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**Datasheet for the decision
of 2 June 2022**

Case Number: T 2118/17 - 3.5.03

Application Number: 12770278.5

Publication Number: 2742606

IPC: H04B7/04, H04B7/06

Language of the proceedings: EN

Title of invention:

Methods and devices for configuring uplink transmission diversity during a serving cell change

Patent Proprietor:

Telefonaktiebolaget LM Ericsson (publ)

Opponent:

Sony Group Corporation

Headword:

Default PCI vector/ERICSSON

Relevant legal provisions:

EPC Art. 100(a), 56, 84, 123(2)

Keyword:

Inventive step - main request and auxiliary request 7 (no)
Clarity - auxiliary requests 2 to 6 and 8 to 12 (no)



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Case Number: T 2118/17 - 3.5.03

D E C I S I O N
of Technical Board of Appeal 3.5.03
of 2 June 2022

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 2 August 2017
revoking European patent No. 2742606 pursuant to
Article 101(3) (b) EPC.**

Composition of the Board:

Chair K. Bengi-Akyürek
Members: K. Schenkel
N. Obrovski

Summary of Facts and Submissions

- I. The appeal of the patent proprietor is against the decision of the opposition division to revoke the opposed patent on the ground that claim 1 of the main request (patent as granted) lacked novelty (Article 100(a) and 54 EPC) and that claim 1 of auxiliary requests 2, 6 and 8 contained added subject-matter (Article 100(c) EPC in conjunction with Article 123(2) EPC). Further claim requests were not admitted into the proceedings.

The following prior-art documents are relevant for this decision:

- 01:** WO 2011/085187;
- 02a:** 3GPP TS25.331 V10.0.0, June 2010
(3rd Generation Partnership Project;
Technical Specification Group Radio Access
Network; Radio Resource Control (RRC);
Protocol specification (Release 10));
- 03:** Chris Johnson: "Radio Access Networks for
UMTS Principles and Practice", John Wiley &
Sons, 2008.

- II. Oral proceedings were held before the board by videoconference on 2 June 2022 in the absence of the duly summoned respondent, who had declared with its submission dated 10 March 2021 that it would not attend. The proceedings were continued without the respondent (Rule 115(2) EPC and Article 15(3) RPBA).

The parties' final requests were as follows:

- The appellant requested that the decision under appeal be set aside and that the patent be maintained as granted (**main request**) or, alternatively, in amended form on the basis of **auxiliary request 1**, filed with the submission dated 14 April 2022, or one of **auxiliary requests 2 to 12**, filed with the statement of grounds of appeal.
- The respondent had requested in writing that the appeal be dismissed.

At the end of the oral proceedings, the board's decision was announced.

III. Claim 1 of the **main request** reads as follows (labelling by the board):

- (a) "A method of configuring the Precoding Control Information, PCI, vector in a User Equipment, UE,
- (b) configured in uplink Closed-loop Transmit Diversity, CLTD, the method comprising the steps of:
- (c) - receiving (S22) an RRC reconfiguration message that indicates a serving cell change procedure, and
- (d) - setting (S23) the PCI vector to a default value upon receipt of the RRC reconfiguration message."

IV. Claim 1 of **auxiliary request 1** differs from claim 1 of the main request in that feature (d) reads as follows (differences to claim 1 of the main request indicated by the board):

(d1) in response to receiving said RRC reconfiguration message, setting (S23) the PCI vector to a default value upon receipt of the RRC reconfiguration message, thereby making the PCI vector used by the UE known to a new Node-B, associated with a new serving cell to which the UE is changing."

V. Claim 1 of **auxiliary request 2** differs from claim 1 of the main request in that between features (b) and (c) the following feature has been added:

(e) "receiving a PCI vector from the source serving Node-B",

and in that feature (d) now reads as follows (differences to claim 1 of the main request indicated by the board):

(d2) "and, when the serving Node-B is changed due to the RRC reconfiguration procedure:

setting (S23) the PCI vector to a default value upon receipt of the RRC reconfiguration message."

