

## PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

# PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To: LEE, Keon-Joo  Mihwa Bldg., 16, Daehak-ro 9-gil Chongro-gu Seoul 03079 Republic of Korea		Date of mailing (day/month/year) <b>12 November 2018 (12.11.2018)</b>	
Applicant's or agent's file reference P23968-PCT		<b>FOR FURTHER ACTION</b> See paragraph 2 below	
International application No. <b>PCT/KR2018/009226</b>	International filing date (day/month/year) <b>10 August 2018 (10.08.2018)</b>	Priority date(day/month/year) 11 August 2017 (11.08.2017)	
International Patent Classification (IPC) or both national classification and IPC <b>H04B 17/24(2014.01)i, H04B 17/30(2014.01)i, H04B 7/26(2006.01)i</b>			
Applicant <b>SAMSUNG ELECTRONICS CO., LTD.</b>			
<p>1. This opinion contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> 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</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p> <p>2. <b>FURTHER ACTION</b></p> <p>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.</p> <p>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.</p> <p>For further options, see Form PCT/ISA/220.</p>			

Name and mailing address of the ISA/KR International Application Division Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea Facsimile No. +82-42-481-8578	Date of completion of this opinion  08 November 2018 (08.11.2018)	Authorized officer  KANG, Hee Gok  Telephone No. +82-42-481-8264
---	---	--

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.  
**PCT/KR2018/009226**

**Box No. I Basis of this 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*.I(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 13*ter*.I(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 13*ter*.I(a)).
    - on paper or in the form of an image file (Rule 13*ter*.I(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:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

**PCT/KR2018/009226**

**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)	Claims	<u>1-15</u>	YES
	Claims	<u>NONE</u>	NO
Inventive step (IS)	Claims	<u>NONE</u>	YES
	Claims	<u>1-15</u>	NO
Industrial applicability (IA)	Claims	<u>1-15</u>	YES
	Claims	<u>NONE</u>	NO

2. Citations and explanations :

Reference is made to the following documents:

D1: ZTE, 'On CSI framework details', R1-1707123, 3GPP TSG RAN WG1 Meeting #89, Hangzhou, China, 08 May 2017

D2: HUAWEI et al. 'Discussion on CSI Framework Design', R1-1706926, 3GPP TSG RAN WG1 Meeting #89, Hangzhou, China, 06 May 2017

1. Novelty (PCT Article 33(2)) and Inventive Step (PCT Article 33(3))

1.1. Claims 1-5

1.1.1. Independent Claim 1

D1, which is considered to be the closest prior art to the subject matter of claim 1, discloses a method for a UE, comprising: receiving a configuration of CSI-RS resource set(s) via RRC; receiving a configuration of combination(s) of the CSI parameters (e.g., CRI, RI, PMI, CQI, etc.); receiving a timing offset Y for CSI reporting by DCI which triggers a CSI-RS resources for AP-CSI-RS since it is single-shot and dynamic CSI-RS transmission; calculating a CSI; building a CSI measurement and feedback; and supporting an aperiodic CSI reporting, wherein the aperiodic CSI reporting timing offset 'Y' refers to the time gap between aperiodic CSI reporting triggering and aperiodic CSI reporting and the value of Y should be configured in report setting (see sections 1-2).

The subject matter of claim 1 differs from that of D1 in the feature of estimating an aperiodic channel status between the UE and the (BS) based on the reference signal. However, D2 relates to a CSI which is in the same technical field as D1 and discloses that the resource

Continued on Supplemental Box

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

**PCT/KR2018/009226**

**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:

Claims 4, 9, and 14 are unclear in that 'the aperiodic CSI report' has not been previously defined. Therefore, claims 4, 9, and 14 do not meet the requirements of PCT Article 6.

(Note: The international search report and written opinion have been established on the assumption that 'the aperiodic CSI report' in claims 4, 9, and 14 is 'an aperiodic CSI report'.)

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of : Box No. V

setting (0) is to be configured with CSI-RS resource of aperiodic transmission to measure a larger dimensional channel; and an estimation on NZP CSI-RS for channel estimation is made by subtracting CSI-RS from Rx signal (see sections 2.3 and 2.4 in D2). As D1 has already disclosed the feature of the CSI calculation, a person skilled in the art would have easily applied the feature of the estimation on NZP CSI-RS in D2 to the features of D1, thereby arriving at the claimed invention.

