

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**
(PCT Rule 43*bis*.1)

To:

see form PCT/ISA/220

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/SE2018/050675

International filing date (day/month/year)
21.06.2018

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11.08.2017

International Patent Classification (IPC) or both national classification and IPC
INV. H04L1/18 H04L5/00 H04W72/10

Applicant
TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- 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 Rule 43*bis*.1(a)(i) with regard to novelty, inventive step and 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

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:




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Date of completion of this opinion

see form
PCT/ISA/210

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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - 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 (Rules 12.3(a) and 23.1 (b)).
2. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. forming part of the international application as filed:
 - in the form of an Annex C/ST.25 text file.
 - on paper or in the form of an image file.
 - b. furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. furnished subsequent to the international filing date for the purposes of international search only:
 - in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of

- the entire international application
- claims Nos. 7-13, 20-26, 33-40, 42, 44, 46, 48, 55-62, 64, 66, 68, 70

because:

- the said international application, or the said claims Nos. relate to the following subject matter which does not require an international search (*specify*):
- the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
- the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed (*specify*):
- no international search report has been established for the whole application or for said claims Nos. 7-13, 20-26, 33-40, 42, 44, 46, 48, 55-62, 64, 66, 68, 70
- a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:
 - furnish a sequence listing in the form of an Annex C/ST.25 text file, and such listing was not available to the International Searching Authority in the form and manner acceptable to it; or the sequence listing furnished did not comply with the standard provided for in Annex C of the Administrative Instructions.
 - furnish a sequence listing on paper or in the form of an image file complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in the form and manner acceptable to it; or the sequence listing furnished did not comply with the standard provided for in Annex C of the Administrative Instructions.
 - pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rule 13ter.1(a) or (b).
- See Supplemental Box for further details

Box No. IV Lack of unity of invention

1. In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has, within the applicable time limit:
- paid additional fees
 - paid additional fees under protest and, where applicable, the protest fee
 - paid additional fees under protest but the applicable protest fee was not paid
 - not paid additional fees
2. This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
- complied with
 - not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
- all parts.
 - the parts relating to claims Nos. 1-6, 14-19, 27-32, 41, 43, 45, 47, 49-54, 63, 65, 67, 69

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>1-6, 14-19, 27-32, 41, 43, 45, 47, 49-54, 63, 65, 67, 69</u>
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-6, 14-19, 27-32, 41, 43, 45, 47, 49-54, 63, 65, 67, 69</u>
Industrial applicability (IA)	Yes: Claims	<u>1-6, 14-19, 27-32, 41, 43, 45, 47, 49-54, 63, 65, 67, 69</u>
	No: Claims	

2. Citations and explanations

see separate sheet

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

Re Item IV

1 Lack of unity of invention

The examiner consider that there are two inventions covered by the claims indicated as follows:

Claims 1-6, 14-19, 27-32, 41, 43, 45, 47, 49-54, 63, 65, 67, 69 directed to adaptation of contention window size in case of HARQ feedback; and

Claims 7-13, 20-26, 33-40, 42, 44, 46, 48, 55-62, 64, 66, 68, 70 directed to separate transmission of higher and lower priority data

1.1 The reasons for which the inventions are not so linked so as to form a single general inventive concept, as required by Rule 13.1 PCT, are as follows:

The prior art has been defined as:

Reference is made to the following document:

D1 ZTE ET AL: "Multiplexing of eMBB and URLLC",
3GPP DRAFT; R1-166408 MULTIPLEXING OF EMBB AND URLLC,
3RD GENERATION PARTNERSHIP PROJECT
vol. RAN WG1, no. Gothenburg, Sweden; 21 August 2016 (2016-08-21)
Retrieved from the Internet:
URL:http://www.3gpp.org/ftp/Meetings_3GPP_SYNC/RAN1/Docs/

1.1.1 First invention

From a comparison of claims 1-6, 14-19, 27-32, 41, 43, 45, 47, 49-54, 63, 65, 67, 69 and the prior art, the following technical features **do not make a contribution over the prior art**:

Claim 1 (as well as claims 27, 41, 43, 45 and 47):

