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Case Number: T 2227/16 - 3.5.05

Application Number: 11170716.2

Publication Number: 2400687

IPC: H04L5/00, H04L27/26, H04W72/04

Language of the proceedings: EN

Title of invention:
Method for reference signal pattern allocation and related communication device

Applicant:
Acer Incorporated

Headword:
Reference signal patterns/ACER

Relevant legal provisions:
EPC Art. 54, 111(1)

Keyword:
Novelty - (yes, after amendments)
Remittal to the first instance for further prosecution - (yes)

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Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 2227/16 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 31 October 2019

Appellant: (Applicant)	Acer Incorporated 8F, 88, Sec. 1, Hsin Tai Wu Road Xizhi District New Taipei City 221 (TW)
Representative:	Becker Kurig Straus Patentanwälte Bavariastrasse 7 80336 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 26 April 2016 refusing European patent application No. 11170716.2 pursuant to Article 97(2) EPC**

Composition of the Board:

Chair	A. Ritzka
Members:	K. Bengi-Akyuerek
	G. Weiss

Summary of Facts and Submissions

I. The appeal is against the decision of the examining division to refuse the present European patent application for lack of novelty (Article 54 EPC) with respect to the claims of a main request and of two auxiliary requests (first and second auxiliary request). The novelty objections relied on the following prior-art documents:

D1: EP-A-2 056 515;

D2: Huawei: "OCC mapping scheme for downlink DMRS", 3GPP TSG RAN WG1 meeting #61, R1-103098, pp. 1-6, May 2010;

D3: Nokia Siemens Networks, Nokia: "Considerations on Initialization and Mapping of DM-RS Sequence", 3GPP TSG RAN WG1 meeting #58bis, R1-093890, pp. 1-5, October 2009.

II. With the statement setting out the grounds of appeal, the appellant requested that the examining division's decision be set aside and that a patent be granted on the basis of any of the claim requests underlying the appealed decision.

III. In a first communication under Rule 100(2) EPC, the board gave its preliminary opinion on the appeal. In particular, it endorsed the finding of the appealed decision that the claimed subject-matter was not novel against D1, D2 or D3 under Article 54(2) EPC.

IV. With a letter of reply dated 5 August 2019, the appellant submitted amended claims according to a third auxiliary request, and requested to remit the case to the examining division for further prosecution.

V. In a further communication under Rule 100(2) EPC, the board indicated that the third auxiliary request was considered to be allowable under Article 54 EPC. The board also informed the appellant that it was minded to exercise its discretion under Article 111(1) EPC to remit the case to the examining division for further prosecution, in particular for the assessment of inventive step, on the basis of the claims of that third auxiliary request, without the necessity to hold oral proceedings.

VI. With a letter of reply, the appellant requested that the case be remitted to the examining division for further prosecution on the basis of the claims of the third auxiliary request on file.

VII. **Claim 1** of the third auxiliary request reads as follows:

"A method for reference signal pattern allocation for an eNodeB in a wireless communication system, characterized by the method comprising:

(S902) allocating a plurality of physical resource blocks, PRBs, to at least one mobile device; and

(S904) mapping a plurality of reference signal patterns to the PRBs according to an orthogonal cover code, OCC, mapping rule, wherein the plurality of reference signal patterns is same as a plurality of OCC reference signal patterns multiplied with an associated demodulation reference signal, DM RS, wherein

the OCC reference signal pattern, when multiplied with the associated DM RS, applies length-2 or length-4 Walsh code OCC mapping according to an antenna port;

wherein said OCC mapping rule is cell-specific or user equipment-specific, UE-specific;

wherein the OCC mapping rule comprises mapping the

plurality of reference signal patterns to the plurality [sic] PRBs according to a plurality of index numbers of the plurality of PRBs when the OCC mapping rule is cell-specific, or the OCC mapping rule comprises cyclically mapping the plurality of reference signal patterns to PRBs of each mobile device in a PRB index order of the PRBs of each mobile device when the OCC mapping rule is UE-specific, or the OCC mapping rule comprises cyclically mapping the plurality of reference signal patterns to each of a plurality of PRB groups in a PRB index order of each of the plurality PRB groups when the OCC mapping rule is UE-specific."

The further independent **claims 2, 14 and 15** of the third auxiliary request are directed to a corresponding receiving method and to corresponding apparatuses respectively.

Reasons for the Decision

1. *The present application*

The present application is concerned with allocations of reference signal patterns ("DM RS patterns") that are commonly used for channel estimation for coherent demodulation in 3GPP-based wireless networks. It describes essentially the mapping of DM RS patterns and so-called orthogonal cover code (OCC) patterns multiplied with the DM RS pattern to physical resource blocks (PRBs) allocated to a user equipment (UE). In that respect, different cell-specific and UE-specific OCC mapping rules are proposed (see e.g. Figs. 10-22 of the application). According to the description, the technical problem to be solved by the present application is to obtain orthogonal demodulation

reference signals even for non-contiguous PRBs.

