

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 P77549WO1	FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/SE2020/050343	International filing date (<i>day/month/year</i>) 02.04.2020	Priority date (<i>day/month/year</i>) 02.04.2019	
International Patent Classification (IPC) or national classification and IPC INV. H04W72/12			
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>8</u> sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. ☒ (<i>sent to the applicant and to the International Bureau</i>) a total of <u>12</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which have been amended and/or sheets containing rectifications authorized by this Authority, unless those sheets were superseded or cancelled, and any accompanying letters (see Rules 46.5, 66.8, 70.16, 91.2, and Section 607 of the Administrative Instructions).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 ☐ superseded sheets and any accompanying letters, where this Authority either considers that the superseding sheets contain an amendment that goes beyond the disclosure in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. ☐ (<i>sent to the International Bureau only</i>) 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 01.02.2021	Date of completion of this report 21.04.2021		
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 Zembery, Peter Telephone No. +49 89 2399-6966		



**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/SE2020/050343

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

1-47 as originally filed

Claims, Numbers

1-37 filed in electronic form on

01-04-2021

Drawings, Sheets

1/12-12/12 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. 38-47
 - ☐ 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)).

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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 06.04.2021 (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. II Priority

1. ☐ This report has been established as if no priority had been claimed due to the failure to furnish within the prescribed time limit the requested:
- ☐ copy of the earlier application whose priority has been claimed (Rule 66.7(a)).
 - ☐ translation of the earlier application whose priority has been claimed (Rule 66.7(b)).
2. ☐ This report has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rule 64.1). Thus for the purposes of this report, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:
- see separate sheet

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>1-37</u>
	No: Claims	
Inventive step (IS)	Yes: Claims	<u>1-37</u>
	No: Claims	
Industrial applicability (IA)	Yes: Claims	<u>1-37</u>
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

**INTERNATIONAL PRELIMINARY REPORT
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Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

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

Reference is made to the following documents:

- D1 OPPO: "UE Adaptation to the Traffic and UE Power Consumption",
3GPP DRAFT; R1-1902745, 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), XP051600440,
Retrieved from the Internet:
URL:[http://www.3gpp.org/ftp/tsg%5Fran/WG1%5FRL1/TSGR1%5F96/
Docs/R1%2D1902745%2Ezip](http://www.3gpp.org/ftp/tsg%5Fran/WG1%5FRL1/TSGR1%5F96/Docs/R1%2D1902745%2Ezip)
[retrieved on 2019-02-16]
- D2 QUALCOMM INCORPORATED: "Potential Techniques for UE Power
Saving", 3GPP DRAFT; R1-1903016 POTENTIAL TECHNIQUES FOR UE
POWER SAVING, 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), XP051600713,
Retrieved from the Internet:
URL:[http://www.3gpp.org/ftp/tsg%5Fran/WG1%5FRL1/TSGR1%5F96/
Docs/R1%2D1903016%2Ezip](http://www.3gpp.org/ftp/tsg%5Fran/WG1%5FRL1/TSGR1%5F96/Docs/R1%2D1903016%2Ezip)
[retrieved on 2019-02-16]

Re Item II

Priority

- 1 Priority document US 62/828218 has been checked, priority of the present
International Patent Application is considered valid.

Re Item V

Reasoned statement under Article 35(2) PCT

- 1 The present International Application relates to a method, for a network node, of scheduling a UE according to **claim 1**, a corresponding method for a UE according to **claim 16**, corresponding apparatuses according to **claims 30, 31, 34 and 35** and corresponding computer program products according to **claims 32, 33, 36 and 27** respectively.
- 2 Document **D1** considered to be the closest prior art discloses a method, performed by a network node, for scheduling a UE similar to that of **claim 1**. According to the method of **D1** the network node transmits to a UE a configuration including time-domain resource allocations, TDRAs, in a form of two tables - one table defines a PDSCH time-domain resource allocation supporting same-slot scheduling, the other table defines a PDSCH time-domain resource allocation supporting cross-slot scheduling. Each table also defines scheduling offsets.
- 2.1 The subject-matter of **claim 1** differs from this known method in that in the transmitted configuration:
the one or more TDRAs each include a first scheduling offset and a second scheduling offset between a scheduling message and a signal or channel scheduled via the scheduling message.