VI. Claim 1 of **auxiliary request 3** differs from claim 1 of the main request in that feature (c) now reads as follows (differences to claim 1 of the main request indicated by the board):

(c1) "receiving (S22) an RRC reconfiguration message that indicates a serving cell change procedure, wherein the serving Node-B is changed due to the RRC reconfiguration procedure; and".

VII. Claim 1 of **auxiliary request 4** differs from claim 1 of auxiliary request 2 in that feature (d2) now reads as

follows (differences to claim 1 of auxiliary request 2 indicated by the board):

(d3) "and, when the serving Node-B is changed due to the ~~RRC reconfiguration~~ serving cell change procedure:

setting (S23) the PCI vector to a default value upon receipt of the RRC reconfiguration message."

VIII. Claim 1 of **auxiliary request 5** differs from claim 1 of main request in that features (b) and (d) now read as follows (differences to claim 1 of the main request indicated by the board):

(b1) "configured in uplink Closed-loop Transmit Diversity, CLTD, in which the UE shall use a PCI vector decided by the network, the method comprising the steps of:"

(d4) "setting (S23) the PCI vector to a default value upon receipt of the RRC reconfiguration message that indicates a serving cell change procedure.

IX. Claim 1 of **auxiliary request 6** reads as follows:

"A User Equipment, UE, (103) adapted to use a Precoding Control Information, PCI, vector, the UE being configurable in uplink Closed-loop Transmit Diversity, CLTD, in which the UE shall use a PCI vector decided by the network, the UE comprising controller circuitry (107) adapted to set the PCI vector to a default value upon receipt of a RRC reconfiguration message that indicates a serving cell change procedure."

X. Claim 1 of **auxiliary request 7** differs from claim 1 of main request in that feature (d) now reads as follows (differences to claim 1 of the main request indicated by the board):

(d5) "setting (S23) the PCI vector of the UE to a default value upon receipt of the RRC reconfiguration message that indicates a serving cell change procedure, whereby the PCI vector of the UE is aligned with a PCI vector used by the new serving cell."

XI. Claim 1 of **auxiliary request 8** differs from claim 1 of the main request in that feature (d) now reads as follows (differences to claim 1 of the main request indicated by the board):

(d6) "setting (S23) the PCI vector to a default value upon receipt of the RRC reconfiguration message that indicates a serving cell change procedure, wherein the UE forgets, during the serving cell change procedure, any PCI vector received from a source serving cell."

XII. Claim 1 of **auxiliary request 9** differs from claim 1 of auxiliary request 7 in that feature (d5) now reads as follows (differences to claim 1 of auxiliary request 7 indicated by the board):

(d7) "setting (S23) the PCI vector of the UE to a default value upon receipt of the RRC reconfiguration message that indicates a serving cell change procedure, whereby the PCI vector of the UE is aligned with a PCI vector used by the new serving cell, wherein the UE forgets, during the

serving cell change procedure, any PCI vector received from a source serving cell."

XIII. Claim 1 of **auxiliary request 10** differs from claim 1 of auxiliary request 5 in that feature (d4) now reads as follows (differences to claim 1 of auxiliary request 5 indicated by the board):

(d8) "setting (S23) the PCI vector to a default value upon receipt of the RRC reconfiguration message that indicates a serving cell change procedure, whereby the PCI vector of the UE is aligned with a PCI vector used by the new serving cell."

XIV. Claim 1 of **auxiliary request 11** differs from claim 1 of auxiliary request 10 in that feature (d8) now reads as follows (differences to claim 1 of the auxiliary request 10 indicated by the board):

(d9) "setting (S23) the PCI vector to a default value upon receipt of the RRC reconfiguration message that indicates a serving cell change procedure, whereby the PCI vector of the UE is aligned with a PCI vector used by the new serving cell, wherein the UE forgets, during the serving cell change procedure, any PCI vector received from a source serving cell."

