

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:

100020
China 20th Floor, East Tower, World Financial Centre,
No. 1 Dongsanhuan Zhonglu, Chaoyang District,,
Beijing

KING & WOOD MALLESONS

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing

(day/month/year)

26 April 2018

Applicant's or agent's file reference

EIE170203PCT

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/CN2017/096911

International filing date (day/month/year)

10 August 2017

Priority date (day/month/year)

International Patent Classification (IPC) or both national classification and IPC

H03M 13/00(2006.01)i; H04L 1/18(2006.01)i

Applicant

NOKIA SOLUTIONS AND NETWORKS OY et al

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 43bis.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 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 66.1bis(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/

**STATE INTELLECTUAL
PROPERTY OFFICE OF THE
P.R.CHINA
China 6, Xitucheng Rd., Jimen Bridge,
Haidian District, Beijing 100088**

Date of completion of this opinion

20 April 2018

Authorized officer

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**WRITTEN OPINION OF THE
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International application No.

PCT/CN2017/096911

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 43*bis*.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 filed or furnished:
 - a. (means)
☐ on paper
☐ in electronic form
 - b. (time)
☐ in the international application as filed
☐ together with the international application in electronic form
☐ subsequently to this Authority for the purposes of search
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 in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/CN2017/096911

Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement																		
1. Statement	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 35%; vertical-align: top;">Novelty (N)</td> <td style="width: 35%; border-bottom: 1px solid black;">Claims 1-23</td> <td style="width: 30%; text-align: right; vertical-align: bottom;">YES</td> </tr> <tr> <td></td> <td style="border-bottom: 1px solid black;">Claims None</td> <td style="text-align: right; vertical-align: bottom;">NO</td> </tr> <tr> <td style="vertical-align: top;">Inventive step (IS)</td> <td style="border-bottom: 1px solid black;">Claims 1-16, 23</td> <td style="text-align: right; vertical-align: bottom;">YES</td> </tr> <tr> <td></td> <td style="border-bottom: 1px solid black;">Claims 17-22</td> <td style="text-align: right; vertical-align: bottom;">NO</td> </tr> <tr> <td style="vertical-align: top;">Industrial applicability (IA)</td> <td style="border-bottom: 1px solid black;">Claims 1-23</td> <td style="text-align: right; vertical-align: bottom;">YES</td> </tr> <tr> <td></td> <td style="border-bottom: 1px solid black;">Claims None</td> <td style="text-align: right; vertical-align: bottom;">NO</td> </tr> </table>	Novelty (N)	Claims 1-23	YES		Claims None	NO	Inventive step (IS)	Claims 1-16, 23	YES		Claims 17-22	NO	Industrial applicability (IA)	Claims 1-23	YES		Claims None	NO
Novelty (N)	Claims 1-23	YES																	
	Claims None	NO																	
Inventive step (IS)	Claims 1-16, 23	YES																	
	Claims 17-22	NO																	
Industrial applicability (IA)	Claims 1-23	YES																	
	Claims None	NO																	
2. Citations and explanations :	[1] D1: 3GPP TSG RAN WG1 NR Ad-Hoc#2, R1-1710485 30 Jun.2017(30.06.2017) [2] I. Novelty and Inventive step [3] D1 is regarded as being the closest prior art to the subject matter of claims 1, 17 and 20. D1 discloses (sections 1-4) rate matching for NR LDPC codes which involves selection of starting locations for different redundancy versions (RVs). A circular buffer is used to generate incremental redundancy retransmissions. Three different options for selecting number of RVs and corresponding circular buffer starting position: 1) use 4 RVs with fixed circular buffer starting positions as in LTE. 2) Increase the number of RVs, so that a RV that corresponds to a starting position in the circular buffer close to the end of the previous transmission can be selected for the retransmission. With a higher number of RVs with distinct circular buffer starting positions, it is possible to select a RV with starting position closer to where the read-out for the previous transmission ended. 3) Let the retransmission start from the end of the previous transmission. [4] Claim 1 differs from D1 in that: 1) starting positions of redundancy versions satisfy one or more of the following criteria: a separation provided between a starting position of a third redundancy version RV2 and a starting position of a fourth redundancy version RV3 is larger than the separation between a starting position of a second redundancy version RV1 and a starting position of the third redundancy version RV2; a separation provided between the starting position of the second RV1, the starting position of third RV2, or the starting position of fourth redundancy version RV3 and the starting position of a respective previous consecutive redundancy version is increased; a starting position of the second redundancy version RV1, third redundancy version RV2, and/or fourth redundancy version RV3 is outside a region of system bits of said buffer; and a separation between the starting position of the first redundancy version RV0 and the starting position of second redundancy version RV1 is larger than a separation between the starting position of the second redundancy version RV1 and the starting position of a third redundancy version RV2, and a separation between the starting position of the third redundancy version RV2 and the starting position of a fourth redundancy version RV3. [5] Claim 17 differs from D1 in that: 2) providing information on selected redundancy version at a base station to a user device. [6] Claim 20 differs from D1 in that: 3) receiving information on a selected redundancy version at a user device, and using said information when communicating with a base station. [7] Hence, claims 1 to 21 meet PCT 33(2). [8] The above difference 1) is neither disclosed by prior art, nor commonly known to a person skilled in the art. Hence, the subject matter of claims 1 to 16 meets PCT 33(3). [9] The above differences 2) and 3) are well known in the art. Hence, claims 17 and 20 do not meet PCT 33(3). [10] The additional technical features of claims 18, 19 and 21 are well known in the art. Hence, claims 18, 19 and 21 do not meet PCT 33(3). [11] The subject matter of claim 22 is a computer program referring to any of claims 1 to 21. Claim 22 meets PCT 33(2) and PCT 33(3) when it refers to any of claims 1 to 16. Claim 22 meets PCT 33(2) and does not meet PCT 33(3) when it refers to any of claims 17 to 21.																		

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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**

- [12] The subject matter of claim 23 is an apparatus. The steps performing by the apparatus are the same as the steps which claim 1 performs. According to the reasoned statement on claim 1, the subject matter of claim 23 meets PCT 33(2) and PCT 33(3).
- [13] II. Industrial Applicability
- [14] Claims 1 to 23 meet PCT 33(4).