A method of operation of a network node (fig. 2), the method comprising:

determining that data is available for Downlink, DL, transmission of a first traffic type to a User Equipment, UE (section 2.2 - the first sentence of the second paragraph "URLLC is a latency critical service");

identifying a DL transmission of a second traffic type to be punctured (section 2.2 - the header - "eMBB" is the second type traffic);

transmitting the DL transmission of the first traffic type by puncturing the identified DL transmission of the second traffic type (fig. 2 and section 2.2.1);

receiving a Hybrid Automatic Repeat Request, HARQ, Negative Acknowledgement, NACK, associated with the punctured DL transmission of the second traffic type (section 2.3 "first two bullets on page 5" and section 4 "cases on page 8" consider CC and IR based on HARQ feedback, the presence of NACK is implicit); ~~and~~

~~excluding (108) the HARQ NACK associated with the punctured DL transmission of the second traffic type from a DL Contention Window Size, CWS, adjustment operation of the network node (38).~~

Claim 14 (as well as **claims 49 ,63, 65, 67 and 69**)

A method of operation of a User Equipment, UE (fig. 4), the method comprising:

determining that data is available for Uplink, UL, transmission of a first traffic type to a network node (section 2.2 - the first sentence of the second paragraph "URLLC is a latency critical service");

identifying an UL transmission of a second traffic type to be punctured (section 2.2 - the header - "eMBB" is the second type traffic);

transmitting the UL transmission of the first traffic type by puncturing the identified UL transmission of the second traffic type (fig. 4 and section 2.2.2);

receiving a Hybrid Automatic Repeat Request, HARQ, Negative Acknowledgement, NACK, associated with the punctured UL transmission of the second traffic type (section 2.3 "first two

bullets on page 5" and section 4 "cases on page 8" consider CC and IR based on HARQ feedback, the presence of NACK is implicit); ~~and~~

~~excluding (1108) the HARQ NACK associated with the punctured UL transmission of the second traffic type from a UL Contention Window Size, CWS, adjustment operation of the UE (18).~~

From a comparison of claims 1-6, 14-19, 27-32, 41, 43, 45, 47, 49-54, 63, 65, 67, 69 and the prior art, the following technical features can be seen as to **make a contribution over the prior art** (Special Technical Features - Rule 13.2 PCT) differentiating at least in:

Claim 1 (as well as **claims 27, 41, 43, 45** and **47**):

excluding the HARQ NACK associated with the punctured DL transmission of the second traffic type from a DL Contention Window Size, CWS, adjustment operation of the network node.

Claim 14 (as well as **claims 49, 63, 65, 67** and **69**):

excluding the HARQ NACK associated with the punctured UL transmission of the second traffic type from a UL Contention Window Size, CWS, adjustment operation of the UE

From these technical features, the objective technical problem to be solved by the first invention is increased latency for the second traffic type.

1.1.2 Second invention

From a comparison of claims 7-13, 20-26, 33-40, 42, 44, 46, 48, 55-62, 64, 66, 68, 70 and the prior art, the following technical features **do not make a contribution over the prior art**:

Claim 7 (as well as **claims 33, 42, 44, 46** and **48**):

A method of operation of a network node (fig 2), the method comprising:

defining a channel access priority class 0 for a Transmit Opportunity, TXOP, comprising one or more symbols of data of a first traffic type only (section 2.2 - the first sentence in the second paragraph "URLLC is a latency critical service", meaning that URLLC is a "priority class 0"), ~~for use during a Contention Window Size, CWS, calculation; and~~

~~transmitting (202) Downlink, DL, data of the first traffic type only to a User Equipment, UE, (18) according to the channel access priority class 0.~~

Claim 20 (as well as claims 55, 64, 66, 68 and 70):

A method of operation of a User Equipment, UE, (fig. 4) the method comprising:

defining a channel access priority class 0 for a Transmit Opportunity, TXOP, comprising one or more symbols of data of a first traffic type only (section 2.2 - the first sentence in the second paragraph "URLLC is a latency critical service", meaning that URLLC is a "priority class 0"), ~~for use during a Contention Window Size, CWS, calculation; and~~

~~transmitting (1202) Uplink, UL, data of the first traffic type only to a network node according to the channel access priority class 0.~~

From a comparison of claim 7-13, 20-26, 33-40, 42, 44, 46, 48, 55-62, 64, 66, 68, 70 and the prior art, the following technical features can be seen as to **make a contribution over the prior art** (Special Technical Features - Rule 13.2 PCT) differentiating at least in:

Claim 7 (as well as claims 33, 42, 44, 46 and 48):

defining priority for use during a Contention Window Size, CWS, calculation; and

transmitting Downlink, DL, data of the first traffic type only to a User Equipment, UE, according to the channel access priority class 0.

