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**Datasheet for the decision  
of 31 March 2010**

**Case Number:** T 0765/07 - 3.5.03

**Application Number:** 04023413.0

**Publication Number:** 1503514

**IPC:** H04B 1/707

**Language of the proceedings:** EN

**Title of invention:**

CDMA communication system and method

**Applicant:**

Hitachi, Ltd., et al

**Opponent:**

-

**Headword:**

CDMA system/ HITACHI

**Relevant legal provisions:**

EPC Art. 56, 76(1)

**Relevant legal provisions (EPC 1973):**

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**Keyword:**

"Divisional application: added subject-matter (yes) - main request"

"Inventive step (yes) - auxiliary request"

**Decisions cited:**

T 0331/87, T 1067/97

**Catchword:**

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Case Number: T 0765/07 - 3.5.03

**D E C I S I O N**  
of the Technical Board of Appeal 3.5.03  
of 31 March 2010

**Appellant:**

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**Decision under appeal:**

Decision of the Examining Division of the  
European Patent Office posted 30 October 2006  
refusing European application No. 04023413.0  
pursuant to Article 97(1) EPC 1973.

**Composition of the Board:**

**Chairman:** A. S. Clelland  
**Members:** T. Snell  
M.-B. Tardo-Dino

## Summary of Facts and Submissions

- I. This appeal is against the decision of the examining division refusing European patent application No. 04023413.0, with publication number EP-A-1503514. This application is a divisional application of European patent application No. 97110809.7, with publication number EP-A-0818892 (hereinafter referred to as the "parent application").

The refusal was based on the ground that the subject-matter of the independent claims did not meet the requirement of inventive step pursuant to Article 52(1) in combination with Article 56 EPC. In the reasons for the decision, the examining division referred to the following documents:

D1: EP-A-0673130  
D2: US-A-5103459

- II. The appellant filed a notice of appeal against the above decision and requested that the decision under appeal be set aside and a patent granted. New claim sets of a main request and an auxiliary request were subsequently filed together with a statement of grounds of appeal.

Oral proceedings were conditionally requested.

- III. In a communication accompanying a summons to oral proceedings the board gave a preliminary opinion in which, *inter alia*, matters concerning Articles 76(1), 123(2) and 84 EPC, as well as Article 52(1) in

combination with Article 56 EPC, were raised with respect to claims of the main and auxiliary requests.

- IV. In response to the board's communication, the appellant filed new claims of a main and an auxiliary request.
- V. Oral proceedings were held on 31 March 2010. In the course of the oral proceedings, the appellant filed new main and auxiliary requests each consisting of a single claim 1. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of claim 1 of the main request, or alternatively claim 1 of the auxiliary request, both filed during the oral proceedings.

At the end of the oral proceedings, after due deliberation, the board announced its decision.

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

"A communication method for use in a CDMA communication system for performing communication between a base station and terminal stations, comprising the steps of: transmitting, in each terminal station, a first signal spread with a spreading code generated by a spreading code generator (318); performing, in the base station, a timing acquisition of the first signal from each terminal station and transmitting a first difference information (PJ-i) which indicates a phase difference between the first signal and a reference phase used in the timing acquisition; generating, in each terminal station, the spreading code by the spreading code generator (318) having a

phase set by the spreading code generator in accordance with the first difference information (PJ-i) and transmitting a second signal spread with the generated spreading code;  
performing, in the base station, a tracking of the second signal from each terminal station and transmitting a second difference information (PC-i) between the second signal and the reference phase; and setting, in each terminal station, a delay amount of a delay circuit (319, 319') in accordance with the second difference information (PC-i), wherein the spreading code generated by the spreading code generator (318) is supplied to the delay circuit (319, 319'), wherein the spreading code is selected from among a plurality of orthogonal codes."