2. *Allowability of the Third Auxiliary Request*

Process claim 1 of the third auxiliary request comprises the following limiting features, as labelled by the board (with the amendments compared to claim 1 of the main request underlying the appealed decision being underlined):

A method for reference signal pattern allocation for a mobile device in a wireless communication system, comprising the steps of:

A) allocating a plurality of physical resource blocks (PRBs) to at least one mobile device;
B) mapping a plurality of reference signal patterns to the PRBs according to an orthogonal cover code (OCC) mapping rule, wherein the plurality of reference signal patterns is same as a plurality of OCC reference signal patterns multiplied with an associated demodulation reference signal (DM RS),
C) wherein the OCC reference signal pattern, when multiplied with the associated DM RS, applies length-2 or length-4 Walsh code OCC mapping according to [an] antenna port;
D) wherein said OCC mapping rule is cell-specific or UE-specific;
E) wherein the OCC mapping rule comprises mapping the plurality of reference signal patterns to the plurality [of] PRBs according to a plurality of index numbers of the plurality of PRBs when the OCC mapping rule is cell-specific, or the OCC mapping rule comprises cyclically mapping the plurality of reference signal patterns to PRBs of

each mobile device in a PRB index order of the PRBs of each mobile device when the OCC mapping rule is UE-specific, or the OCC mapping rule comprises cyclically mapping the plurality of reference signal patterns to each of a plurality of PRB groups in a PRB index order of each of the plurality [of] PRB groups when the OCC mapping rule is UE-specific.

Thus, present claim 1 differs from claim 1 of the refused main request essentially by the addition of features D) and E). Features D) and E) are supported e.g. by dependent claim 7 of the present application as originally filed. The amendments thus comply with Article 123(2) EPC.

2.1 *Novelty (Article 54 EPC)*

2.1.1 As regards feature B), the appellant essentially argued that none of documents D1, D2 and D3 disclosed that the respective reference signal patterns were mapped to the PRBs according to a mapping rule, i.e. that mapping rules were used "on PRB level".

However, **D2** teaches that the OCC reference signal pattern is indeed mapped to resource elements (REs) in the time and frequency domain (see e.g. page 2, last paragraph). Given that REs are commonly grouped into PRBs (typically made up of twelve sub-carriers and seven slots), the skilled reader would understand that the resulting reference signal pattern is in fact mapped to the PRBs as claimed in claim 1.

Furthermore, **D3** unequivocally discloses that the resulting reference signal pattern (scrambled "URS Gold sequence") is mapped to the PRBs ("PRB#=x"; "PRB#=x+1";

see Figs. 1 and 2) allocated to the respective UEs ("UE's PRB allocation"; see e.g. section 1, penultimate sentence) according to an OCC mapping rule (see e.g. section 1, third sentence: *"... URS Gold sequence is mapped frequency-first within a UE's PRB allocation ..."* and section 2.2, first paragraph, in conjunction with Figs. 1 and 2). Moreover, contrary to the appellant's view that D3 does not disclose mapping multiple patterns to a plurality of PRBs but to resource elements (REs), the board holds, firstly, that REs are commonly grouped into PRBs and thus are part of the PRBs and, secondly, that D3 palpably discloses that the pattern sequences are indeed mapped to the PRBs (see e.g. D3, section 2.2, first sentence: *"... is mapped to the PRBs allocated to a UE ..."*).

2.1.2 As to feature C), the appellant argued that the application of OCC mapping "according to antenna port" aiming at "multiplex on multiple antennas" and thus distinguished the claimed subject-matter from that of the cited prior art.

In this regard, the board notes that it is not derivable from the wording of feature C) that multiple antennas are used, nor that any multiplexing is performed based on multiple antennas. Thus, the use of different antenna ports as e.g. disclosed in D3 (see section 2.3, first bullet point) falls within the terms of that feature.

2.1.3 As regards added feature E), document D3 evidently relies on both cell-specific ("CRS-based mapping") and UE-specific ("URS-based mapping") mapping rules (see e.g. page 1, last paragraph; Figs. 1 and 2).

However, the board concurs with the appellant that

conditional cyclical mapping is not disclosed in the available prior art. In particular, prior-art documents D1 to D3 fail to disclose that, in the event of a **cell-specific** OCC mapping rule, the reference signal patterns are to be mapped to the PRBs according to a plurality of index numbers of the PRBs and that, in the event of a **UE-specific** OCC mapping rule, the reference signal patterns are cyclically mapped to PRBs of each mobile device in a PRB index order of the PRBs of each mobile device or to each of a plurality of PRB groups in a PRB index order of each of the plurality of PRB groups.

2.1.4 Hence, in view of distinguishing feature E), the subject-matter of claim 1 is novel over the cited prior art. The same applies to the other independent claims 2, 14 and 15 of the present auxiliary request.

2.2 In conclusion, the third auxiliary request complies with Article 54 EPC, having regard to prior-art documents D1, D2 and D3.

3. *Remittal of the case for further prosecution*

3.1 As the sole ground for refusal (i.e. lack of novelty under Article 54 EPC) no longer applies for the third auxiliary request, the decision under appeal has to be set aside.

3.2 The appellant requested that the case be remitted to the examining division for further prosecution on the basis of the claims of the third auxiliary request (see point VI above).

3.3 Given that lack of novelty (Article 54 EPC) was the only issue that was addressed in the decision under

appeal, the question of inventive step (Article 56 EPC) as regards the present independent claims (in particular the determination of the closest prior art and the objective technical problem based on the above distinguishing feature) could neither be discussed nor be decided in the appealed decision. However, the board does not consider it appropriate to take a preliminary view or to pass final judgment on the issue of inventive step as regards the present set of claims for the first time in these appeal proceedings.

3.4 In view of the above, the board has decided, in the exercise of its discretion under Article 111(1) EPC and in accordance with the appellant's request, to remit the case to the examination division for further prosecution on the basis of the claims of the third auxiliary request.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the examining division for further prosecution on the basis of claims 1 to 26 of the third auxiliary request submitted with the letter of 5 August 2019.

The Registrar: The Chair:

K. Götz-Wein A. Ritzka

Decision electronically authenticated