

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference PJ9903WD	<b>FOR FURTHER ACTION</b>		See item 4 below
International application No. PCT/CN2017/109417	International filing date ( <i>day/month/year</i> ) 03 November 2017 (03.11.2017)	Priority date ( <i>day/month/year</i> ) 04 November 2016 (04.11.2016)	
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237			
Applicant HUAWEI TECHNOLOGIES CO., LTD.			

<p>1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).</p> <p>2. This REPORT consists of a total of 4 sheets, including this cover sheet.</p> <p>In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.</p>																								
<p>3. This report contains indications relating to the following items:</p> <table> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table> <p>4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).</p>	<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
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	Date of issuance of this report 07 May 2019 (07.05.2019)
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From the INTERNATIONAL SEARCHING AUTHORITY

To:

**PCT**

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing <i>(day/month/year)</i> <b>29 January 2018</b>	
Applicant's or agent's file reference <b>PJ9903WD</b>	<b>FOR FURTHER ACTION</b> See paragraph 2 below
International application No. <b>PCT/CN2017/109417</b>	International filing date <i>(day/month/year)</i> <b>03 November 2017</b>
Priority date <i>(day/month/year)</i> <b>04 November 2016</b>	
International Patent Classification (IPC) or both national classification and IPC <b>H04L 5/00(2006.01)i</b>	
Applicant <b>HUAWEI TECHNOLOGIES CO., LTD.</b>	

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/	Date of completion of this opinion	Authorized officer
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WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/CN2017/109417

## 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/CN2017/109417

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

Novelty (N)	Claims	<u>1-56</u>	YES
	Claims	<u>None</u>	NO
Inventive step (IS)	Claims	<u>13-28, 41-56</u>	YES
	Claims	<u>1-12, 29-40</u>	NO
Industrial applicability (IA)	Claims	<u>1-56</u>	YES
	Claims	<u>None</u>	NO

## 2. Citations and explanations :

[1] **2.1**Cited reference document

[2] D1: CN 103874207 A (18 June 2014)

[3] **2.2**Novelty and Inventive Step

[4] D1 discloses a signal transmission method and device (see description, paragraphs [0043]-[0125]): a base station determining a physical downlink shared channel resource mapping (PQ) parameter set of a user equipment, the PQ parameter set comprising a parameter of a resource element (RE) occupied by a cell-specific reference signal (CRS) (equivalent to a first reference signal) and/or a demodulation reference signal (DMRS) (equivalent to a second reference signal), such as the number of CRS antenna ports, the position of the CRS in the frequency domain, zero-power channel state indication reference signal (CSI-RS) configuration information, a starting symbol of a physical downlink shared channel (PDSCH), and non-zero-power CSI-RS configuration information (equivalent to first configuration information), as well as the number of antenna ports corresponding to the DMRS, a starting position of a time domain occupied by the DMRS, a starting position of a frequency domain occupied by the DMRS, a resource element pattern used by the DMRS and the type of a carrier that bears the DMRS (equivalent to second configuration information); the PQ parameter set is sent to the user equipment, and the user equipment determines to receive the position of the RE of the CRS and/or the DMRS according to a PQ parameter of a serial number.

[5] Claims 1, 7, 29 and 35 differ from D1 in that: (1) a network device determines a reference signal resource pool and sends information indicating resources therein to a terminal, and the terminal receives the indication information. Claims 13, 21, 41 and 49 differ from D1 in that: (2) according to first port information which comprises a port used by the first and second reference signals, the network device determines second port information which comprises a remaining port used by the second reference signal, and the first and second reference signals are respectively sent to the terminal according to configuration information of said port information.

[6] Therefore, claims 1-56 are novel in the sense of PCT Article 33(2).

[7] Regarding difference (1), placing resources in a resource pool and indicating said resources to a user are both conventional means in the art. Therefore, claims 1, 7, 29 and 35 do not involve an inventive step in the sense of PCT Article 33(3). The additional technical features of dependent claims 2-6, 8-12, 30-34, and 36-40 are disclosed in part by D1, while the remaining features are conventional means in the art. Therefore, claims 2-6, 8-12, 30-34, and 36-40 do not involve an inventive step in the sense of PCT Article 33(3).

[8] Difference (2) has not been disclosed by the prior art documents, and no motivation for deriving the technical solutions of claims 13, 21, 41 and 49 can be obtained from the prior art. Therefore, claims 13, 21, 41, and 49 involve an inventive step in the sense of PCT Article 33(3). Correspondingly, dependent claims 14-20, 22-28, 42-48 and 50-56 also involve an inventive step in the sense of PCT Article 33(3).

[9] **2.3**Industrial Applicability

[10] Claims 1-56 are industrially applicable in the sense of PCT Article 33(4).