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

"A communication method for use in a CDMA communication system for performing communication between a base station and terminal stations, comprising the steps of: transmitting, in each terminal station, a first signal spread by a modulator (320) with a spreading code generated by a spreading code generator (318); performing, in the base station, a timing acquisition of the first signal from each terminal station and transmitting a first difference information (PJ-i) which indicates a phase difference between the first signal and a reference phase used in the timing acquisition;  
generating, in each terminal station, the spreading code by the spreading code generator (318) having a phase set by the spreading code generator in accordance with the first difference information (PJ-i) and

transmitting a second signal spread with the generated spreading code;  
performing, in the base station, a tracking of the second signal from each terminal station and  
transmitting a second difference information (PC-i) between the second signal and the reference phase; and  
setting, in each terminal station, a delay amount of a delay circuit (319) in accordance with the second difference information (PC-i), wherein the spreading code generated by the spreading code generator (318) is supplied to the delay circuit (319) which is located between the modulator (320) of each terminal station and the spreading code generator (318), wherein the spreading code is selected from among a plurality of orthogonal codes."

## **Reasons for the Decision**

### 1. *Article 76(1) EPC - claim 1, main request*

- 1.1 In accordance with Article 76(1) EPC, "[a European divisional application] may be filed only in respect of subject-matter which does not extend beyond the content of the earlier application as filed". In the present case the earlier application is the parent application as referred to at point I above. The established criterion, analogous to Article 123(2) EPC, is that the subject-matter of a divisional application must be **directly and unambiguously** derivable from the parent application. This is the criterion adopted by the board in the present case.

1.2 In the view of the board, the feature of claim 1 of the main request "wherein the spreading code generated by the spreading code generator is supplied to the delay circuit (319, 319')" is not directly and unambiguously derivable from the parent application as filed. In accordance with this wording, the delay circuit could be placed anywhere on the output side of the generator, ie anywhere between the generator and antenna. The appellant argues that the claim wording is supported by claims 19 and 21 as well as the passage at column 9, lines 6-10 of the published parent application. However, in all these passages it is explicitly mentioned that the signal from the delay circuit 319 is output to the multiplier/modulator 320 (see also Fig. 3), without there being any suggestion that an alternative position of the delay might be contemplated. Hence, claim 1 includes matter not directly and unambiguously disclosed in parent application as filed, contrary to Article 76(1) EPC.

1.3 In the oral proceedings the appellant argued that the skilled person would recognise that the location of the delay circuit between the code generator and the modulator was not an essential aspect of the invention and hence could be omitted from the claim in accordance with the "essentiality test" used in decision T 331/87 (OJ 1991, 022). In the letter of reply to the summons to oral proceedings, it was also apparently argued (albeit in respect of a different claim wording), with reference *inter alia* to decision T 1067/97 (not published), that the delay circuit and the modulator/multiplier 320 have no close functional or structural relationship, and that therefore it was

allowable that the modulator/multiplier 320 be omitted from claim 1.

- 1.4 However, as indicated above, the board considers that the correct criterion to apply is whether or not the claimed matter is directly and unambiguously derivable from the parent application as filed. As stated above, there is no basis in the parent application for any other position of the delay circuit. Moreover, with regard to the appellant's arguments, the board is not convinced that the location of the delay circuit between the code generator and the modulator should not be regarded as "essential", as other locations of the delay circuit would have plausibly undesirable consequences such as adding delay to the data signal input to the modulator. Hence, the "essentiality test" is not applicable in the present case. Furthermore, in the board's view the case law exemplified by T 1067/97 does not apply to the present application since the code generator, the delay circuit, and the modulator clearly interact closely to provide a spread spectrum signal with the correct phase. They therefore have a close functional and structural relationship. Hence, the board finds the appellant's arguments unconvincing.

- 1.5 The board therefore concludes that claim 1 of the main request does not comply with Article 76(1) EPC.

In consequence, the main request is not allowable.

2. *Claim 1, auxiliary request*

- 2.1 Claim 1 of the auxiliary request is essentially based on claims 9 and 11 of the published parent application.



The additional feature of setting a delay amount of a delay circuit located between the modulator of each terminal station and the spreading code generator in accordance with second difference information is derivable from claim 19 in combination with Fig. 3. Claim 1 of the auxiliary request therefore complies with Article 76(1) EPC.

2.2 The subject-matter of claim 1 of the auxiliary request is disclosed in the present (divisional) application as filed, see eg claim 1 combined with col. 9, lines 9-17 and Fig. 3 (referring to the published application EP-A-1503514). Hence claim 1 also complies with Article 123(2) EPC.

