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**Datasheet for the decision
of 15 January 2021**

Case Number: T 1786/18 - 3.5.05

Application Number: 10776839.2

Publication Number: 2514131

IPC: H04L5/00

Language of the proceedings: EN

Title of invention:

METHOD AND ARRANGEMENT FOR RECONFIGURING MAPPING OF CARRIER
INDICATOR FILED TO COMPONENT CARRIER

Applicant:

Telefonaktiebolaget LM Ericsson (publ)

Headword:

Component carrier indication in LTE/ERICSSON

Relevant legal provisions:

EPC Art. 56

Keyword:

Inventive step - (yes)

Decisions cited:

Catchword:



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Case Number: T 1786/18 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 15 January 2021

Appellant: Telefonaktiebolaget LM Ericsson (publ)
(Applicant) 164 83 Stockholm (SE)

Representative: Ericsson
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 9 March 2018
refusing European patent application No.
10776839.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair A. Ritzka
Members: P. Cretaine
E. Mille

Summary of Facts and Submissions

- I. This appeal is against the decision of the examining division, posted on 9 March 2018, refusing European patent application No. 10776839.2. The application was refused for lack of inventive step (Article 56 EPC) over the disclosure of
- D7: ALCATEL-LUCENT: "Component carrier indication for bandwidth extension in LTE-A", 19 August 2009, 3GPP TSG-RAN WG1 #58, R1-093362, 3GPP MOBILE COMPETENCE CENTRE, Sophia Antipolis, FRANCE.
- II. Notice of appeal was received on 4 May 2018 and the appeal fee was paid on the same date. The statement setting out the grounds of appeal was received on 18 June 2018. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims on which the decision was based (main request). Oral proceedings were requested in the event the request was not allowed.
- III. A summons to oral proceedings was issued on 8 June 2020. In a communication pursuant to Article 15(1) RPBA, sent on 20 July 2020, the board gave its preliminary opinion, namely that the main request did not meet the requirements of Article 56 EPC in light of the disclosure of D7.
- IV. With a letter of response dated 15 December 2020, the appellant filed first, second and third auxiliary requests.
- V. Oral proceedings were held on 15 January 2021. The appellant withdrew the first to third auxiliary

requests, and requested that the decision under appeal be set aside and a patent be granted on the basis of the claims of the main request. The decision of the board was announced at the end of the oral proceedings.

VI. Claim 1 of the main request reads as follows:

"A method in a radio network node (130) for reconfiguring mappings from Carrier Indicator Field-values, referred to as "CIF-values", to component carriers, wherein each CIF-value is mapped to a respective component carrier comprising a respective shared data channel, wherein each respective shared data channel is addressed by at least one downlink control channel carrying said each CIF-value, and the component carriers are managed by the radio network node (130), wherein the radio network node (130) and the user equipment (120) are comprised in a multi-carrier radio communication system (100), wherein the method comprises reconfiguring (210) mappings from CIF-values to component carriers, while maintaining at least one mapping of CIF-value to component carrier and changing at least one mapping of CIF-value to component carrier transmitted on the component carrier of the maintained at least one mapping to a mapping to another component carrier, wherein the component carrier of the maintained at least one mapping from CIF-value to component carrier comprises said at least one downlink control channel and a shared data channel addressed by said at least one downlink control channel, and sending (220) at least one of the reconfigured mappings from CIF-values to component carriers to the user equipment (120)."

The main request comprises further independent claims directed to a corresponding arrangement (claim 7), and to a method (claim 13) and a user equipment (claim 18) for receiving the reconfigured mappings sent according to claim 1.

Reasons for the Decision

1. The appeal is admissible (see point II above).
2. Prior art

D7 was considered as the closest prior art in the decision under appeal. D7 is an LTE-Advanced standardisation document dealing with the indication of carrier components (CCs).

In section 1, D7 refers to the carrier indicator field (CIF) used for bandwidth extension. The CIF in a PDCCH channel transmitted on a carrier component CC allows the allocation of traffic channels, i.e. shared data channels PSCCH and PUSCH in the downlink and uplink, respectively, in carrier components CCs that may be different from the carrier component on which the PDCCH is transmitted. This discloses mapping of CIF-values to component carriers, allowing cross-carrier scheduling. It is further stated that a user equipment must decode the PDCCH, and hence its CIFs, for all CCs, including the non-active CCs, in order to obtain the uplink and downlink allocation in the coverage area. The aim of D7 is to provide a solution for indicating CCs with active PDCCH transmission in order to avoid unnecessary PDCCH decoding on non-active CCs.

