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Datasheet for the decision of 14 February 2020

Case Number: T 1599/17 - 3.5.05

Application Number: 07841291.3

Publication Number: 2060080

IPC: H04L27/26, H04Q7/32, H04J13/00

Language of the proceedings: EN

Title of invention:
ACQUISITION IN FREQUENCY DIVISION MULTIPLE ACCESS SYSTEMS

Applicant:
QUALCOMM Incorporated

Headword:
Cell ID acquisition in wireless FDMA system/QUALCOMM

Relevant legal provisions:
EPC Art. 54(3), 56

Keyword:
Novelty - main request (yes)
Inventive step - main request (yes)

Decisions cited:

Catchword:

Europäisches Patentamt
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Office européen des brevets

Beschwerdekammern

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Case Number: T 1599/17 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 14 February 2020

Appellant: (Applicant)	QUALCOMM Incorporated Attn: International IP Administration 5775 Morehouse Drive San Diego, CA 92121 (US)
Representative:	Dunlop, Hugh Christopher Maucher Jenkins 26 Caxton Street London SW1H 0RJ (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 17 February 2017 refusing European patent application No. 07841291.3 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair	A. Ritzka
Members:	P. Cretaine
	F. Blumer

Summary of Facts and Submissions

I. This appeal is against the decision of the examining division posted on 17 February 2017, refusing European patent application No. 07841291.3. A main request was refused for lack of novelty (Article 54(3) EPC) over the disclosure of

D12: WO 2007/124451,

and lack of inventive step (Article 56 EPC) over the disclosure of

D11: WO 2007/075463.

A first and a second auxiliary request were refused for lack of inventive step (Article 56 EPC), and a third auxiliary request was not admitted into the proceedings (Rule 137(3) EPC).

II. Notice of appeal was received on 27 April 2017, and the appeal fee was paid on the same day. The statement setting out the grounds of appeal was received on 16 June 2017. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request or the first or second auxiliary request on which the decision was based. In support of its arguments, the appellant submitted the document

E1: "Synchronisation Channel Structure for Cell Search", TSG-RAN Working Group 1 meeting #5, Cheju, Korea, 1-4 June 1999.

In the alternative, oral proceedings were requested.

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

"An apparatus that operates in a wireless communication environment, the apparatus comprising:
means for receiving a code sequence in a primary synchronization channel, the code sequence facilitating orthogonal frequency division multiplexing symbol boundary detection, slot boundary detection, and sub-frame boundary detection and conveying a part of a cell identification code; and
means for receiving one or more code sequences in a secondary synchronization channel, the one or more code sequences conveying the remaining part of the cell identification code."

The main request comprises further independent claims relating to corresponding transmission apparatus (claim 5), a receiving method (claim 10), a transmitting method (claim 15), and a computer program product (claim 19).

Given the outcome of the appeal, there is no need to give details of the claims of the first and second auxiliary requests.

Reasons for the Decision

1. The appeal is admissible (see point II).

2. Main request - Article 54(3)

D12 is a prior art document under Article 54(3) EPC; the main request was refused for lack of novelty of claim 1 over D12.

D12 discloses, as per its title, a downlink synchronisation channel and methods for cellular systems. The downlink synchronisation process involves a base station sending a synchronisation signal to the user equipment. The passage on page 1, lines 11 to 15, gives two examples of standardised cellular systems: the IEEE 802.16e standard, wherein the synchronisation signal is known as the synchronisation preamble, and the 3GPP WCDMA/HSDPA standard, wherein the synchronisation signal is known as the synchronisation channel (SCH). On page 1, lines 24 to 28, D12 teaches that the synchronisation signal may consist of two portions: the primary and secondary synchronisation signals. This definition of the primary and secondary synchronisation signals as portions of the downlink synchronisation signal is repeated several times throughout the description and claims of D12 (see page 3, lines 1 to 9, lines 12 to 13, lines 16 to 17, and lines 22 to 26; page 5, lines 23 to 25, and lines 27 to 28; page 6, lines 4 to 7; page 11, lines 8 to 13 and lines 29 to 31; page 12, lines 16 to 17; claims 1, 7, and 8). Only two arrangements of the synchronisation signal in the time domain radio frame are provided in D12, as described from page 10, line 26 to page 11, line 5, in relation to Figures 7 and 8. In the first embodiment, according to Figure 7, two synchronisation signal sub-frames are shown in the radio frame. However, there is no disclosure that each subframe carries a part of the cell ID. It may well be that the whole cell ID is in the first subframe or in the second subframe illustrated in Figure 7. In the second embodiment, according to Figure 8, a primary synchronisation signal and an adjacent secondary synchronisation signal are shown within each synchronisation subframe.

In the decision under appeal, the primary and secondary portions of the synchronisation signal in D12 were considered as separate physical and logical channels for conveying information, and were identified as the primary and secondary synchronisation channels defined in claim 1.

