

PATENT COOPERATION TREATY

PCT

From the INTERNATIONAL SEARCHING AUTHORITY

To:
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 SUEDE

INVITATION TO PAY ADDITIONAL FEES
 AND, WHERE APPLICABLE, PROTEST FEE
 (PCT Article 17(3)(a) and Rule 40.1 and 40.2(e))

	Date of mailing <i>(day/month/year)</i>
	11 October 2018 (11-10-2018)
Applicant's or agent's file reference P72237WO1	PAYMENT DUE within ONE MONTH from the above date of mailing
International application No. PCT/SE2018/050675	International filing date <i>(day/month/year)</i>
	21 June 2018 (21-06-2018)
Applicant TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)	

1. This International Searching Authority

(i) considers that there are 2 *(number of)* inventions claimed in the international application covered by the claims indicated on an extra sheet:

(ii) therefore considers that **the international application does not comply with the requirements of unity of invention** (Rules 13.1, 13.2 and 13.3) for the reasons indicated on an extra sheet:

(iii) has carried out a partial international search (see Annex) will establish the international search report on those parts of the international application which relate to the invention first mentioned in claims Nos.:
see extra sheet

(iv) will establish the international search report on the other parts of the international application only if, and to the extent to which, additional fees are paid.

2. Consequently, the applicant is hereby **invited to pay**, within the time limit indicated above, the amount indicated below:

<u>EUR 1.775,00</u>	x	<u>1</u>	=	<u>EUR 1.775,00</u>
Fee per additional invention		number of additional inventions		currency/total amount of additional fees

3. The applicant is informed that, according to Rule 40.2(c), **the payment of any additional fee may be made under protest**, i.e., a reasoned statement to the effect that the international application complies with the requirement of unity of invention or that the amount of the required additional fee is excessive, where applicable, subject to the payment of a protest fee.
 Where the applicant pays additional fees under protest, the applicant is hereby invited, within the time limit indicated above, to pay a protest fee (Rule 40.2(e)) in the amount of EUR 875,00 *(currency/amount)*

Where the applicant has not, within the time limit indicated above, paid the required protest fee, the protest will be considered not to have been made and the International Searching Authority will so declare.

4. Claim(s) Nos. _____ have been found to be unsearchable under Article 17(2)(b) because of defects under Article 17(2)(a) and therefore have not been included with any invention.

Name and mailing address of the International Searching Authority European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040 Fax: (+31-70) 340-3016	Authorized officer ROLAFF, Jorg Tel: +31 (0)70 340-3107
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This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-6, 14-19, 27-32, 41, 43, 45, 47, 49-54, 63, 65, 67, 69

Adaptation of contention window size in case of HARQ feedback

2. claims: 7-13, 20-26, 33-40, 42, 44, 46, 48, 55-62, 64, 66, 68, 70

Separate transmission of higher and lower priority data

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.

1. The present communication is an Annex to the invitation to pay additional fees (Form PCT/ISA/206). It shows the results of the international search established on the parts of the international application which relate to the invention first mentioned in claims Nos.:
- see 'Invitation to pay additional fees'
2. This communication is not the international search report which will be established according to Article 18 and Rule 43.
3. If the applicant does not pay any additional search fees, the information appearing in this communication will be considered as the result of the international search and will be included as such in the international search report.
4. If the applicant pays additional fees, the international search report will contain both the information appearing in this communication and the results of the international search on other parts of the international application for which such fees will have been paid.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>ZTE ET AL: "Multiplexing of eMBB and URLLC", 3GPP DRAFT; R1-166408 MULTIPLEXING OF EMBB AND URLLC, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE</p> <p>, vol. RAN WG1, no. Gothenburg, Sweden; 20160822 - 20160826 21 August 2016 (2016-08-21), XP051140214, Retrieved from the Internet: URL: http://www.3gpp.org/ftp/Meetings_3GPP_SYNC/RAN1/Docs/ [retrieved on 2016-08-21] figures 2,4 * sections 2.2.1, 2.2.2, Appendix *; pages 2,3</p> <p align="center">----- -/--</p>	<p>1-6, 14-19, 27-32, 41,43, 45,47, 49-54, 63,65, 67,69</p>



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

**Annex to Form PCT/ISA/206
COMMUNICATION RELATING TO THE RESULTS
OF THE PARTIAL INTERNATIONAL SEARCH**

International Application No
PCT/SE2018/050675

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>INTEL CORPORATION: "Remaining Details on HARQ Feedback Based CW Adaptation", 3GPP DRAFT; R1-156511 HARQ REMAINING DETAILS FINAL, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE</p> <p>, vol. RAN WG1, no. Anaheim, USA; 20151115 - 20151122 15 November 2015 (2015-11-15), XP051002951, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/Meetings_3GPP_SYNC/RAN1/Docs/ [retrieved on 2015-11-15] * section 2.2 *; page 3</p> <p align="center">-----</p>	<p>1-6, 14-19, 27-32, 41,43, 45,47, 49-54, 63,65, 67,69</p>

Application no:
Demande n°: PCT/SE2018/050675
Anmelde-Nr:

DISCLAIMER

The attached provisional opinion on the patentability of the first invention searched serves only as information.
A reply addressing the points raised in the opinion is **not** required and will **not** be taken into account when issuing the final search report and opinion on patentability.

AVERTISSEMENT

L'avis provisoire ci-joint sur la brevetabilité de la première invention recherchée ne sert qu'à titre d'information.
Une réponse abordant les points soulevés dans l'avis n'est **pas** nécessaire et ne sera **pas** prise en compte lors de l'établissement du rapport final de la recherche et de l'avis sur la brevetabilité.

DISCLAIMER

Die beigefügte vorläufige Stellungnahme zur Patentierbarkeit der ersten geprüften Erfindung dient lediglich zur Information.
Eine Antwort auf die erhobenen Punkte in der Stellungnahme ist **nicht** erforderlich und bleibt bei der Erstellung des endgültigen Recherchenberichts und der Stellungnahme zur Patentierbarkeit **unberücksichtigt**.

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).