Claim 20 (as well as claims 55, 64, 66, 68 and 70):

defining priority or use during a Contention Window Size, CWS, calculation; and

transmitting Uplink, UL, data of the first traffic type only to a network node according to the channel access priority class 0.

From these technical features, the objective technical problem to be solved by the first invention is latency for the high priority traffic.

- 1.2 A comparison of the objective technical problem of the first group of claims with the objective technical problems of second group of claims indicates that there is no correspondence between those problems, nor they show any corresponding technical effect.
Therefore, the application is not unitary within the meaning of Rules 13.1 and 13.2 PCT.

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 document:

- D2 INTEL CORPORATION: "Remaining Details on HARQ Feedback Based CW Adaptation",
3GPP DRAFT; R1-156511 HARQ REMAINING DETAILS FINAL, 3RD GENERATION PARTNERSHIP PROJECT,
vol. RAN WG1, no. Anaheim, USA; 15 November 2015 (2015-11-15)
URL:http://www.3gpp.org/ftp/Meetings_3GPP_SYNC/RAN1/Docs/

- 2 INVENTIVE STEP (Article 33(3) PCT)
Claims 1-6, 14-19, 27-32, 41, 43, 45, 47, 49-54, 63, 65, 67, 69 do not involve inventive step.

2.1 Claim 1

The features disclosed by document D1 are described in details in section 1 and will not be repeated here for the reason of economy.

The difference between claim 1 and the closest prior art is in excluding the HARQ NACK associated with the punctured DL transmission of the second traffic type from a DL Contention Window Size, CWS, adjustment operation of the network node.

The technical effect of this difference is in that CWS will not be unduly increased, since the NACK does not refer to the second traffic data type. The problem solved by the invention may be regarded as latency of the second traffic type.

A skilled person faced with the above mentioned problem, departing from document D1 in the technical area of wireless communication would come across document D2 in the same technical area solving the above mentioned problem.

Document D2 (references in parentheses refer to document D2) discloses:

excluding the HARQ NACK associated with the punctured DL transmission of the second traffic type from a DL Contention Window Size, CWS, adjustment operation of the network node (page 3 - "Observation").

The skilled person would thus arrive at the subject matter of claim 1 without exercising any inventive skill.

Therefore, claim 1 does not involve an inventive step (Article 33(3) PCT).

2.2 Claims 14, 27, 49, 41, 43, 45, 47, 63, 64, 67 and 69

These claims are either a corresponding feature or a computer program product corresponding to the method steps of claim 1 and/or corresponding method steps of claim 14 (on the uplink side).

The objections related to claim 1 therefore apply mutatis mutandis to these claims that are therefore regarded as not involving an inventive step.

2.3 Dependent claims (2-6, 15-19, 28-32 and 50-54)

The claims are either regarded as explicitly or implicitly disclosed by documents D1 (sections 2.2.1, 2.2.2 and Appendix) and/or D2 (section 2.2), and are therefore regarded as not involving an inventive step (Article 33(3) PCT).

Re Item VII

3 Certain defects in the international application

- 3.1 The relevant background art disclosed in documents D1 and D2 is not mentioned in the description (Rule 5.1(a)(ii) PCT).
- 3.2 Independent claims are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art document D1 being placed in the preamble (Rule 6.3(b)(i) PCT) and the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

Re Item VIII

4 Certain observations on the international application

- 4.1 In paragraph [0001], it is mentioned that another patent application document are "incorporated herein by reference". The patent specification should regarding the essential features of the invention be self contained, i.e capable of being understood without reference to any other document. Therefore, this or any expression of the same kind should be deleted from the description.
- 4.2 The terms CWS, priority claims 0, post-backoff are not apparent to a person skilled in the art without mentioning the specific technology in which they are used. (Article 6 PCT).