The subject-matter of **claim 1** is therefore novel (Article 33(2) PCT).
- 3 A technical effect related to the difference identified above is that a faster dynamic switching between a same-slot and a cross-slot scheduling can be achieved. The objective technical problem to be solved can be formulated as how to achieve this technical effect.
- 4 The solution to this problem proposed in **claim 1** of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

According to document **D1**, two tables defining a same-slot scheduling offsets and a cross-slot scheduling offsets respectively are defined. Thus, when a dynamic indication on which offsets are to be used for a particular TDRA is received by a UE, the respective table is referenced and the desired offset is found. There is however no hint to define, for each TDRA, both offsets at once, thereby shortening the time of acquisition of the desired offset the UE is to use. There is further no hint in document **D1**, that would suggest the technical problem identified by the present International Application either. Thus, starting from the disclosure of document **D1**, a person skilled in the art would not arrive at a solution defined by the technical features of **claim 1** starting from document **D1** alone.

Document **D2** cited in the ISR (EPO was the ISA) discloses a method performed by a network node, for scheduling a UE, wherein the dynamic switching between a same-slot scheduling and a cross-slot scheduling is performed by means of a bandwidth parts adaptation. There is, similarly to **D1**, no hint to define, for each TDRA, both offsets at once, thereby shortening the time of acquisition of the desired offset the UE is to use, and there is further no hint in document **D2**, that would suggest the technical problem identified by the present International Application either.

Consequently, neither document **D1** nor document **D2** neither disclose nor suggest respectively the technical features as defined by **claim 1** and, consequently, said claim meets the requirements of Article 33(2) and (3) PCT regarding novelty and inventive step.

- 5 For the same reasons, independent **claims 16 and 30 to 37** meet the requirements of Article 33(2) and (3) PCT regarding novelty and inventive step.
- 6 Dependent **claims 2 to 15 and 17 to 29** also meet the requirements of Article 33(2) and (3) PCT regarding novelty and inventive step.
- 7 Claims **1 to 37** meet the requirements of Article 33(4) PCT regarding industrial applicability.

Re Item VII

Further remarks made in respect of the present application

- 1 In case of submitting amendments - e.g. in the national, or regional phase - the following remarks should receive the applicant's attention:
 - 1.1 Any new independent claim should be drafted in the proper two-part form recommended by Rule 6.3(b) PCT.
 - 1.2 The opening part of the description should be modified to bring it into agreement with any new independent claim (see Rule 5.1(a)(iii) PCT), prior art should be correctly identified with the corresponding bibliographic data (see Rule 5.1(a)(ii) PCT).
 - 1.3 The applicant is requested to file amendments by way of replacement pages in the manner stipulated by Rule 66.8(a) PCT. In particular, fair copies of the amendments should be filed.

Re Item VIII

Certain observations on the international application (clarity)

- 1 **Claims 1, 16 and 30 to 37** do not include all the essential technical features to properly define the present claimed invention. In particular, the present claimed invention has been made to address technical problems specific to New Radio, NR. This is clear from the description, page 19, line 17 to 20. Thus, the technical limitation to NR is considered essential to a correct definition of the present claimed invention. This limitation is however not present in any of the independent claims **1, 16 and 30 to 37**.

Requirements of Article 6 PCT are thus not met.

