transmission of the second sidelink control information (206)
defines radio resources forming multiple search spaces for transmission of the second sidelink
control information (206) and a priority order of the multiple search spaces.

26. The method according to any one of claims 19 to 25,
35 wherein the configuration for transmission of the second sidelink control information (206)
defines a format for transmission of the second sidelink control information (206).

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27. The method according to any one of claims 19 to 26,
wherein the configuration for transmission of the second sidelink control information (206)
defines an aggregation level for transmission of the second sidelink control information (206).

5

28. The method according to any one of claims 19 to 27,
wherein the configuration for transmission of the second sidelink control information (206)
defines a modulation and/or coding scheme for transmission of the second sidelink control
information (206).

10

29. The method according to any one of claims 19 to 28,
wherein at least one of the first sidelink control information (204) and the second sidelink
control information (206) comprises a common error detection code for checking integrity of
both the first sidelink control information (204) and the second sidelink control information
(206).

15

30. The method according to any one of claims 19 to 29, comprising:
the radio device (20) receiving at least a part of the assistance information from a node (100)
of the wireless communication network; and
the radio device (20) storing the received assistance information.

20

31. The method according to claim 30, comprising:
the radio device (20) receiving the at least part of the assistance information in response to
the radio device (20) entering a service area of the node (100).

25

32. The method according to any one of claims 19 to 31, comprising:
the radio device (20) receiving at least a part of the assistance information from the further
radio device (30).

30

33. The method according to claim 32, comprising:
the radio device (20) receiving the at least part of the assistance information in response to
the radio device (20) entering a radio coverage area of the further radio device (30).

35

34. The method according to any one of claims 30 to 33, comprising:
the radio device (20) receiving the at least part of the assistance information in response to a
request (302) from the radio device (20).

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35. The method according to any one of claims 19 to 34,
wherein the sidelink radio transmission (207, 208) comprises a transmission on a data channel.

36. The method according to any one of claims 19 to 35,

5 wherein the sidelink radio transmission (207, 208) comprises a transmission of one or more
reference signals.

37. A method of controlling sidelink radio transmissions in a wireless communication network,
the method comprising:

10 a node (100) of the wireless communication network providing assistance information to a first
radio device (20); and

the node (100) providing the assistance information to a second radio device (30),
the assistance information relating first sidelink control information (204), transmitted from the
first radio device (20) to the second radio device (30) and comprising information for sensing-
15 based allocation of radio resources for a sidelink radio transmission (207, 208) from the first
radio device (20) to the second radio device (30), to a configuration for transmission of second
sidelink control information (206) from the first radio device (20) to the second radio device
(30).

20 38. The method according to claim 37,

wherein the assistance information defines multiple candidate configurations for transmission
of the second sidelink control information (206); and

wherein the first sidelink control information (204) identifies the configuration for transmission
of the second sidelink control information (206) among the candidate configurations.

25

39. The method according to claim 38,

wherein the first sidelink control information (204) comprises an index identifying the
configuration for transmission of the second sidelink control information (206) among the
candidate configurations.

30

40. The method according to any one of claims 37 to 39,

wherein the second sidelink control information (206) comprises information indicating at least
one of: radio resources to be used for the sidelink radio transmission (207, 208), a modulation
and/or coding scheme to be used for the sidelink radio transmission (207, 208), one or more
35 retransmission parameters of the sidelink radio transmission (207, 208), and a priority level of
the sidelink radio transmission (207, 208).

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41. The method according to any one of claims 37 to 40,
wherein a first part of the configuration for transmission of the second sidelink control
information (206) is defined by the first sidelink control information (204) and a second part of
the configuration for transmission of the second sidelink control information (206) is defined by
5 the assistance information.

42. The method according to any one of claims 37 to 41,
wherein the configuration for transmission of the second sidelink control information (206)
defines radio resources forming a search space for transmission of the second sidelink control
10 information (206).

43. The method according to claim 42,
wherein the configuration for transmission of the second sidelink control information (206)
defines radio resources forming multiple search spaces for transmission of the second sidelink
15 control information (206) and a priority order of the multiple search spaces.

44. The method according to any one of claims 37 to 43,
wherein the configuration for transmission of the second sidelink control information (206)
defines a format for transmission of the second sidelink control information (206).
20

45. The method according to any one of claims 37 to 44,
wherein the configuration for transmission of the second sidelink control information (206)
defines an aggregation level for transmission of the second sidelink control information (206).

46. The method according to any one of claims 37 to 45,
wherein the configuration for transmission of the second sidelink control information (206)
defines a modulation and/or coding scheme for transmission of the second sidelink control
25 information (206).

47. The method according to any one of claims 37 to 46, comprising:
a node (100) of the wireless communication network sending the assistance information in
response to the first radio device (20) and/or the second radio device (30) entering a service
30 (101) area of the node (100).

48. The method according to any one of claims 37 to 47, comprising:

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a node (100) of the wireless communication network sending the assistance information in response to a request (302; 306) from the first radio device (20) and/or a request from the second radio device (30).

5 49. The method according to any one of claims 37 to 48, comprising:

a node (100) of the wireless communication network sending the assistance information via the first radio device (20) to the second radio device (30).