XV. Claim 1 of **auxiliary request 12** differs from claim 1 of auxiliary request 6 in that the following wording is added at the end:

", whereby the PCI vector of the UE is aligned with a PCI vector used by the new serving cell, and further adapted to forget, during the serving cell change procedure, any PCI vector received from a source

serving cell".

Reasons for the Decision

1. Technical background

The present patent relates to wireless communication between a UE (user equipment) and a Node-B (base station). The UE is configured in CLTD (closed-loop transmit diversity), i.e. it uses multiple antennas and receives fast feedback about the spatial (three-dimensional) channel to assist the transmission over the multiple antennas (page 1, lines 8 to 13 of the application as filed).

The UE pre-codes the signal, i.e. assigns weights to the signals for the different antennas, based on a PCI (pre-coding information) vector (page 1, lines 17 to 20 of the application as filed). The simultaneous use of multiple antennas with respective weights is employed in a CLTD scheme called "beamforming" (page 1, lines 22 to 26 of the application as filed). The UE further receives a RRC (Radio Resource Control) reconfiguration message indicating a cell change procedure and, upon receipt of this message, sets a predetermined CLTD mode, for example by setting the PCI vector to a default value. As to the implications of CLTD during a cell change, it is stated that the pre-coding weights, unless they are signalled to it, would be unknown to the new Node-B of the new cell (page 4, lines 8 to 12 of the application as filed).

2. Main request - claim 1 - inventive step (Article 56 EPC)

2.1 Claim 1 of the main request includes the following limiting features:

(a) A method of configuring the PCI vector in a UE

(b) configured in uplink CLTD, with the steps of:

(c) receiving an RRC reconfiguration message that indicates a serving cell change procedure, and

(d) setting the PCI vector to a default value upon receipt of the RRC reconfiguration message.

2.2 Prior-art document O1

Document **O1**, which was taken as a suitable starting point for the assessment of inventive step in the impugned decision, also relates to wireless communication between an UE (WTRU, Wireless Transmit/Receiver Unit) and a Node-B (abstract). In paragraphs [0130] to [0147], the concept of pre-coding for uplink transmit diversity using pre-coding is disclosed and also that the pre-coding information (weights) in closed loop beamforming (BF) is sent by the base station Node-B, where the UE subsequently controls the pre-coding weights (paragraph [0131]).

O1 further discloses that ULTD (uplink transmit diversity) may be *disabled* or *deactivated* based on the cells in the active set (paragraph [0169]). In more detail, ULTD may be disabled after the reception of an "ACTIVE SET UPDATE" message indicating that a radio link not belonging to the serving Node-B is added to the set of radio links, which is considered to change the configuration and therefore to be a reconfiguration message (*ibid.*). To the skilled person in the field of

wireless communication it is known that the "ACTIVE SET UPDATE" message corresponds to an RRC message (see point 2.3 below). It is also noted that the addition of a radio link not belonging to the serving Node-B implies that a connection between the UE and a different Node-B than the serving Node-B and thus a cell change is possible. Further cases in which ULTD is disabled are listed in paragraphs [0171] to [0178] and include one in which the UE, if it moves towards the cell edge may disable transmit diversity if this causes problems for a soft handover, it being noted that a handover takes place in a cell change procedure (paragraph [0175]). The following paragraphs [0179] to [0181] provide different examples of deactivating the ULTD which show that, for this purpose, the use of multiple antennas does not necessarily need to be abolished. In the context of beamforming, for example, which is also mentioned in the opposed patent, ULTD may be deactivated by resetting the pre-coding weights to pre-specified values (paragraph [0180]).

2.3 Prior-art document O2a

Document **O2a** is a document related to the 3GPP standard to which also O1 refers (see for example paragraphs [0002] and [0040]). O2a discloses that the "ACTIVE SET UPDATE" message is an RRC message and that it is used "to add, replace or delete radio links in the active set of the UE" (page 536, sections 10.2 and 10.2.1). O2a further discloses that the "ACTIVE SET UPDATE" message includes "Target cell pre-configuration information", it being noted that a target cell is the cell a UE changes to in a cell change procedure (see page 538).