CLAIMS

1. A method, performed by a network node of a wireless network, for scheduling user
5 equipment, UEs, served by the network node, the method comprising:
transmitting (1510), to a UE, a configuration including one or more time-
domain resource allocations, TDRAs, wherein:
the one or more TDRAs each include a first scheduling offset and a second
10 scheduling offset between a scheduling message and a signal or channel
scheduled via the scheduling message, and
a second minimum value of the second scheduling offsets is greater than a first
minimum value of the first scheduling offsets; and
subsequently transmitting (1530) to the UE:
an indication of whether the UE should use the first scheduling offsets or the
15 second scheduling offsets, and
a first scheduling message that schedules a first signal or channel for the UE
according to the indication.
2. The method of claim 1, further comprising transmitting or receiving (1540) the first
20 signal or channel at one of the first scheduling offsets or one of the second scheduling offsets
after transmitting the first scheduling message, in accordance with the indication.
3. The method of any of claims 1-2, wherein:
the one or more TDRAs are included in a list of a plurality of TDRAs; and
25 the TDRAs in the list include respective scheduling offsets from the first scheduling
offsets and respective scheduling offsets from the second scheduling offsets.
4. The method of claim 3, wherein:
the indication indicates, for all TDRAs in the list, whether the first scheduling offsets or
30 the second scheduling offsets should be used; and
the first scheduling message indicates a particular TDRA in the list.
5. The method of any of claims 1-4, wherein:
the configuration is transmitted in a radio resource control, RRC, message;
35 the first scheduling message is transmitted as downlink control information, DCI, in a

physical downlink control channel, PDCCH; and
the indication is transmitted according to any of the following:

- in a separate bit field in the DCI;
- as part of a TDRA field in the DCI;
- 5 as indicated by a DCI format used for the DCI;
- as indicated by a type of identifier included in the DCI or the PDCCH carrying
the first scheduling message;
- as indicated by a PDCCH search space in which the first scheduling message is
transmitted;
- 10 as indicated by a bandwidth part in which the first scheduling message is
transmitted;
- in a further DCI that does not include a scheduling message for the UE;
- in a medium access control, MAC, control element; and
- in a further RRC message.

15 6. The method of claim 5, wherein:

- the identifier is a radio network temporary identifier, RNTI, used to scramble a cyclic
redundancy check, CRC, of the DCI;
- a paging RNTI, P-RNTI, indicates that the UE should use the second scheduling offset;
- 20 and
- a non-paging RNTI indicates that the UE should use the first scheduling offset.

7. The method of any of claims 1-6, wherein:

- the first scheduling offsets and the second scheduling offsets are in units of slots;
- 25 the second minimum value is greater than a threshold; and
- the first minimum value is less than or equal to the threshold.

8. The method of claim 7, wherein the threshold is one of the following: zero or a
parameter value included in the transmitted configuration.

9. The method of any of claims 7-8, wherein the first scheduling message includes a TDRA
index value that corresponds to a particular first scheduling offset and to a particular second
scheduling offset.

35 10. The method of claim 9, wherein the TDRA index value also corresponds to one of the

following:

a start and length indicator value, SLIV, associated with both the particular first scheduling offset and the particular second scheduling offset; or
a first SLIV associated with the particular first scheduling offset, and a second SLIV
5 associated with the particular second scheduling offset.

11. The method of any of claims 1-6, wherein:

each first scheduling offset comprises one or more symbols in a same slot as a scheduling message; and

10 each second scheduling offset comprises two or more symbols in a same slot as a scheduling message.

12. The method of any of claims 1-11, wherein the first scheduling offsets and the second scheduling offsets, included in the configuration, are one of the following:

15 respective K0 offsets between a scheduling message and a physical downlink shared channel, PDSCH, transmission scheduled by the scheduling message;

respective K2 offsets between a scheduling message and a physical uplink shared channel, PUSCH, transmission scheduled by the scheduling message; or

20 respective aperiodic triggering offsets between a scheduling message and a channel state information reference signal, CSI-RS, transmission scheduled by the scheduling message.

13. The method of any of claims 1-12, wherein:

the indication indicates that the UE should use the second scheduling offsets; and

25 the configuration also identifies a period, following the indication, during which the UE should use the second scheduling offsets and after which the UE should use the first scheduling offsets if a further scheduling message has not been received by the UE.

30 14. The method of any of claims 1-13, further comprising determining (1520) whether the UE should use the first scheduling offsets or the second scheduling offsets based on an amount of data needing to be transmitted to, or received from, the UE.

15. The method of any of claims 1-14, further comprising, after transmitting or receiving
35 the first signal or channel, transmitting (1550) a further indication that the UE should use the

other of the first and second scheduling offsets, than indicated by the indication, for transmitting or receiving a second signal or channel scheduled by a second scheduling message.