Accordingly, claim 1 would have been obvious over D1 in view of D2. Therefore, claim 1 lacks an inventive step under PCT Article 33(3).

1.1.2. Dependent Claims 2-5

The additional feature of claim 2, dependent on claim 1, can be easily derived from the feature of D1 (aperiodic CSI reporting timing offset  $Y'$  refers to the time gap between aperiodic CSI reporting triggering and aperiodic CSI reporting, see section 1).

The additional feature of claim 3, dependent on claim 1, can be easily derived from the feature of D1 (at least some combination(s) of the CSI parameters (e.g., CRI, RI, PMI, CQI, etc.) can be configured to be omitted from reporting within a CSI reporting setting, see section 1).

The additional features of claims 4-5, dependent on claim 1, can be easily derived from the feature of D1 (NR should support dynamic CSI report resource indication based on CSI report resource pooling, and the CSI-RS resource pool is used for AP CSI-RS resource configuration, see sections 2.1 and 2.2).

Accordingly, claims 2-5 would have been obvious over D1 in view of D2. Therefore, claims 2-5 lack an inventive step under PCT Article 33(3).

1.2. Claims 6-10

1.2.1. Independent Claim 6

D1, which is considered to be the closest prior art to the subject matter of claim 6,

Continued on The Next Page

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of : Previous Page

discloses a method for a gNB, comprising: signaling a configuration of CSI-RS resource set(s) via RRC; configuring combination(s) of the CSI parameters (e.g., CRI, RI, PMI, CQI, etc.); and configuring a timing offset Y for CSI reporting by DCI which triggers a CSI-RS resources for AP-CSI-RS since it is single-shot and dynamic CSI-RS transmission (see sections 1-2).

The subject matter of claim 6 differs from that of D1 in the feature of receiving feedback information, which is based on an aperiodic channel status between the UE and the BS, based on the feedback transmission timing. However, the different feature can be easily derived from the feature of D1 (the aperiodic CSI reporting timing offset 'Y' refers to the time gap between aperiodic CSI reporting triggering and aperiodic CSI reporting and the value of Y should be configured in report setting; and the aperiodic CSI reporting should be all supported for NR CSI reporting, see sections 1, 2.1 and 2.3).

Accordingly, claim 6 would have been obvious over D1. Therefore, claim 6 lacks an inventive step under PCT Article 33(3).

1.2.2. Dependent Claims 7-10

The additional feature of claim 7, dependent on claim 6, can be easily derived from the feature of D1 (aperiodic CSI reporting timing offset Y' refers to the time gap between aperiodic CSI reporting triggering and aperiodic CSI reporting, see section 1).

The additional feature of claim 8, dependent on claim 6, can be easily derived from the feature of D1 (at least some combination(s) of the CSI parameters (e.g., CRI, RI, PMI, CQI, etc.) can be configured to be omitted from reporting within a CSI reporting setting, see section 1).

The additional features of claims 9-10, dependent on claim 6, can be easily derived from the feature of D1 (NR should support dynamic CSI report resource indication based on CSI report resource pooling, and the CSI-RS resource pool is used for AP CSI-RS resource configuration, see sections 2.1 and 2.2).

Accordingly, claims 7-10 would have been obvious over D1. Therefore, claims 7-10 lack an inventive step under PCT Article 33(3).

Continued on The Next Page

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of : Previous Page

1.3. Claims 11-15

1.3.1. Independent Claim 11

Claim 11 relates to a user equipment (UE) configured to operate in a wireless communication system, and the features of claim 11 essentially correspond to those of claim 1 except for the category of invention. Accordingly, the same reasoning as in claim 1 could be applied to claim 11. Therefore, claim 11 lacks an inventive step under PCT Article 33(3) as being obvious over D1 in view of D2.

1.3.2. Dependent Claims 12-15

The additional features of claims 12-15 essentially correspond to those of claims 2-5, respectively. Accordingly, the same reasoning as in claims 2-5 could be applied to claims 12-15. Therefore, claims 12-15 lack an inventive step under PCT Article 33(3) as being obvious over D1 in view of D2.

2. Industrial Applicability (PCT Article 33(4))

Claims 1-15 are industrially applicable under PCT Article 33(4).