In section 2, D7 discloses that the set of component carriers comprises an anchor carrier and multiple non-anchor carriers. The anchor carrier is defined as being the component carrier in which the user equipment UE first acquires synchronisation and which transmits the overhead channels, whereas the non-anchor carriers are used only for traffic channels. D7 further teaches that the non-anchor carriers can be scheduled dynamically. The anchor carrier is defined as carrying a PDCCH for resource allocation on the anchor carrier itself.

D7 specifies in section 3 that the resource allocation for the anchor carrier is signalled in the PDCCH transmitted in the anchor carrier. However, contrary to what is stated in point 1.2 of the reasons for the decision under appeal, this does not imply that the PDCCH transmitted on the anchor carrier comprises a CIF-value pointing to the PDSCH of the anchor carrier, all the more so since there is no need for it. In D7, resources are scheduled on the anchor carrier without CIF.

The solution proposed by D7 to avoid the above-mentioned unnecessary blind decoding attempts is to provide an indicator, the ACCI, in the PDCCH of the anchor carrier which serves as a pointer to the non-anchor carrier with active PDCCH transmission (see section 3). This indicator is represented in Figure 2(a) for instance by the arrows pointing from the anchor carrier PDCCH0 to the PDCCH1 and PDCCH2 of the non-anchor carriers 1 and 3, respectively, indicating that non-anchor carriers 1 and 3 are active, whereas non-anchor carrier 2 is inactive. The ACCI in the PDCCH of the anchor carrier thus indicates on which CCs a user equipment should decode PDCCH, whereas the CIF in

the PDCCH of any carrier CC indicates on which CCs the user may receive PDSCH.

3. Invention

A main difference between the subject-matter of claim 1 and the disclosure of D7 is that D7 does not address the issue of dynamic reconfiguring of the mapping of CIF-values to component carriers CCs, i.e. how the user equipment can be scheduled if the CIF mapping is reconfigured for all carriers. In that respect, claim 1 does not define that the user equipment needs to decode the PDCCH on an anchor carrier first, but instead that the PDCCH can be decoded for any carrier in any order. Thus a problem arises in the context of claim 1 when a reconfiguration of the CIF mapping for all carriers is performed. By contrast, in D7, the PDCCH on an anchor carrier is transmitted without CIF such that the user equipment can always have the anchor carrier connection on, regardless of whether and how the CIFs are reconfigured.

The problem solved by claim 1 is thus how to maintain communication between the network and the user equipment during updating of the CIF mapping. According to the features of claim 1, this is solved by maintaining, during reconfiguration of the CIF-CC mapping, one mapping of CIF-value to component carrier, wherein the component carrier comprises a downlink control channel PDCCH and a shared channel, PSCCH and/or PUSCH, addressed by the downlink control channel. In this manner, there will be a component carrier CC available for transmission even during updating of the mapping from CIF-value to component carrier. Thus a user equipment may transmit and receive by using the component carrier whose CIF mapping had been maintained

when the CIF to CC mapping was updated for other carriers. Carriers may thus be added to or removed from the user equipment configuration without causing interruptions in the communication between the user equipment and the network node.

The skilled person would not find any pointer to the problem and its solution in D7. The disclosure of D7 in respect of the new indicator ACCI leads away from the features of claim 1. The ACCI in the PDCCH of the anchor carrier points to other carriers, e.g. non-anchor 1 and non-anchor 2, that carry corresponding PDCCHs, namely PDCCH1 and PDCCH2. Thus the user equipment must first decode the PDCCH on the anchor carrier and then decode the PDCCHs on the non-anchor carriers to obtain its PDSCH resources (see Figures 2(a) and (b)). By contrast, in claim 1 the decoding of the PDCCH on an anchor carrier is not needed to obtain the PDSCH on the non-anchor carriers. Moreover, the appellant plausibly argued that the CIF configuration/reconfiguration step defined by claim 1 occurs before the dynamic allocation step disclosed in section 3 of D7.

For these reasons, the board holds that the subject-matter of claim 1 involves an inventive step (Article 56 EPC), having regard to the disclosure of D7.

Independent claims 7, 13 and 18 contain the same features as claim 1, but expressed in terms of an arrangement in a radio network node, a method in a user equipment and a user equipment respectively. Therefore claims 7, 13 and 18 also meet the requirements of

Article 56 EPC. Claims 2 to 6, 8 to 12, 14 to 17 and 19 to 22 are dependent claims and, as such, also meet the requirements of Article 56 EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to grant a patent on the basis of the following documents:
 - claims 1 to 22 of the main request,
 - description and figures to be adapted.

The Registrar:

The Chair:



A. Chavinier-Tomsic

A. Ritzka

Decision electronically authenticated