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**D E C I S I O N**  
**of 24. April 2006**

**Case Number:** T 0341/05 - 3.5.03

**Application Number:** 99964681.3

**Publication Number:** 1145031

**IPC:** G01S 1/02

**Language of the proceedings:** EN

**Title of invention:**

A method of and system for estimating a time of arrival of a radio signal

**Applicant:**

Motorola Limited

**Opponent:**

-

**Headword:**

Estimating a time of arrival/MOTOROLA

**Relevant legal provisions:**

EPC Art. 123(2), 92(1)

EPC R. 86(4)

**Keyword:**

"Amendments - added subject-matter (no)"

**Decisions cited:**

-

**Catchword:**

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**Case Number:** T 0341/05 - 3.5.03

**DECISION  
of the Technical Board of Appeal 3.5.03  
of 24. April 2006**

**Appellant:** Motorola Limited  
Jays Close  
Viables Industrial Estate  
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Hampshire RG22 4PD (GB)

**Representative:** Cross, Rupert Edward Blount  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted 25 October  
2004 refusing European application  
No. 99964681.3 pursuant to Article 97(1)  
EPC.**

**Composition of the Board:**

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

## Summary of Facts and Submissions

- I. This appeal is against the decision of the examining division dated 25 October 2004, refusing European patent application No. 99 964 681.3 for the reason that claims 13 to 15 and page 3 of the description contained subject-matter which extended beyond the content of the application as originally filed, Article 123(2) EPC.
- II. The application in suit was filed as international application PCT/EP99/10418 with publication number WO 00/42445. The international preliminary examination report held that claims 1 to 13 were novel and involved an inventive step. At the entry into the European phase it was requested that the proceedings before the EPO be based on the documents on which the international preliminary examination report was based.
- III. In reply to the communication pursuant to Rules 109 and 110 EPC (amendment of application documents on entering the European phase) the applicant filed with letter of 5 October 2001 an amended set of claims 1 to 15 and amended pages 2 and 3 and requested that the further examination be based on the amended claims.
- IV. In a communication under Rule 51(4) EPC dated 22 January 2003 the applicant was informed that the examining division intended to grant a patent on the basis of claims 1 to 13 as originally filed and that pages 2 and 3 and claims 1, 13, 14 and 15 as filed with letter of 5 October 2001 did not comply with Article 123(2) EPC and related to unsearched matter, Rule 86(4) EPC. It was stated that if the applicant insisted on the introduction of the new documents, the application would be refused under Article 97(1) EPC.
- V. The appellant in its letter of 28 May 2003 disagreed with the text proposed for grant, filed amended claims 1 to 14 and amended pages 2 and 3 and presented arguments that claims 14 and 15 were supported by the disclosure as originally filed. An auxiliary request for oral proceedings was made.
- VI. In a consultation by telephone with the applicant on 18 September 2003, the minutes of which were sent to the applicant on 24 September 2003, the examining division expressed its view that claims 13 and 14 extended beyond the original disclosure and announced that, if no claims compliant with the EPC were received within a time limit, oral proceedings would be held; refusal under Article 97(1) EPC was then to be expected.
- VII. With a letter of 22 March 2004 the applicant filed amended claims 13 and 14 and repeated its auxiliary request for oral proceedings.

- VIII. In a communication dated 25 May 2004 and annexed to a summons to oral proceedings on 30 September 2004 the examining division maintained its view that claims 13 to 15 and page 3 of the description extended beyond the content of the application as originally filed, Article 123(2) EPC, and that claims 13 to 15 related to unsearched matter, Rule 86(4) EPC.
- IX. In response to the summons the applicant filed with letter of 30 August 2004 a replacement page 3 and a set of claims 1 to 16. It was argued that the documents complied with the provisions of the EPC, in particular Article 123(2). Further, the issuing of the communication under Rule 51(4) EPC dated 22 January 2003 on the basis of the originally filed claims, without giving the applicant the opportunity to address objections to the claims submitted on 5 October 2001 was said to constitute a substantial procedural violation.
- X. In a letter of 23 September 2004 the applicant announced that it would not attend oral proceedings and requested that either the proceedings be continued in writing or a decision be made based on the current state of the file.
- XI. In the oral proceedings held on 30 September 2004 in absence of the applicant, the examining division refused the application on the basis of Article 97(1) EPC.
- XII. Notice of appeal was filed on 22 December 2004 and the appeal fee paid. It was requested that the decision be cancelled in its entirety. With the statement of grounds of appeal filed on 9 February 2005 the appellant submitted a set of claims 1 to 15 according to a first auxiliary request and a set of claims 1 to 13 and replacement pages 3, 3a according to a second auxiliary request. The main request was based on the documents on file at the time of the decision dated 25 October 2004. The appellant requested that the appealed decision be cancelled in its entirety and that a patent be granted on the basis of one of these requests.
- XIII. The board issued a communication, inter alia expressing the preliminary view that claim 15 of the main request and claim 14 of the first auxiliary request did not comply with Article 123(2) EPC.
- XIV. With a letter dated 20 September 2005, in response to the communication, the appellant filed new pages including an amended claim 15 of the main request and an amended claim 14 of the first auxiliary request.
- XV. Claim 1 according to the main request reads as follows:
- "A method of estimating an average time of arrival of a radio signal in a receiver comprising the steps of:

receiving at the receiver (401) a plurality of radio signals transmitted from a transmitter (407) to the receiver through a propagation channel;  
estimating (503) a time of arrival for each of a plurality of the radio signals received at the receiver;  
selecting (505) a subset of the plurality of the radio signals received at the receiver in response to the time of arrival estimates;  
generating (507) an averaged propagation channel estimate from the subset of radio signals; and  
estimating (509) an averaged time of arrival from the averaged propagation channel estimate."

Claim 14 according to the main request reads as follows:

"Subscriber unit (401) comprising:  
a receiver for receiving a plurality of radio signals transmitted from a transmitter to the receiver through a radio propagation channel;  
processor means (601, 603, 605, 607) for estimating a time of arrival for each of a plurality of the radio signals received at the receiver;  
means for selecting a subset of the plurality of the radio signals received at the receiver in response to the time of arrival estimates;  
means for generating an averaged propagation channel estimate from the subset of radio signals; and  
means for estimating an averaged time of arrival from the averaged propagation channel estimate."

Claim 16 according to the main request reads as follows:

"A system for estimating an average time of arrival of a radio signal comprising:  
a receiver (401):  
a transmitter (407) transmitting a plurality of radio signals to the receiver through a radio propagation channel;  
processor means (601, 603, 605, 607) for estimating a time of arrival for each of a plurality of the radio signals received at the receiver;  
means for selecting a subset of the plurality of the radio signals received at the receiver in response to the time of arrival estimates;  
means for generating an averaged propagation channel estimate from the subset of radio signals; and  
means for estimating an averaged time of arrival from the averaged propagation channel estimate."

Claims 1, 13 and 15 according to the first auxiliary request correspond to claims 1, 14 and 16 of the main request, respectively.

Claims 1 and 13 according to the second auxiliary request correspond to claims 1 and 16 of the main request, respectively. Claims 1 to 13 according to the second

auxiliary request correspond to the set of claims on which the international preliminary examination report was based.

## **Reasons for the Decision**

### 1. *Main request*

#### 1.1 Preliminary remark

The decision of the department of first instance refers to claims 13 to 15 only and is mute about claims 1 to 12. From the communication of 25 May 2004 accompanying the summons for oral proceedings before the department of first instance it can be inferred that present claims 1 to 12 are considered to comply with the provisions of the EPC.

#### 1.2 Article 123(2)

##### 1.2.1 Claim 13

Claim 13 is directed to a subscriber unit adapted to operate the method of any preceding claim. The originally filed application did not claim a subscriber unit and the question to be decided by the board is whether subject-matter has thereby been added. The examining division argued that although the original description did refer to a subscriber unit it did not suggest its operation with any of the combinations of method steps specified in the claims.

The board notes that the description as a whole relates to a subscriber unit. Referring to Figure 4 (see page 4, lines 11 to 25) a method of calculating the position of a subscriber unit using the range from the subscriber unit to at least three base stations is disclosed. Range is determined from the time of arrival of the signals from the different base stations. The claimed method solves the problem that the time of arrival may be affected by factors such as multipath propagation. When a plurality of signals is received, a selected subset of the received signals is used to determine an averaged time of arrival estimate, see page 2, lines 23 to 35. Although the brief description of the drawings refers to Figure 4 as prior art, Figure 4 also applies to the claimed subject-matter, which primarily differs from the prior art in the specific way of estimating the time of arrival.

