

PATENT COOPERATION TREATY

PCT

From the INTERNATIONAL SEARCHING AUTHORITY

To:
 Röthinger, Rainer
 WUESTHOFF & WUESTHOFF
 PATENTANWÄLTE PARTG MBB
 Schweigerstrasse 2
 D-81541 München
 ALLEMAGNE

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 (day/month/year) 16 October 2018 (16-10-2018)
Applicant's or agent's file reference 30A-140 647	PAYMENT DUE within ONE MONTH from the above date of mailing
International application No. PCT/EP2018/070913	International filing date (day/month/year) 1 August 2018 (01-08-2018)
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 FéVRIER, Patricia Tel: +31 (0)70 340-3659
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This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-25, 29, 30(completely); 27, 28, 32, 33(partially)

Apparatus, method, system and computer product for determining a Random Access-Radio Network Temporary Identifier RA-RNTI

2. claims: 26, 31(completely); 27, 28, 32, 33(partially)

Apparatus, method, system and computer product for managing Radio Network Temporary Identifiers RNTIs

This Authority considers that there are 2 inventions covered by the claims indicated as follows:

I: Claims 1-25, 27-30 and 32-33 directed to an apparatus, method, system and computer product for determining a Random Access-Radio Network Temporary Identifier RA-RNTI.

II: Claims 26, 27-28, 31 and 32-33 directed to an apparatus, method, system and computer product for managing Radio Network Temporary Identifiers RNTIs.

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

The first group of claims comprises the technical features of:

- a1) determine a Random Access-Radio Network Temporary Identifier, RA-RNTI, for use in a radio network system,
- b1) a first counter configured to be incremented after a pre-defined period of time and to be re-set when having reached a predefined first number, wherein the first counter counts a first count;
- c1) a second counter configured to be incremented when the first counter reaches the predefined first number and to be re-set when having reached a predefined second number, wherein the second counter counts a second count;
- d1) a third counter configured to be incremented when the second counter reaches the predefined second number and to be re-set when having reached a predefined third number, wherein the third counter counts a third count;
- e1) determine an RA-RNTI at least based on the second count and the third count.

The second group of claims comprises the technical features of:

- a2) managing Radio Network Temporary Identifiers, RNTIs, for use in a radio network system,
- b2) the RNTIs belonging to a first RNTI type comprising a number of designated Random Access-, RA-, RNTIs and
- c2) at least one second RNTI type different from the first type,
- d2) determine, based on a priori-knowledge, one or more designated RA-RNTIs available but unused in the radio network system;
- e2) allocate the one or more unused designated RA-RNTIs to the second

RNTI type.

The technical feature common to groups I and II is represented by "determine RA-RNTI". This feature is a priori well known to a person skilled in the art and does not represent any contribution to the prior art (it is needed in the standard random access procedure in wireless communication). Therefore it cannot be considered as a "special technical feature".

The remaining technical features being not obvious to a person skilled in the art and a priori considered as special features according to Rule 13.1 PCT are the following:

Group I: use of three counters and use of the second and third counter values for obtaining RA-RNTI.

Group II: classify RA-RNTI as first type of RNTIs, determine RA-RNTIs not being used and assigne these to a second type of RNTIs.

Also when examining the possible correspondence by technical effect, one finds that:

- the technical effect of the first group of claims is to have a more elaborate method to compute RA_RNTI,

- the technical effect of the second group of claims is to improve the use of available RNTIs for different procedures in wireless networks.

This appears to show lack of corresponding technical effect as well.

These features are neither the same nor corresponding, because they solve different objective problems:

Group 1: the potential special technical features solve the objectively determined problem of improving the method for computing RA-RNTI.

Group 2: the special technical features solve the objectively determined problem of how to improve the use of RNTIs available in a wireless network.

Consequently, neither the objective problem underlying the subjects of the claimed inventions, nor their solutions defined by the special technical features allow for a relationship to be established between the said inventions, which involves a single general inventive concept.

In conclusion, the groups of claims are not linked by common or corresponding special technical features and define two different inventions not linked by a single general inventive concept.

Thus, these two groups of inventions do not have any special technical feature in common, nor they have any corresponding technical features as meant by Rule 13.2 PCT, as they relate to different solutions of different objectively determined problems. Hence, Rule 13.1 PCT is not satisfied and the subject-matter of the application contains more subjects which are not linked by a single inventive concept.