- 5 16. A method performed by a user equipment, UE, configured for operation in a wireless network, the method comprising:
- receiving (1610), from a network node serving the UE in the wireless network, a configuration including one or more time-domain resource allocations, TDRAs, wherein:
- 10 the one or more TDRAs each include a first scheduling offset and a second scheduling offset between a scheduling message and a signal or channel scheduled via the scheduling message, and
- a second minimum value of the second scheduling offsets is greater than a first minimum value of the first scheduling offsets; and
- 15 subsequently receiving (1620) from the network node:
- an indication of whether the UE should use the first scheduling offsets or the second scheduling offsets, and
- a first scheduling message that schedules a first signal or channel for the UE according to the indication.
- 20 17. The method of claim 16, further comprising receiving or transmitting (1630) the first signal or channel at one of the first scheduling offsets or one of the second scheduling offsets after receiving the first scheduling message, in accordance with the indication.
- 25 18. The method of any of claims 16-17, wherein:
- the one or more TDRAs are included in a list of a plurality of TDRAs; and
- the TDRAs in the list include respective scheduling offsets from the first scheduling offsets and respective scheduling offsets from the second scheduling offsets.
- 30 19. The method of claim 18, wherein:
- the indication indicates, for all TDRAs in the list, whether the first scheduling offsets or the second scheduling offsets should be used; and
- the first scheduling message indicates a particular TDRA in the list.
- 35

20. The method of any of claims 16-19, wherein:
the configuration is received in a radio resource control, RRC, message;
the first scheduling message is received as downlink control information, DCI, in a
physical downlink control channel, PDCCH; and
the indication is received according to any of the following:
in a separate bit field in the DCI;
as part of a TDRA field in the DCI;
as indicated by a DCI format used for the DCI;
as indicated by a type of identifier included in the DCI or the PDCCH carrying
the first scheduling message;
as indicated by a PDCCH search space in which the first scheduling message is
received;
as indicated by a bandwidth part in which the first scheduling message is
received;
in a further DCI that does not include a scheduling message for the UE;
in a medium access control, MAC, control element; and
in a further RRC message.

21. The method of claim 20, wherein:
the identifier is a radio network temporary identifier, RNTI, used to scramble a cyclic
redundancy check, CRC, of the DCI;
a paging RNTI, P-RNTI, indicates that the UE should use the second scheduling offset;
and
a non-paging RNTI indicates that the UE should use the first scheduling offset.

22. The method of any of claims 16-21, wherein:
the first scheduling offsets and the second scheduling offsets are in units of slots;
the second minimum value is greater than a threshold; and
the first minimum value is less than or equal to the threshold.

23. The method of claim 22, wherein the threshold is one of the following: zero or a
parameter value included in the transmitted configuration.

24. The method of any of claims 22-23, wherein the first scheduling message includes a
TDRA index value that corresponds to a particular first scheduling offset and to a particular

second scheduling offset.

25. The method of claim 24, wherein the TDRA index value also corresponds to one of the following:

- 5 a start and length indicator value, SLIV, associated with both the particular first scheduling offset and the particular second scheduling offset; or
a first SLIV associated with the particular first scheduling offset, and a second SLIV associated with the particular second scheduling offset.

10

26. The method of any of claims 16-21, wherein:
each first scheduling offset comprises one or more symbols in a same slot as a scheduling message; and
each second scheduling offset comprises two or more symbols in a same slot as a
15 scheduling message.

15

27. The method of any of claims 16-26, wherein the first scheduling offsets and the second scheduling offsets, included in the configuration, are one of the following:

- respective K0 offsets between a scheduling message and a physical downlink shared
20 channel, PDSCH, transmission scheduled by the scheduling message;
respective K2 offsets between a scheduling message and a physical uplink shared channel, PUSCH, transmission scheduled by the scheduling message; or
respective aperiodic triggering offsets between a scheduling message and a channel state information reference signal, CSI-RS, transmission scheduled by the
25 scheduling message.