Turning now to the preferred embodiment as described in connection with Figures 4 to 7, page 4, lines 11 to 13 states that a subscriber unit receives signals from three base stations. Further, page 4, lines 19 and 20 refers to a method for determining the range by determining the time of arrival of the signals of the different base stations. It is clear from the context that the time of arrival at the subscriber unit is meant, since according to page 4,

lines 11 to 13, it is only the subscriber unit which receives signals from the different base stations. The description of Figure 5 confirms this interpretation: at page 4, lines 41 and 42, step 501 is said to show a plurality of signals "received by the subscriber unit".

Although the description nowhere explicitly states that specific method steps are implemented in the subscriber unit, the passage bridging pages 7 and 8 refers to Figure 5 and states that the method can be implemented "in the subscriber unit, in the base station or can be distributed in the system". In the board's view the skilled person would understand the reference to Figure 5 in this passage as a reference to the detailed description of Figure 5 at page 4, line 39 to page 7, line 41. Thus, the skilled person is taught that a subscriber unit can be used with various combinations of method steps. Moreover, claims 1 to 8 refer to the average time of arrival of a radio signal (board's emphasis), implying that the method is carried out at a receiver, whilst claim 9 specifically refers to estimating range between a transmitter and a receiver. In the light of the description and claims as a whole the board therefore concludes that the skilled person would understand that the receiver referred to is that of the subscriber unit, and that it can be used with any of the claimed combination of the method features.

The board accordingly holds that the subject-matter of the claim is disclosed by the originally filed application and that the claim complies with Article 123(2) EPC.

#### 1.2.2 Claim 14

Claim 14 differs from claim 13 as originally filed in being directed to a "subscriber unit" rather than a "system" and in that the reference to a transmitter has been removed. The various features of the claim are now specified as being comprised in the subscriber unit. This amendment is analogous to the amendment which led to present claim 1, which was not objected to in the appealed decision. Thus, if claim 1 is in compliance with Article 123(2) EPC, then for the same reasons, mutatis mutandis, claim 14 must be also.

Moreover, as noted above, in the passage bridging pages 7 and page 8 the description discloses that the method is preferably implemented as a software program running on a suitable processor and that the method can be implemented in the subscriber unit, the base station or can be distributed in the system.

The original claim 13 referred to processor means but did not specify their location; the present claim 14 on the other hand is restricted to one of the alternatives discussed in the above-mentioned passage. Moreover, the various means specified in the claim are, as discussed at

point 1.2.1 above, based on the embodiment described in connection with Figures 4 to 7 above.

Thus, claim 14 complies with Article 123(2) EPC.

#### 1.2.3 Claim 15

As previously noted, the passage bridging pages 7 and 8 discloses the implementation of the method as a software program running on a suitable processor and explicitly states that this method can be implemented in the subscriber unit.

The description states e.g. at page 4, lines 18 to 21 and page 8, lines 33 and 34, that the range between the subscriber unit and the base station is derived from the time of arrival signal. The board understands the reference in the claim to estimating a range to refer to the fact that the time of arrival signal is an estimate, but in any case page 8, lines 41 and 46 makes reference to "range estimates". Thus, claim 15 complies with Article 123(2) EPC.

#### 1.2.4 Page 3

Amended page 3 includes the subject-matter of present claim 14 and thus complies with Article 123(2) EPC for the reasons, mutatis mutandis, set out in point 1.2.2 above.

#### 1.3 Rule 86(4) EPC

According to Rule 86(4) EPC amended claims may not relate to unsearched subject-matter which does not combine with the originally claimed invention or group of inventions to form a single general inventive concept. According to Article 92(1) EPC the search report is to be drawn up on the basis of the claims, with due regard to the description and any drawings.

The originally filed description states at page 8, lines 1 and 2 that the described method can be implemented in the subscriber unit, the base station or can be distributed in the system. The board accordingly considers that the subscriber unit, the base station and the system form a single general inventive concept, so that Rule 86(4) EPC is met. The subscriber unit in which the method is implemented should therefore have been searched. The board has no reason to doubt that the subject-matter of claims 13 and 14 fell within the scope of the search.

1.4 Thus, the board concludes that the decision under appeal should be set aside and the case remitted to the department of first instance.

#### 2. *First and second auxiliary requests*



The main request being allowable, it is not necessary for the board to consider the auxiliary requests.

**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 14 as filed with letter of 30 August  
                                  2004,  
                                  15 and 16 as filed with letter of  
                                  20 September 2005.

Description: pages 1, 2, 4-8 as originally filed amended  
                                  page 3 as filed with letter of 30 August  
                                  2004

Drawings:                 sheets 1-3 as originally filed

The Registrar:

The Chairman:

D. Magliano

A. S. Clelland