- 2.4 In sum, document O1 discloses a method of configuring the PCI vector in a UE configured in uplink Closed-loop Transmit Diversity, CLTD (paragraph [0131]). Moreover, the UE receives an RRC reconfiguration message indicating the possibility for a cell change and sets the PCI vector to a default value upon receipt of this message (paragraphs [0169] and [0180]).
- 2.5 The method of claim 1 thus differs from the method of **O1** in that the RRC reconfiguration message, which triggers the setting of the PCI vector to a default value, indicates a serving cell change procedure. Hence, contrary to the novelty analysis provided in the impugned decision, the subject-matter of claim 1 is indeed novel over O1 (Article 54 EPC).
- 2.6 The technical effect of this difference is that the PCI vector is set to a default value in a cell change procedure which facilitates a soft handover and thus a robust cell change. The objective technical problem may thus be framed as "how to enable a robust cell change in the system of O1". The objective problem formulated by the appellant during oral proceedings, i.e. "how to make it possible that the respective PCI vector is aligned between the UE and Node-B", is however not persuasive since the mere fact that the UE of a wireless system sets its PCI vector to a certain value as claimed does not mean that the Node-B also sets its PCI vector to that value. Hence, such a problem is not credibly solved by the features of present claim 1.
- 2.7 The need to solve the above objective problem is self-evident, especially in view of paragraph [0175] of O1 and in view of the close association of the "ACTIVE SET UPDATE" message with soft handover (see also **O2a** page 538, information element "Target cell

preconfiguration information"). In this respect, the skilled person would have been well aware from their common general knowledge that the receipt of an ACTIVE SET UPDATE message is the *first* phase of a soft handover (cf. e.g. O3, page 340, Fig. 6.38) and thus marks the *initiation* of the respective serving cell change procedure. The skilled person, starting out from O1 and faced with the above objective problem, would therefore have readily applied the teaching of paragraph [0175], namely to *disable* CLTD in the event that CLTD impairs a soft handover, upon the receipt of the "ACTIVE SET UPDATE" message and would have compellingly arrived at the method of claim 1 without having to exercise inventive skills.

2.8 The arguments of the appellant can be summarised as follows:

- (i) Paragraph [0169] of O1 did not apply to CLTD, because paragraph [0169] was concerned with the problem that the UE may receive contradicting TPC commands, whereas a UE applying CLTD was controlled by the serving Node-B only, so that this problem could not arise. For this reason also, paragraphs [0169] and [0180] could not be combined, since the latter paragraph did not address the risk of contradicting TPC commands.
- (ii) The solution proposed in paragraph [0169] resulted in a different timing than in the claimed invention, since deactivation began with the ACTIVE SET UPDATE message.

- (iii) Disabling and deactivation were technically different actions for which different types of signalling were used.
- (iv) The skilled person would not have combined O1 and O2a. In this respect, adding the IE "Serving Cell Change Parameters" to the ACTIVE SET UPDATE message received by the UE related to circumstances outside the control of the UE developer.
- (v) Compared with the teachings of paragraph [0169] and paragraphs [0182] to [0188] of O1, the alleged distinguishing features (c) and (d) improved the robustness. Accordingly, the objective problem to be solved, as formulated in the statement of grounds of appeal, was to improve the robustness of the system. Using a predefined PCI for the purpose of improving the robustness did however not belong to the skilled person's common general knowledge at the patent's priority date. The combination of features (c) and (d) was not part of common general knowledge either.
- (vi) Feature (b) of claim 1 stipulated that the UE was configured in CLTD throughout the entire process, which meant that it is and stays configured in this mode, contrary to the method of O1.
- (vii) The "RRC reconfiguration message that indicates a serving cell change procedure" of feature (c) did indicate itself a cell

change regardless of its content. Thus, the UE did not need to look into the message to carry out the claimed method.

- (viii) According to feature (d), the UE would set the PCI vector to a "default value" unconditionally upon receipt of the RRC message. This would provide some predictability to align the PCI vector between the Node-B and the UE since the Node-B would have the possibility to know what PCI was to be expected.

