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**Datasheet for the decision  
of 5 December 2019**

**Case Number:** T 1010/16 - 3.5.05

**Application Number:** 10774301.5

**Publication Number:** 2540025

**IPC:** H04L5/00, H04L27/26

**Language of the proceedings:** EN

**Title of invention:**

METHODS AND ARRANGEMENTS FOR DYNAMICALLY TRIGGERING THE  
TRANSMISSION OF SOUNDING REFERENCE SIGNAL IN A  
TELECOMMUNICATION SYSTEM

**Applicant:**

Telefonaktiebolaget LM Ericsson (publ)

**Headword:**

Sounding reference signal triggering/ERICSSON

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

Inventive step - main request (yes)

**Decisions cited:**



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Case Number: T 1010/16 - 3.5.05

**D E C I S I O N**  
**of Technical Board of Appeal 3.5.05**  
**of 5 December 2019**

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

**Representative:** Ericsson  
Patent Development  
Torshamnsgatan 21-23  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 10 December  
2015 refusing European patent application No.  
10774301.5 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chair** A. Ritzka  
**Members:** P. Cretaine  
D. Prietzel-Funk

## **Summary of Facts and Submissions**

I. This appeal is against the decision of the examining division, posted on 10 December 2015, refusing European patent application No. 10774301.5. The application was refused for lack of novelty of the independent claims (Article 54 EPC), having regard to the disclosure of

D2: US 2008/0267269.

II. Notice of appeal was received on 18 January 2016 and the appeal fee was paid on the same day. The statement setting out the grounds of appeal was received on 7 April 2016. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of a main request or auxiliary requests I to III, all requests submitted with the statement setting out the grounds of appeal. Oral proceedings were requested if the main request was not allowable.

III. A summons to oral proceedings was issued on 16 September 2019. In a communication pursuant to Article 15(1) RPBA sent on 8 October 2019, the board gave its preliminary opinion on the case. In the board's view, the main request and auxiliary requests I to III did not meet the requirements of Article 56 EPC having regard to the disclosure of D2 in combination with

D3: 3GPP Draft R1-100860: "Further Discussions on SRS Enhancement", 16 February 2010,

which had been cited in the international search report and referred to by the appellant in the statement setting out the grounds of appeal.

The board raised further objections against auxiliary requests I to III under Articles 123(2) and 84 EPC.

- IV. In a letter of response dated 5 November 2019, the appellant submitted an auxiliary request IV and provided further arguments in respect of inventive step.
- V. Oral proceedings were held on 5 December 2019, during which the appellant withdrew auxiliary requests I to IV. The board's decision was announced at the end of the oral proceedings.
- VI. Claim 1 according to the main request reads as follows:

"A method in a base station for dynamically triggering a mobile terminal to transmit sounding reference signals, SRS, wherein a predefined uplink symbol of an uplink subframe is configured to be used by the mobile terminal for SRS, the method being characterized in the steps of:

- determining (301) whether the mobile terminal shall use the predefined uplink symbol for data transmission or not during uplink transmission,
- signaling (302) to the mobile terminal, at least partially in an uplink grant, an instruction whether the mobile terminal shall use the predefined uplink symbol for data transmission or not during uplink transmission, wherein the signaled instruction further comprises information whether the mobile terminal shall use the predefined uplink symbol for SRS or leave the predefined uplink symbol blank if the predefined uplink symbol shall not be used for data transmission."

The request contains further independent claims directed to a corresponding method in a mobile terminal (claim 9), a corresponding base station (claim 17) and a corresponding mobile terminal (claim 21).

### **Reasons for the Decision**

1. The appeal is admissible (see point II).
2. Main request - Article 123(2) EPC

The independent claims of the main request have been amended on appeal by adding the feature that the signalling to the terminal in respect of the use of the predefined uplink symbol is made at least partially in an uplink grant. This amendment is supported (Article 123(2) EPC) by the passage on page 13, lines 6 to 10 of the originally filed description.

Furthermore, the wording "wherein the predefined uplink symbol of an uplink subframe may be used for data if not used for SRS" has been deleted from the independent claims. This wording was, however, redundant in view of previous features of the claim defining the content of the signalled instruction, illustrated in Figure 5. Therefore its deletion does not contravene Article 123(2) EPC.

3. Main request - Article 56 EPC
- 3.1 Prior art

One piece of prior art acknowledged in the description is the technical specification 3GPP/LTE TS 36.211, Release 9.

Part 5.5.3 of this specification relates to the configuration of the sounding reference signal (SRS) sent from a mobile terminal to a base station for the base station to estimate the uplink channels used by the mobile. The SRS resource is located in a reserved predefined uplink single OFDM symbol in an uplink subframe of each OFDM uplink frame in a cell, as illustrated in Figures 1 and 2 of the application in this case, and is shared among mobile terminals of the cell by using time or frequency multiplexing, as stated on page 3, lines 3 to 15 of the description.

