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Datasheet for the decision
of 27 April 2023

Case Number:	T 1445/20 - 3.5.03
Application Number:	12732365.7
Publication Number:	2611038
IPC:	H03M13/11
Language of the proceedings:	EN

Title of invention:
Decoding method and decoding device

Applicant:
Huawei Technologies Co., Ltd.

Headword:
Error overflow/HUAWEI

Relevant legal provisions:
RPBA 2020 Art. 12(4), 12(8)

Keyword:
Decision in written proceedings - (yes): indication of non-attendance by applicant - oral proceedings neither necessary nor expedient
Admittance of request filed with the appeal - sole claim request (no): amendment not suitable to address the issues which led to the appealed decision

Case Number: **T 1445/20 - 3.5.03**

D E C I S I O N
of Technical Board of Appeal 3.5.03
of 27 April 2023

Appellant:	Huawei Technologies Co., Ltd.
(Applicant)	Huawei Administration Building
	Bantian
	Longgang District
	Shenzhen, Guangdong 518129 (CN)

Representative:	Gill Jennings & Every LLP
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Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 30 January 2020 refusing European patent application No. 12732365.7 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair	K. Bengi-Akyürek
Members:	K. Peirs
	C. Almberg

Summary of Facts and Submissions

I.   The appeal lies from the decision of the examining
       division to refuse the present European patent
       application. The sole claim request subject to the
       appealed decision was deemed not to be allowable under
       Articles 83 and 84 EPC.

II.   The appellant requests that the decision under appeal
       be set aside and that a patent be granted according to
       the claims of an **amended claim request** filed for the
       first time with the statement setting out the grounds
       of appeal.

III.   The appellant was summoned to oral proceedings before
       the board. A communication was issued under
       Article 15(1) RPBA 2020 including the board's negative
       preliminary opinion regarding the admittance into the
       proceedings under Article 12(4) RPBA 2020 of the
       amended claim request.

IV.   In a written reply, the appellant stated that it would
       not be attending the arranged oral proceedings.

V.   Subsequently, the oral proceedings were cancelled.

VI.   Claim 1 of the **amended claim request** reads as follows
       (board's feature labelling and highlighting of
       amendments vis-à-vis claim 1 of the sole claim request
       underlying the appealed decision):

       (a) "An error-correcting decoding method, comprising:
       (b) performing (S201) iterative decoding on a
           multidimensional code in order to obtain
           incorrigible code words, wherein the number of

error bits of <u>an incorrible</u> code word in each
dimension where error bits of the incorrible code
words are located is greater than the ~~capacity~~
<u>error correction capability</u> of the multidimensional
code;

(c) determining (S202) locations of error bits in the
incorrible code words that have been obtained by
performing the iterative decoding on the
multidimensional code, wherein the locations of the
error bits in the incorrible code words are
multidimensional coordinate locations of the error
bits in the multidimensional code;

(d) correcting (S203) error bits of a part of the
incorrible code words in the multidimensional
code according to the determined locations of the
error bits in the incorrible code words, so that
the number of error bits of a code word in each
dimension where the error bits of the incorrible
code words are located is less than the ~~capacity~~
<u>error correction capability</u> of the multidimensional
code<u>, wherein only error bits that are located in
both a first incorrible code word and a second
incorrible code word are corrected</u>; and

(e) after the error bits of a part of the incorrible
code words in the multidimensional code are
corrected, performing (S204) iterative decoding on
the multidimensional code".

Reasons for the Decision

1.   *Decision in written proceedings*

As the appellant effectively withdrew its request for
oral proceedings by declaring its intent not to attend
them, and as the board does not consider the conduct of

oral proceedings to be expedient either (cf.
Article 116(1) EPC), the decision is handed down in
written proceedings (Article 12(8) RPBA 2020).