2.9 The board is not convinced by these arguments for the following reasons:

Re (i): The board notes that paragraph [0169] is silent on whether it concerns *closed* loop or *open* loop transmit diversity and that the embodiment described therein involves the UE receiving TPC commands from the Node-B. Since TPC commands are derived by the Node-B based on the uplink signals received from the UE, such a control/diversity system is still a closed loop system. Hence, the features of paragraphs [0169] and [0180] can indeed be combined. It is further noted that claim 1 is not limited to CLTD methods in which the UE is controlled by the serving Node-B only.

Re (ii): The "message which indicates a serving cell change procedure" referred to in feature (c) is not limited to messages which result immediately in a serving cell change but indicate a respective procedure and therefore embraces any message occurring as part of such a procedure.

Re (iii): The board does not see the relevance of this point. The essential idea disclosed in O1 is that uplink diversity is temporarily stopped during soft handover. Whether this is by "deactivation" or "disabling" (even assuming these were different functions) is irrelevant in that regard.

Re (iv): This argument is unconvincing as there is no reason to restrict the skilled person to applying measures only in the UE.

Re (v): The formulated problem does not indicate in which respect the robustness is to be increased. Moreover, disabling of uplink diversity transmission and the use of pre-defined values as disclosed in O1 also have implicitly the effect of "improving robustness". Therefore, whether or not the use of pre-defined values to improve robustness belonged to common general knowledge is not relevant.

Re (vi): Claim 1 is silent as to whether the UE is necessarily to be configured in CLTD mode while performing method steps (c) and (d). However, even if it was assumed that the UE is in the CLTD mode while it is carrying out step (d) of claim 1, the ongoing adaptation of the PCI vector in this phase is frozen since it is set to a default value. Thus, there is no difference to the situation in document O1, in which multiple antennas are used with pre-specified weights (paragraph [0180]).

Re (vii): Feature (c) leaves it open which part of the RRC reconfiguration message indicates the serving cell change procedure, i.e. whether it is the *content* or the *type* of the message.

Re (viii): Paragraph [0169] of O1 does not mention other conditions for deactivating ULTD than the receipt of the "ACTIVE SET UPDATE" message either.

2.10 The board therefore concludes that Article 100(a) EPC in conjunction with Article 56 EPC prejudices the maintenance of the patent as granted.

3. *Auxiliary request 1 - admittance (Article 13(2) RPBA 2020)*

3.1 Since auxiliary request 1 was filed after the notification of the summons to oral proceedings before the board, its admittance is governed by Article 13(2) RPBA 2020. Under Article 13(2) RPBA 2020, any amendment to a party's appeal case made *after* notification of a summons to oral proceedings is, in principle, not taken into account unless there are exceptional circumstances, which have been justified with cogent reasons. When applying Article 13(2) RPBA 2020, a board may also rely on the criteria referred to in Article 13(1) RPBA 2020. These criteria include the suitability of the amendment to resolve the issues raised and whether the amendment gives rise to new objections (i.e. *prima facie* allowability).

3.2 The appellant argued that the inventive-step objection was not substantiated before the issuance of the board's preliminary opinion and that only then the proprietor had the chance to react to it. In addition, the amendments were intended to emphasise the unconditional triggering of the receipt of the message and would in fact limit the claim by adding the *causal* effect to the *temporal* link. The added features were not merely a consequence of what was achieved but directed the claim to a new case in which the new

Node-B came into play and thereby further limited the "default value". In this respect, it was referred to the description as filed which stated as a technical problem that the PCI vector, after a cell change and if it is not signalled, was unknown to the new Node-B (page 4, lines 8 to 12). The amendment would differentiate claim 1 of auxiliary request 1 clearly from the method of O1 in which the solution was to disable CLTD.