D1 is a standard draft for LTE Release 10. It proposes the ability to trigger SRS transmission (see part 1, second paragraph) in order to minimise the SRS overhead (see part 3.1, fourth paragraph). The predefined uplink symbol reserved in the previous Release is maintained (see part 2, fourth paragraph). However, the base station can request a mobile terminal not to transmit an SRS (see part 3.1, first paragraph). The base station may reassign SRS capacity in the multiplexing SRS scheme among mobile terminals (see part 3.2, first paragraph).

D2 also relates to SRS transmission in LTE (see paragraph [0044]). A subframe is defined as comprising blocks; each block may include an OFDM symbol and transmit a reference signal or data (see paragraphs [0049] and [0055]). The reference signal may be an SRS (see paragraph [0050]). A variable block in a subframe may contain a demodulation reference signal (DMRS), an SRS or a data signal (see paragraph [0056]). In another embodiment, a variable block may include data, an SRS or be empty (see paragraphs [0115] to [0119]). The base station instructs the mobile terminal to transmit in

the variable block an SRS, a data signal or no signal at all (see paragraph [0115]).

D3 is a standard draft for LTE Release 10. It proposes the ability to trigger SRS transmission (see part 1, second paragraph, and part 2.1, second paragraph). The triggering instruction is set to be part of the uplink grant signal (see part 2.1, second Proposal).

- 3.2 The application was refused for lack of novelty of the independent claims with respect to D2. The independent claims of the main request have been amended on appeal by adding the feature that the signalling to the terminal in respect of the use of the predefined uplink symbol is made at least partially in an uplink grant.

D1 and D3 deal with the dynamic assignment of SRS resources to mobile stations but do not disclose that the base station could release an SRS resource to be used for data transmission. D2 does disclose that a variable block in the uplink could be used for transmitting an SRS or data. D2 further discloses in paragraph [0115] that an indication is sent to the mobile terminal regarding whether the SRS resource should include "no signal" (which is the same as indicating that the SRS resource should be left blank as defined in claim 1), data or an SRS. D2 thus represents the closest prior art.

The subject-matter of claim 1 differs in substance from the disclosure of D2 in that:

- (i) the signalling in respect of the SRS instruction is made at least partially in an uplink grant, and
- (ii) the signalling has a layered structure, comprising firstly an instruction to send data or not in the SRS resource, and if not, a further instruction to send an

SRS or leave the SRS resource blank, as illustrated in Figure 5. By contrast, D2 is silent on the structure of the signalling conveying the information (see the last sentence of paragraph [0115]).

The technical effect of feature (ii) is in particular that an instruction to leave the reserved uplink symbol blank or use it for an SRS is sent only if the symbol is not to be used for data transmission. Hence, this instruction to leave the symbol blank or use it for an SRS is omitted if the symbol is to be used for data transmission, as shown in Figure 5, in which case once a bit "0" indicating "Send data" has been sent, no further bit is needed by the instruction. Thus, feature (ii) tends to reduce the average number of bits needed for the SRS signalling; this technical effect is even more prominent in a scenario with slowly changing channel conditions that require less frequent SRS transmissions from the mobile terminal. Moreover the appellant plausibly argued that the second bit of the SRS signalling code word not used in that case could be advantageously used to convey other signalling information not related to SRS.

The objective technical problem solved by feature (ii) can thus be formulated as how to reduce the signalling overhead in the downlink, as proposed by the appellant.

This problem is not addressed in D2 and the skilled person would get no hint from D2 to build the SRS signalling instruction according to the layered structure defined by feature (ii). Since D1 and D3 do not in any way contemplate using the reserved SRS uplink symbol for transmitting data, the skilled person would not get any hint from these documents either.



For these reasons, the board holds that feature (ii) confers inventive step on the subject-matter of claim 1, having regard to the prior art on file (Article 56 EPC).

Independent claims 9, 17 and 21 contain the same features as claim 1 but expressed in terms of a corresponding method in a mobile terminal, a base station and a mobile terminal, respectively, and thus also meet the requirements of Article 56 EPC. Claims 2 to 8, 10 to 16, 18 to 20 and 22 to 26 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 examining division with the order to grant a patent on the basis of claims 1 to 26 of the main request submitted with the statement setting out the grounds of appeal and with description pages 1, 2, 4 to 15 as published, pages 3 to 3a as submitted on 5 June 2014 and figures 1 to 12 as published.

The Registrar:

The Chair:



K. Götz-Wein

A. Ritzka

Decision electronically authenticated