It is therefore considered that the international application does not comply with the requirements of unity of invention (Rules 13.1, 13.2 and 13.3 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.
X	HUAWEI ET AL: "Random Access Procedure Remaining Issues", 3GPP DRAFT; R2-163228 RANDOM ACCESS PROCEDURE REMAINING ISSUES, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE , vol. RAN WG2, no. Sophia Antipolis, France; 20160503 - 20160504 28 April 2016 (2016-04-28), XP051095152, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_AHs/2016_05_LTE_NB_IoT/Docs/[retrieved on 2016-04-28] Section 2.3 RA-RNTI -----	1-3,6, 11-13, 18-20, 25, 27-30, 32,33
X	WO 2017/121380 A1 (ZTE CORP [CN]) 20 July 2017 (2017-07-20) abstract paragraphs [0340] - [0361]; claims 61-64 ----- -/--	1-3,6, 11-13, 18-20, 25, 27-30, 32,33



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/EP2018/070913

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>CN 106 973 441 A (ZTE CORP) 21 July 2017 (2017-07-21)</p> <p>paragraphs [0354] - [0374]; claims 61-64 -----</p>	<p>1-3,6, 11-13, 18-20, 25, 27-30, 32,33</p>
A	<p>WO 2016/158394 A1 (NTT DOCOMO INC [JP]) 6 October 2016 (2016-10-06)</p> <p>abstract & EP 3 280 191 A1 (NTT DOCOMO INC [JP]) 7 February 2018 (2018-02-07) paragraphs [0015], [0016], [0020], [0030] - [0035], [0045], [0046] -----</p>	<p>1-25, 27-30, 32,33</p>

Patent Family Annex

Information on patent family members

International Application No

PCT/EP2018/070913

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2017121380	A1	20-07-2017	NONE
CN 106973441	A	21-07-2017	NONE
WO 2016158394	A1	06-10-2016	CN 107113716 A 29-08-2017
			EP 3280191 A1 07-02-2018
			JP W02016158394 A1 27-07-2017
			US 2017339745 A1 23-11-2017
			WO 2016158394 A1 06-10-2016

Application no:
Demande n°: PCT/EP2018/070913
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

Lack of unity of invention

This Authority considers that there are 2 inventions covered by the claims indicated as follows:

I: Claims 1-25, 27-30 and 32-33 directed to an apparatus, method, system and computer product for determining a Random Access-Radio Network Temporary Identifier RA-RNTI.

II: Claims 26, 27-28, 31 and 32-33 directed to an apparatus, method, system and computer product for managing Radio Network Temporary Identifiers RNTIs.

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

The first group of claims comprises the technical features of:

- a1) determine a Random Access-Radio Network Temporary Identifier, RA-RNTI, for use in a radio network system,
- b1) a first counter configured to be incremented after a pre-defined period of time and to be re-set when having reached a predefined first number, wherein the first counter counts a first count;
- c1) a second counter configured to be incremented when the first counter reaches the predefined first number and to be re-set when having reached a predefined second number, wherein the second counter counts a second count;
- d1) a third counter configured to be incremented when the second counter reaches the predefined second number and to be re-set when having reached a predefined third number, wherein the third counter counts a third count;
- e1) determine an RA-RNTI at least based on the second count and the third count.

The second group of claims comprises the technical features of:

- a2) managing Radio Network Temporary Identifiers, RNTIs, for use in a radio network system,
- b2) the RNTIs belonging to a first RNTI type comprising a number of designated Random Access-, RA-, RNTIs and
- c2) at least one second RNTI type different from the first type,

d2) determine, based on a priori-knowledge, one or more designated RA-RNTIs available but unused in the radio network system;

e2) allocate the one or more unused designated RA-RNTIs to the second RNTI type.

The technical feature common to groups I and II is represented by "determine RA-RNTI". This feature is a priori well known to a person skilled in the art and does not represent any contribution to the prior art (it is needed in the standard random access procedure in wireless communication). Therefore it cannot be considered as a "special technical feature".

The remaining technical features being not obvious to a person skilled in the art and a priori considered as special features according to Rule 13.1 PCT are the following:

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Also when examining the possible correspondence by technical effect, one finds that:

- the technical effect of the first group of claims is to have a more elaborate method to compute RA_RNTI,
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Group 2: the special technical features solve the objectively determined problem of how to improve the use of RNTIs available in a wireless network.

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In conclusion, the groups of claims are not linked by common or corresponding special technical features and define two different inventions not linked by a single general inventive concept.

Thus, these two groups of inventions do not have any special technical feature in common, nor they have any corresponding technical features as meant by Rule 13.2 PCT, as they relate to different solutions of different objectively determined problems. Hence, Rule 13.1 PCT is not satisfied and the subject-matter of the application contains more subjects which are not linked by a single inventive concept.

It is therefore considered that the international application does not comply with the requirements of unity of invention (Rules 13.1, 13.2 and 13.3 PCT).