D12 clearly relates to a cellular wireless communication system operating under a telecommunication standard, and cites the IEEE 802.16e and 3GPP WCDMA/HSDPA standards. In such telecommunication standards, the downlink synchronisation is achieved by the transmission in the downlink radio frame of synchronisation information, designated the synchronisation preamble in IEEE 802.16e or the synchronisation channel in 3GPP WCDMA/HSDPA. The position of this synchronisation information, preamble or channel in the time domain radio frame is specified by the standard. The board agrees with the appellant that the two portions of the synchronisation signal disclosed in D12 do not represent channels in the sense of claim 1. On this point, the appellant took document E1 as a basis (see in particular section 2.1 and Figure 1), arguing that the terms "primary synchronisation channel" and "secondary synchronisation channel" used in claim 1 had a well-known meaning at the filing date of the present application and that the skilled person would not interpret the portions of a single channel disclosed in D12 as these channels. In particular, the appellant argued convincingly that the skilled person would consider that the primary and secondary synchronisation channels of claim 1 were received at separate times (see Figure 4 of the application and Figure 1 of E1), whereas the two portions of the single

channel in D12 are never specified as being non-adjacent.

For these reasons, the board holds that the disclosure of D12 does not clearly and unambiguously anticipate the subject-matter of claim 1 and the corresponding independent claims (Article 54(3) EPC).

3. Main request - Article 56 EPC

The main request was refused for lack of inventive step of claim 1 over the disclosure of D11.

The differences between the subject-matter of claim 1 and the disclosure of D11 that were identified in the decision are that:
- the code sequence in the primary synchronisation channel explicitly conveys part of a cell identification code, and
- the one or more code sequences in the secondary synchronisation channel explicitly convey the remaining part of the cell identification code.

The technical effect of these distinguishing features are that cell identification can be performed in two stages: a rough search on receiving the P-SCH, and a fine search on receiving the S-SCH that follows. Thus, excessive bandwidth consumption for the cell ID on the P-SCH can be avoided, and bandwidth in the P-SCH can be saved for other synchronisation codes essential to channel acquisition, e.g. the cyclic prefix duration, the symbol boundary detection, slot boundary detection, and the sub-frame boundary detection (see Figure 14). Clearly, the cell ID identification is faster than when the whole cell ID is in the S-SCH, but not faster than when the whole cell ID is in the P-SCH.

The objective technical problem can thus be formulated as how to efficiently use the available bandwidth in the synchronisation channels to perform fast channel acquisition.

The board agrees with the appellant that, contrary to what is stated in the decision under appeal (see Reasons 15.2.4), there is nothing in D11 to hint at the solution. Paragraph [0043] quoted in the decision discloses that P-SCH and S-SCH symbols can be processed to obtain different cell acquisition parameters, inter alia the cell ID, but does not teach that the cell ID is divided into two parts, one in the P-SCH and one in the S-SCH. Paragraph [0062] discloses that K synchronisation symbols are transmitted per radio frame, concatenated or separated in time, but does not teach that part of an item of synchronisation information, e.g. the cell ID, carried by several symbols, may be transmitted in the P-SCH and part in the S-SCH. Paragraph [0063], quoted in the decision, discloses that if the synchronisation channel, which is the P-SCH in the specific case covered by this paragraph, cannot carry all the information, an S-SCH may be required, at a fixed timing in relation to the P-SCH in the radio frame: this means that the number of K synchronisation symbols in a radio frame may be increased to build an S-SCH, but the document is silent on transmission of the cell ID, let alone on dividing the cell ID into parts. Paragraphs [0066] to [0068], quoted in the decision, disclose that, alternatively, the cell ID can be "mapped" to the combination of code indices and sub-carrier mapping patterns used in the K synchronisation symbols, but it does not teach that an S-SCH is used in addition to a
P-SCH, or that part of the cell ID is transmitted in a

P-SCH and part in an S-SCH. The subcarrier mapping is in fact used to reduce the interference between neighbouring cells. Moreover, paragraph [0068] mentions "the synchronisation channel", i.e. a single channel, which is clearly the P-SCH. Finally, paragraph [0069], also quoted in the decision under appeal, mentions the case in which an S-SCH is used, and teaches that the cell ID is first detected, that a subcarrier mapping for the S-SCH is derived from the detected cell-ID, and that only then can the S-SCH be received by the terminal. This is contrary to transmission of part of the cell ID in the S-SCH, since the cell ID is needed for receiving the S-SCH.

Therefore, the board concurs with the appellant that the findings of the examining division that the solution to the technical problem is obvious, starting from D11 as closest prior art, is based on hindsight.

For these reasons, the board holds that the subject-matter of claim 1 and of the corresponding independent claims involves an inventive step over D11 (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 19 of the main request submitted with the letter dated 24 December 2010 with description pages 1 and 5 to 25 as published, description page 3 as filed with the letter of 15 February 2010, description page 2 as filed with the letter of 24 December 2010, and drawing sheets 1/14 to 14/14 as published.

The Registrar: The Chair:

G. Nachtigall A. Ritzka

Decision electronically authenticated