

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 92002578PCT2	FOR FURTHER ACTION See item 4 below	
International application No. PCT/CN2022/123378	International filing date (<i>day/month/year</i>) 30 September 2022 (30.09.2022)	Priority date (<i>day/month/year</i>) 30 October 2021 (30.10.2021)
International Patent Classification (IPC) or national classification and IPC See relevant information in Form PCT/ISA/237		
Applicant HUAWEI TECHNOLOGIES CO., LTD.		

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).
2. This REPORT consists of a total of 5 sheets, including this cover sheet.

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.

3. This report contains indications relating to the following items:

<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 and industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/>	Box No. VI	Certain documents cited
<input checked="" type="checkbox"/>	Box No. VII	Certain defects in the international application
<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
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).

	Date of issuance of this report 30 April 2024 (30.04.2024)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Xin Wang e-mail pct.team2@wipo.int

CORRECTED
VERSION

PATENT COOPERATION TREATY

TRANSLATION

From the INTERNATIONAL SEARCHING AUTHORITY

To:

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing
(day/month/year) **21 March 2024**

Applicant's or agent's file reference
92002578PCT2

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/CN2022/123378

International filing date (day/month/year)
30 September 2022

Priority date (day/month/year)
30 October 2021

International Patent Classification (IPC) or both national classification and IPC
H04L1/00(2006.01)i; H03M13/09(2006.01)i; H03M13/11(2006.01)i

Applicant
HUAWEI TECHNOLOGIES CO., LTD.

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

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/CN2022/123378

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 43bis.1(b)).
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.
 - b. ☐ furnished subsequent to the international filing date for the purposes of international search (Rule 13ter.1(a)),
☐ accompanied by a statement to the effect that the sequence listing does not go beyond the disclosure in the international application as filed.
4. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, this opinion has been established to the extent that a meaningful opinion could be formed without a WIPO Standard ST.26 compliant sequence listing.
5. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/CN2022/123378**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	1-30	YES
	Claims	None	NO
Inventive step (IS)	Claims	1-30	YES
	Claims	None	NO
Industrial applicability (IA)	Claims	1-30	YES
	Claims	None	NO

2. Citations and explanations:

D1: WO 2021/96054 A1

D1 is the closest prior art document, and discloses (see description, page 12, line 1 to page 37, last line): an encoding method for a polar code, comprising: respectively acquiring a first bit and a second bit, the type of the first bit being a known bit, and the type of the second bit comprising at least one of a frozen bit, a parity check bit or an information bit; generating a pilot sequence on the basis of the first bit; encoding the second bit to obtain a first encoding sequence; and when determining to send the pilot sequence, sending a second encoding sequence to a decoding device, wherein the second encoding sequence comprises the pilot sequence and the first encoding sequence. A decoding method for a polar code, comprising: receiving a message from an encoding apparatus, the message comprising a subsequence to be decoded, the subsequence comprising a first bit, and the type of the first bit being a known bit; and using the type of the first bit as a target type, and decoding the first bit according to a first decoding algorithm corresponding to the target type, the target type comprising a parity check bit or a frozen bit.

Novelty

Claim 1 at least differs from D1 by: determining a first frozen bit sequence on the basis of a probability distribution value P1 of a first information bit sequence.

Claim 11 at least differs from D1 by: on the basis of an *i*th probability distribution value in a probability distribution value set P and a frozen bit sequence corresponding to an *i*th probability distribution value, decoding a sequence to be decoded.

D1 does not explicitly or implicitly disclose the technical solutions of claims 1-30. Therefore, claims 1-30 are novel in the sense of PCT Article 33(2).

Inventive Step

It would not have been possible for a person skilled in the art to obviously arrive at the technical solutions of claims 1-30 from any combination of D1 and common general knowledge. Therefore, claims 1-30 involve an inventive step in the sense of PCT Article 33(3).

Industrial Applicability

The technical solutions of claims 1-30 can be made or used in industry, and thus, claims 1-30 are industrially applicable in the sense of PCT Article 33(4).

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/CN2022/123378**Box No. VII Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

Claims 5, 6, 9, 10, 18-21, and 24 are themselves multiple dependent claims and refer to preceding multiple dependent claims, and therefore do not comply with PCT Rule 6.4(a).