Re Item V

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

1. Reference is made to the following documents:

- D1 HUAWEI ET AL: "Random Access Procedure Remaining Issues", 3GPP DRAFT; R2-163228 RANDOM ACCESS PROCEDURE REMAINING ISSUES, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. Sophia Antipolis, France; 20160503 - 20160504 28 April 2016 (2016-04-28), XP051095152
- D2 WO 2017/121380 A1 (ZTE CORP [CN]) 20 July 2017 (2017-07-20)
- D3 CN 106 973 441 A (ZTE CORP) 21 July 2017 (2017-07-21)
- D4 WO 2016/158394 A1 (NTT DOCOMO INC [JP]) 6 October 2016 (2016-10-06); & EP 3 280 191 A1 (NTT DOCOMO INC [JP]) 7 February 2018 (2018-02-07)

2. The present application does not meet the criteria of Article 33(3) PCT, because the **subject-matter of claims 1, 19, 27, 29, 30 and 32 does not involve an inventive step.**

2.1 D1 is regarded as being the prior art closest to the subject-matter of claim 1, and discloses:

A wireless device configured to determine a Random Access-Radio Network Temporary Identifier, RA-RNTI, for use in a radio network system (D1: Section 2.3 RA-RNTI),

and

wherein the wireless device is configured to determine an RA-RNTI at least based on the second count and the third count (D1: page 4, lines 25-27).

2.2 The subject-matter of claim 1 therefore differs from this known D1 in that

the wireless device comprising:

a first counter configured to be incremented after a pre-defined period of time and to be re-set when having reached a predefined first number, wherein the first counter counts a first count;

a second counter configured to be incremented when the first counter reaches the predefined first number and to be re-set when having reached a predefined second number, wherein the second counter counts a second count; and

a third counter configured to be incremented when the second counter reaches the predefined second number and to be re-set when having reached a predefined third number, wherein the third counter counts a third count;

and is therefore new.

2.3 The problem to be solved by the present invention may therefore be regarded as how to implement the determination of RA-RNTI based on SFN and H-SFN.

2.4 The solution proposed in claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

D1 discloses a formula for obtaining RA-RNTI that makes use of SFN and H-SFN. It is well known for the skilled person in LTE and wireless communications that a system frame is composed of a given number of subframes (predefined first number) and that a hyperframe is composed of a given number of system frames (predefined second number). It is also well known that when the SFN reaches the predetermined value (predefined second number) the SFN is re-set to 0 and the H-SFN is incremented by one. Subframes, SFN and H-SFN are widely used in different aspects of wireless networks (see D4 that discloses the relation between SFN and H-SFN for DRX). If for the calculation of a RA-RNTI the values of SFN and H-SFN are needed as disclosed in D1, it would be an obvious choice for the skilled person to make use

of counters/timers to count the subframes to obtain the system frames and SFN value and also to obtain the H-SFN value at a given point. Therefore the solution proposed in claim 1 cannot be considered as involving an inventive step (Article 33(3) PCT).

2.5 The same objection of missing inventive step could be substantiated based on D2 or D3 (machine translations have been attached).

3. The same reasoning applies, mutatis mutandis, to the subject-matter of the corresponding independent claims 19, 27, 29, 30 and 32, which therefore are also considered not inventive.

4. Dependent claims 2, 3, 6, 11-13, 18, 20, 25, 28 and 33 do not contain any features which, in combination with the features of any claim to which it/they refers/refer, meet the requirements of the PCT in respect of novelty and/or inventive step.

Claims 2, 3, 13, 20: are implicit in the use of RA-RNTI in wireless communication.

Claims 11, 12, 28, 33: these features are merely straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill.

Claims 6: see D1: page 4, line 27.

Claims 18, 25: see D1: section 2.3.

4.1 The combination of the features of dependent claims 4, 5, 7-10, 14-17 and 21-24 is neither known from, nor rendered obvious by, the available prior art.

Re Item VII

Certain defects in the international application

5.1 Independent claims 1, 19, 27, 29, 30 and 32 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 D1-D4 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).

5.2 The claims (preamble and characterising portion) do not contain **reference signs** placed in parentheses (Rule 6.2(b) PCT).

5.3 The cited documents D1-D4, which represent the **relevant state of the art** with regard to the present application, are not acknowledged and briefly discussed in the opening part of the description, Rule 5.1 (a) (ii) PCT.

5.4 According to the requirements of Rule 11.13(I) **reference signs not appearing in the description shall not appear in the drawings**, and vice versa. This requirement is not met in view of the reference sign 460 in fig. 4A that does not appear in the description.

5.5 The Applicant's attention is drawn to some obvious typographical errors in the description and claims, namely:

- page 1, line 15: "new a radio" should read "a new radio"
- page 7, line 31: "RN-RNTI" should read "RA-RNTI"
- page 7, line 34: "RN-RNTI" should read "RA-RNTI"
- page 8, line 7: "RN-RNTI" should read "RA-RNTI"
- page 9, line 26: "RN-RNTI" should read "RA-RNTI"
- page 10, line 27: "may be generate" should read "may be generated"
- page 11, line 12: "a prior-knowledge" should read "a priori-knowledge"
- page 11, line 14: "a prior-knowledge" should read "a priori-knowledge"
- page 12, line 1: "RN-RNTI" should read "RA-RNTI"
- page 12, line 13: "there is also provided is" should read "there is also provided"
- page 30, line 7: "RN-RNTI" should read "RA-RNTI"
- Claims 6, 7, 9, 23: "RN-RNTI" should read "RA-RNTI"