25

28. The method of any of claims 16-27, wherein:
the indication indicates that the UE should use the second scheduling offsets; and
the configuration also identifies a period, following the indication, during which the UE
30 should use the second scheduling offsets and after which the UE should use the first scheduling offsets if a further scheduling message has not been received by the UE.

30

29. The method of any of claims 16-28, further comprising, after receiving or transmitting
35 the first signal or channel, receiving (1640) a further indication that the UE should use the

other of the first and second scheduling offsets, than indicated by the indication, for transmitting or receiving a second signal or channel scheduled by a second scheduling message.

5

30. A network node (105, 110, 115, 300, 350, 410, 420, 1800), for a wireless network (100, 399, 499, 1930), configured to schedule user equipment, UEs (120, 430, 1700, 1910) served by the network node, wherein the network node comprises:

10

radio network interface circuitry (1840) configured to communicate with the UEs; and
processing circuitry (1810) operatively associated with the radio network interface
circuitry, whereby the processing circuitry and the radio network interface
circuitry are configured to perform operations corresponding to any of the
methods of claims 1-15.

15

31. A network node (105, 110, 115, 300, 350, 410, 420, 1800), for a wireless network (100, 399, 499, 1930), configured to schedule user equipment, UEs (120, 430, 1700, 1910) served by the network node, the network node being further arranged to perform operations corresponding to any of the methods of claims 1-15.

20

32. A non-transitory, computer-readable medium (1820) storing computer-executable instructions that, when executed by processing circuitry (1810) of a network node (105, 110, 115, 300, 350, 410, 420, 1800) for a wireless network (100, 399, 499, 1930), cause the network node to perform operations corresponding to any of the methods of claims 1-15.

25

33. A computer program product (1821) comprising computer-executable instructions that, when executed by processing circuitry (1810) of a network node (105, 110, 115, 300, 350, 410, 420, 1800) for a wireless network (100, 399, 499, 1930), cause the network node to perform operations corresponding to any of the methods of claims 1-15.

30

34. A user equipment, UE (120, 430, 1700, 1910) configured for operation in a wireless network (100, 399, 499, 1930), the UE comprising:

radio transceiver circuitry (1740) configured to communicate with a network node (105, 110, 115, 300, 350, 410, 420, 1800) configured to serve the UE in the wireless network; and

35

processing circuitry (1710) operatively associated with the radio transceiver circuitry, whereby the processing circuitry and the radio transceiver circuitry are

configured to perform operations corresponding to any of the methods of claims 16-29.

35. A user equipment, UE (120, 430, 1700, 1910) configured for operation in a wireless
5 network (100, 399, 499, 1930), the UE being further arranged to perform operations
corresponding to any of the methods of claims 16-29.

36. A non-transitory, computer-readable medium (1720) storing computer-executable
instructions that, when executed by processing circuitry (1710) of a user equipment, UE (120,
10 430, 1700, 1910), cause the UE to perform operations corresponding to any of the methods of
claims 16-29.

37. A computer program product (1721) comprising computer-executable instructions that,
when executed by at processing circuitry (1710) of a user equipment, UE (120, 430, 1700,
15 1910), cause the UE to perform operations corresponding to any of the methods of claims 16-29.

PCT International Preliminary Examination Authority

Response to Written Opinion pursuant to Article 34 PCT

Application Number: PCT/SE2020/050343
Application Date: April 02, 2020
Applicant: Telefonaktiebolaget LM Ericsson (publ)
Our Reference: P077549WO01

Enclosure(s):
Claims: Substitute claims number 1-37
Marked up claim amendments for information purpose

Dear Madam/Sir,

In response to the Written Opinion of 2020-06-30, Applicant hereby submits the following comments and enclosed amendments pursuant to Article 34 PCT.

Amendments and Support

Independent claims 1 and 16 have been amended to recite that "one or more TDRAs each include a first scheduling offset and a second scheduling offset." These amendments are supported at least by the Description on page 24, lines 6-18, page 30, lines 24-33 and Figure 14.