2.3 In the board's view, claim 1 is clear and thus complies with Article 84 EPC.

2.4 *Inventive step*

2.4.1 The present invention relates to timing acquisition and tracking in a CDMA system. As is well known in the art, in order for orthogonality to be preserved, two or more signals spread by orthogonal codes have to be received in perfect synchronism. The aim of the present invention is to enable the use of orthogonal spreading codes in the reverse link (ie mobile-to-base station) of a CDMA system.

2.4.2 The board considers that D1 represents the closest prior art. D1 discloses a method for use in a CDMA system for achieving time synchronisation at the base station between code division multiplexed signals transmitted from mobile units (ie "terminal stations"

in the terminology of the present application) to a base station over the reverse link. D1 does not explicitly state that orthogonal codes are used, but the skilled person would understand this to be implicit, otherwise there would be no need to ensure time alignment.

In order to achieve synchronisation, each terminal station in D1 includes a delay circuit (Fig. 2: 53) for adjusting the phase of the code produced by the respective spreading code generator 49. The delay circuit is set in a first period following switch-on of the terminal station with a phase difference value  $2t(D)$  transmitted to the terminal station by the base station (cf. Fig. 4(C) and col. 9, line 36 - col. 10, line 49). This phase difference value  $2t(D)$  can be equated to the "first difference information" of claim 1 of the present auxiliary request. In a subsequent "tracking" phase, a further incremental phase difference value  $t(d)$  is transmitted to the terminal station where it is subtracted from the value held by the delay circuit (cf. Fig. 5(C) and col. 10, line 50 - col. 11, line 48). This difference value can be equated to the "second difference information" of claim 1.

- 2.4.3 The subject-matter of claim 1 of the auxiliary request differs from the disclosure of D1 essentially in that, as claimed, the spreading code generator has a phase set by the spreading code generator (board's emphasis) in accordance with the first difference information, and a delay amount of a delay circuit located between the spreading code generator and the spreading modulator is set in accordance with the second

difference information. In contrast, in accordance with D1, only a single delay circuit is used which is provided with both the first and second phase difference information. In accordance with the claimed invention, two separate circuits, ie the spreading code generator and the delay circuit, are provided for the respective phase adjustments in the acquisition and tracking phases, instead of a single circuit as in D1.

2.4.4 The board considers the problem to be solved starting out from D1 as to provide an alternative method for carrying out the phase adjustment of the spreading code in the terminal station for reverse link transmission.

2.4.5 In the view of the board, the skilled person starting out from D1 would not be motivated to solve this problem by separating the single delay value of D1 into two phase adjusting elements with individual control. Firstly, no document is at the board's disposal illustrating such a solution - D1 contains no hint in this direction, and D2, which discloses a method of timing adjustment by means of fixed adjustment increments (cf. col. 28, line 59 to col. 29, line 4), is silent as to implementation details of the timing adjustment circuit. In any event it does not describe any delay circuit. Secondly, the change to the D1 arrangement involves adding at least one further component and an extra signal path. Since the skilled person using common general knowledge would arguably seek to reduce the number of components rather than add extra hardware and circuit complexity, in the board's view, the skilled person starting out from D1 would not obviously arrive at the invention by making use of common general knowledge either.

2.4.6 The examining division in the impugned decision argued that no technical advantage could be seen in separating a delay circuit into two delay circuits. The board disagrees, since the claimed solution makes it possible to select components which are optimised for the phase adjustment during either the acquisition or the tracking phase. Thus, a delay circuit which is only required to take account of delay increments (tracking) can plausibly be designed with a reduced size and/or be specialised to provide finer incremental delay steps without being constrained by the needs of the acquisition phase. Similarly, the phase shifter employed by the code generator can be designed according to the needs of the coarser delay requirements of the acquisition phase.

2.4.7 In view of the above, the board concludes that the subject-matter of claim 1 of the auxiliary request involves an inventive step (Articles 52(1) and 56 EPC).

3. At the oral proceedings, the appellant stated that its main and auxiliary requests consisting of only a single claim were filed on the understanding that it would have an opportunity before the examining division to file a second independent claim directed to a terminal station or a system, as well as dependent claims. For this reason, the board deems it appropriate to remit the case to the examining division for further prosecution.

**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 for further prosecution on the basis of claim 1 of the auxiliary request filed in the course of the oral proceedings.

The Registrar:

The Chairman:

D. Magliano

A. S. Clelland