50. The method according to any one of claims 37 to 49, comprising:

10 a node (100) of the wireless communication network sending the assistance information via the second radio device (30) to the first radio device (20).

51. The method according to any one of claims 37 to 50,

wherein the sidelink radio transmission (207, 208) comprises a transmission on a data channel.

15

52. The method according to any one of claims 37 to 51,

wherein the sidelink radio transmission (207, 208) comprises a transmission of one or more reference signals.

20 53. A radio device (30) for a wireless communication network, the radio device (30) being configured to:

- receive first sidelink control information (204) from a further radio device (20), the first sidelink control information (204) comprising information for sensing-based allocation of radio resources for a sidelink radio transmission (207, 208);

25 - based on assistance information stored in the radio device (30) and the received first sidelink control information (204), determine a configuration for transmission of second sidelink control information (206);

- based on the determined configuration for transmission of the second sidelink control information (206), receive the second sidelink control information (206) from the further radio
30 device (20); and

- based on the received second sidelink control information (206), receive the sidelink radio transmission (207, 208) from the further radio device (20).

54. The radio device (30) according to claim 53,

35 wherein the radio device (30) is configured to perform the steps of a method according to any one of claims 1 to 18.

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55. The radio device (30) according to claim 53, comprising:

at least one processor and a memory containing instructions executable by said at least one processor, whereby the radio device (30) is operative to perform a method according to any one of claims 1 to 18.

5

56. A radio device (20) for a wireless communication network, the radio device (20) being configured to:

- based on assistance information stored in the radio device (20), determine first sidelink control information (204), the assistance information relating the first sidelink control information (204) to a configuration for transmission of second sidelink control information (206), and the first sidelink control information (204) comprising information for sensing-based allocation of radio resources for a sidelink radio transmission (207, 208);
- sending the first sidelink control information (204) to a further radio device (30);
- based on the configuration, send the second sidelink control information (206) to the further radio device (30); and
- based on the second sidelink control information (206), send the sidelink radio transmission (207, 208) to the further radio device (30).

10
15

57. The radio device (20) according to claim 56,

- wherein the radio device (20) is configured to perform the steps of a method according to any one of claims 19 to 36.

20

58. The radio device (20) according to claim 56, comprising:

- at least one processor and a memory containing instructions executable by said at least one processor, whereby the radio device (20) is operative to perform a method according to any one of claims 19 to 36.

25

59. A node (100) for a wireless communication network, the node (100) being configured to:

- provide assistance information to a first radio device (20); and
 - provide the assistance information to a second radio device (30),
- the assistance information relating first sidelink control information (204) to a configuration for transmission of second sidelink control information (206) from the first radio device (20) to the second radio device (30), the first sidelink control information (204) being transmitted from the first radio device (20) to the second radio device (30) and comprising information for sensing-based allocation of radio resources for a sidelink radio transmission (207, 208) from the first radio device (20) to the second radio device (30).

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60. The node (100) according to claim 59,
wherein the node (100) is configured to perform the steps of a method according to any one
of claims 37 to 52.

5 61. The node (100) according to claim 59, comprising:
at least one processor and a memory containing instructions executable by said at least one
processor, whereby the node (100) is operative to perform a method according to any one of
claims 37 to 52.

10 62. A system, comprising:
a first radio device (20) and a second radio device (30) storing assistance information;
the first radio device (20) being configured to:
- based on the assistance information stored in the first radio device (20), determine first
sidelink control information (204), the assistance information relating the first sidelink control
15 information (204) to a configuration for transmission of second sidelink control information
(206), and the first sidelink control information (204) comprising information for sensing-based
allocation of radio resources for a sidelink radio transmission (207, 208);
- send the first sidelink control information (204) to the second radio device (30);
- based on the configuration, send the second sidelink control information (206) to the second
20 radio device (30); and
- based on the second sidelink control information (206), send the sidelink radio transmission
(207, 208) to the second radio device (30);
the second radio device (30) being configured to:
- receive the first sidelink control information (204) from the first radio device (20);
25 - based on the assistance information stored in the second radio device (30) and the received
first sidelink control information (204), determine the configuration for transmission of the
second sidelink control information (206);
- based on the determined configuration for transmission of the second sidelink control
information (206), receive the second sidelink control information (206) from the first radio
30 device (20); and
- based on the received second sidelink control information (206), receive the sidelink radio
transmission (207, 208) from the first radio device (20).

63. The system according to claim 62, further comprising:
35 a node (100) of the wireless communication network, the node (100) being configured to
provide the assistance information to the first radio device (20) and/or to the second radio
device (30).

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64. A computer program comprising program code to be executed by at least one processor of a radio device (30, 20), whereby execution of the program code causes the radio device (30, 20) to perform a method according to any one of claims 1 to 36.

5

65. A computer program product comprising program code to be executed by at least one processor of a radio device (30, 20), whereby execution of the program code causes the radio device (30, 20) to perform a method according to any one of claims 1 to 36.

10

66. A computer program comprising program code to be executed by at least one processor of a node (100) of a wireless communication network, whereby execution of the program code causes the node (100) to perform a method according to any one of claims 37 to 52.

15

67. A computer program product comprising program code to be executed by at least one processor of a node (100) of a wireless communication network, whereby execution of the program code causes the node (100) to perform a method according to any one of claims 37 to 52.