2.   *Technical background*

2.1   The present application relates to correcting, by means
        of an error-correction algorithm, errors that typically
        occur when a coded bit stream is transmitted in a
        communication system. In particular, the present
        application concerns "incorrigible code words" that are
        obtained by iterative decoding of such a coded bit
        stream. These "incorrigible code words" are inherent to
        any error-correction algorithm. They arise when the
        number of error bits in the coded bitstream is beyond
        the algorithm's "capability" to correct. In such a
        case, the error-correction algorithm is overloaded.

2.2   The invention addresses this overloading by *first*
        locating the error bits in the incorrigible code words
        and *then* correcting some of these error bits. This
        correction takes place until the number of error bits
        is below the error correction capability of the
        algorithm, after which iterative decoding is resumed.

3.   *Amended claim request: admittance into the proceedings*

3.1   In view of the amendments made to present claim 1, the
        admittance into the proceedings of the amended claim
        request mentioned in point II above is at the board's
        discretion under Article 12(4) RPBA 2020.

3.2   The amended claim request is not suitable to address
        all of the issues which led to the decision under
        appeal. In particular, the objections raised in
        Reasons 1.3 to 1.5 and 2 of the appealed decision are

unaffected by claim 1 of the amended claim request. The
board notes the following in this respect:

3.2.1   In Reasons 1.3 of the appealed decision, the examining
        division correctly observed that the expression "in
        order to obtain incorrigible code words" according to
        feature (b) renders claim 1 of the appealed decision's
        claim request unclear. The board endorses the reasons
        provided by the examining division in this respect.
        These reasons still apply to claim 1 of the amended
        claim request. Even with "a mind willing to understand
        the claims", the skilled reader would not necessarily
        interpret, based on their common general knowledge, the
        "iterative decoding" of feature (b) as "a first round
        of iterative decoding" in the sense that only a single
        iteration of the iterative decoding would be conducted.
        Incidentally, this would also run contrary to the
        present application's description (see page 6, lines 16
        and 17 and page 9, lines 14 to 24): the second and
        third embodiment's decoder is explicitly configured to
        perform the iterative decoding according to feature (b)
        "m times" (emphasis added).

3.2.2   The board also concurs with Reasons 1.4 and 1.5 of the
        impugned decision. It is indeed not clear how the
        "iterative decoding" of feature (b) can be
        distinguished from that of **feature (e)**. Even a skilled
        reader "well versed in iterative coding" would not
        immediately understand, based on claim 1 taken by
        itself, that these features represent two (different)
        stages of iterative decoding, where the *first* stage
        would "identify the incorrigible words" and the *second*
        stage would then correct "the remaining parts of the
        words". Moreover, it is not apparent how the
        "determining" step of **feature (c)** and the "correcting"
        step according to **feature (d)** relate to the "iterative

decoding" of features (b) and (e). In particular, it is unclear whether these steps are part of the "iterative decoding" or whether they represent additional steps.

3.2.3   As to Reasons 2 of the appealed decision, the board agrees with the examining division at least in that it is not sufficiently disclosed for the skilled person how the "correcting" according to feature (d) indeed takes place. The description (see e.g. page 5, lines 9 to 12 regarding step S103; page 7, line 34 to page 8, line 3 regarding step S203 and on page 11, lines 4 to 6 and 19 to 24 regarding error correcting unit 53) of the present application merely states that error bits of the incorrigible word are corrected but does not teach *how* this is done. The board notes in this respect that code words that are damaged beyond the multidimensional code's ability to repair will typically necessitate a re-transmission of the damaged data. The skilled person would not understand the "correcting" step of feature (d) to amount to a mere re-transmission. Moreover, the present application is silent about any such re-transmission.

3.3   The board therefore decided not to admit the amended claim request into the proceedings under Article 12(4) RPBA 2020.

4.   *Conclusion*

Already because there is no admissible claim request on file, the appeal is to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

B. Brückner   K. Bengi-Akyürek

Decision electronically authenticated