3.3 In that regard, the board however notes the following:

3.3.1 The opposition division concluded in its appealed decision that claim 1 of the main request was not new having regard to O1 and that consequently the ground for opposition under Article 100(a) EPC (which includes not only the requirement of novelty but also of inventive step) prejudiced the maintenance of the patent. The proprietor had thus been informed that the subject-matter of claim 1 of the main request lacked novelty and, inherently, also an inventive step in view of document O1. It does not constitute "exceptional circumstances" that the board deviated from the decision under appeal *in favour* of the appellant by considering the claimed subject-matter novel, but still obvious in view of that document. Hence, the appellant did not provide "cogent reasons" justifying "exceptional circumstances" for filing auxiliary request 1 only after the notification of the summons to oral proceedings.

3.3.2 Furthermore, as to the auxiliary request's *prima facie* allowability, it is unclear how the effect of "making the PCI vector used by the UE known to a new Node-B" is achieved *without* ensuring that the new Node-B knows the

default value of the PCI vector for which, however, no feature is included in claim 1.

Further to that clarity issue, it is unclear how the added effect could change the assessment of inventive step since a "default" value implies that it must be known to the components processing it and since this purpose was clear anyway, assuming that the new Node-B simply saves the default values.

3.3.3 Claim 1 of auxiliary request 1 is therefore, *prima facie*, not allowable under Articles 56 and 84 EPC.

3.4 In view of the above, the board, in exercising its discretion, decided not to admit auxiliary request 1 into the appeal proceedings (Article 13(2) RPBA 2020).

4. *Auxiliary requests 2 to 6 and 8 to 12 - claim 1 - clarity (Article 84 EPC)*

4.1 All the added features of claim 1 of each of the present auxiliary requests have been taken from the patent's description. Hence, all those requests are open to objections under Article 84 EPC.

4.2 As to feature (d2) or (c1) of **auxiliary requests 2 and 3**, the phrase "the RRC reconfiguration procedure" lacks any proper antecedence since an "RRC reconfiguration procedure" has not been defined before.

4.3 As to feature (d3) of **auxiliary request 4**, the phrase "when the serving Node-B is changed" is unclear because the term "when" has both the meaning of indicating a point in time when something occurs as well as setting a condition ("if"). Under the first interpretation, there is further unclarity in that the setting of the

PCI vector to a default value occurs at a time point defined in two different ways, namely "when the serving Node-B is changed" and "upon receipt of the RRC reconfiguration message". If "when" is understood as a condition, the term "when" implies a further step of checking for the condition, namely whether the serving Node-B is changed, for which there is also no basis in the application as filed.

- 4.4 As to features (b1) and (d4) of **auxiliary requests 5, 6, 10, 11 and 12**, the feature "in which the UE shall use a PCI vector decided by the network" contradicts with the feature of setting, by the UE, the PCI vector to a default value, and could even leave open the possibility that the UE also determines the PCI vector in other situations. In addition, the phrase "decided by the network" neither specifies which Node-B nor whether it is a Node-B at all which decides on the PCI vector.
- 4.5 As to features (d6) and (d7) of **auxiliary requests 8 and 9**, the term "forgets" is technically unclear. In addition, it is ambiguous whether or not PCI vectors only received during the serving cell change procedure are meant here, or whether PCI vectors received prior to this are also embraced especially in view of the fact that "has received" has been amended to "received".
- 4.6 In view of the above, auxiliary requests 2 to 6 and 8 to 12 are not allowable (at least) under Article 84 EPC. In that context, it is noted that the appellant merely referred to its written submissions.

5. *Auxiliary request 7 - claim 1 - inventive step
(Article 56 EPC)*

5.1 Added feature (d5), in particular the phrase "whereby the PCI vector of the UE is aligned with a PCI vector used by the new serving cell" does actually not limit the method carried out by the UE since claim 1 concerns a method of configuring the PCI in a UE and "aligning" is a feature reflected by considering the UE and the network (i.e. Node-B) together. The UE in fact need not be aware of whether or not the new serving cell is using the same PCI vector and is thus aligned with it. In addition, it is unclear how this alignment can be effected by a method carried out by the UE alone.

5.2 The board therefore concludes that auxiliary request 7 is not allowable at least under Article 56 EPC.

6. As there is no allowable set of claims 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