Dependent claims 3-6, 15, 23-26, and 35 have been cancelled, and remaining claims re-numbered 1-37. Amended claims 1 and 16 are independent.

All claim amendments are supported by the application as filed. No subject-matter that violates Art. 34(2)(b) PCT has been added.

Remarks

In the Written Opinion, the Examiner cites references D1=3GPP DRAFT R1-1902745 against novelty for claims 1-9, 1-12, 16-17, 19-29, 31-32, 36-37, and 39-47, and further alleges that D1



is prejudicial in view of inventive step of claims 1-9, 11-29, and 31-37. Applicant disagrees for the reasons presented below.

Amended claim 1 recites (amendment underlined):

1. A method, performed by a network node of a wireless network, for scheduling user equipment, UEs, served by the network node, the method comprising:

transmitting (1510), to a UE, a configuration including one or more time-domain resource allocations, TDRAs, wherein:

the one or more TDRAs each include a first scheduling offset and a second scheduling offset between a scheduling message and a signal or channel scheduled via the scheduling message, and

a second minimum value of the second scheduling offsets is greater than a first minimum value of the first scheduling offsets; and

subsequently transmitting (1530) to the UE:

an indication of whether the UE should use the first scheduling offsets or the second scheduling offsets, and

a first scheduling message that schedules a first signal or channel for the UE according to the indication.

D1 does not disclose that one or more TDRAs “each include a first scheduling offset and a second scheduling offset.” From the citation of D1 in the Written Opinion, page 9, Tables 1a and 1b show one or more scheduling offsets. However, Table 1a shows a PDSCH time domain resource allocation supporting only same-slot scheduling, and Table 1b shows a PDSCH time domain resource allocation only supporting cross-slot scheduling. There is no recitation of a time domain resource allocation in D1 that has, for each entry, both a first scheduling offset and a second scheduling offset.

Thus, amended claim 1 is novel, Art. 33(2) PCT, over D1.

Regarding inventive step, D1, as held by the Examiner, may be seen to implicitly disclose that the configuration of TDRAs can easily accommodate an adaptive processing timeline supporting both same-slot and cross-slot scheduling. D1 does however not disclose that *each TDRA includes a first and second scheduling offset*.

This feature has the effect of dynamically configuring and/or switching between applying first scheduling offsets and applying second scheduling offsets, i.e., between same-slot and cross-



slot scheduling of PDSCH and/or PUSCH for a particular UE. Such techniques are asserted to facilitate faster switching between same- and cross-slot scheduling, thereby facilitating reductions in overall UE power. See e.g. Application page 20 lines 21-29.

The objective technical problem is thus how to facilitate dynamic switching between same-slot and cross-slot scheduling.

There is nothing in D1 itself that would motivate the skilled person, being confronted with the objective technical problem, to modify D1 into a solution falling within the scope of Applicant's amended claim 1, since D1 does not at all consider configurations with both offsets. In fact, D1 enables dynamic switching between same-slot and cross-slot scheduling by switching between table 1a and table 1b by, e.g., DCI signaling. Since D1 already achieves access to both scheduling, there is no reason for the skilled person to seek an alternative solution within the scope of Applicant's amended claim 1.

Amended claims 1 is therefore inventive, Art. 33(3) PCT, over D1.

Amended claim 16 recites same or corresponding subject-matter to that claimed in amended claim 1. Applicant therefore submits that this claim is novel and inventive as well.

Regarding items VII and VIII in the Written Opinion:

Applicant intends to attend to the objections and observations as needed during national/regional phase

Summary

The claims are considered to fulfill the requirements on clarity, conciseness, support by the description, novelty, and inventive step. A positive International Preliminary Examination Report is therefore expected.

Should the Examiner have any questions that may be favorably discussed over the telephone or deems further minor amendments to be needed before issuance of a positive IPRP, you are welcome to contact the case responsible patent engineer/patent attorney, Sarah Moore +46761346408.

Yours faithfully,

/Roger Bou Faical/

Roger Bou Faical
European Patent Attorney



Reference: P077549WO01
Date: 1 April 2021

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Association Ericsson (Registration number 643)

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