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**Datasheet for the decision
of 2 June 2009**

Case Number: T 0102/06 - 3.5.05

Application Number: 04250904.2

Publication Number: 1460813

IPC: H04L 25/03

Language of the proceedings: EN

Title of invention:

Spherical decoder for wireless communications

Applicant:

LUCENT TECHNOLOGIES INC.

Opponent:

-

Headword:

Spherical decoder/LUCENT

Relevant legal provisions:

EPC Art. 111(1), 123(2)

Relevant legal provisions (EPC 1973):

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Keyword:

Added subject-matter - amended main request (no)

Decisions cited:

-

Catchword:

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Case Number: T 0102/06 - 3.5.05

D E C I S I O N
of the Technical Board of Appeal 3.5.05
of 2 June 2009

Appellant: LUCENT TECHNOLOGIES INC.
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Representative: Sarup, David Alexander
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 29 August 2005
refusing European application No. 04250904.2
pursuant to Article 97(1) EPC 1973.

Composition of the Board:

Chairman: D. H. Rees
Members: M. Höhn
F. Blumer

Summary of Facts and Submissions

- I. This appeal is against the decision of the examining division dispatched 29 August 2005, refusing European patent application No. 04250904.2 on the grounds that it did not fulfil the requirements of Article 123(2) EPC.
- II. The appellant appealed and requested that a patent be granted on the basis of the claims on which the appealed decision had been based (main request). In addition, the appellant submitted an auxiliary set of claims 1-10 with the statement setting out the grounds of appeal. It was requested that an appropriate one of the amended claims 1, 5-7 and 9 be considered only if the corresponding claim of the main request was considered to be in violation of Article 123(2) EPC, while keeping the other claims of the main request not violating Article 123(2) EPC (see grounds of appeal, p. 5, last paragraph).
- III. In a communication dated 18 December 2008 the board expressed the preliminary opinion that the subject-matter of claims 1, 5-7, 9 and 10 of the main request did not fulfil the requirements of Article 123(2) EPC. The board gave its reasons for these objections and why the appellant's arguments were not convincing. It further gave its opinion that the amendments to claims 1, 5-7 and 9 of the auxiliary request overcame these objections. However, as claims 9 and 10 of the main request gave rise to the same objection with respect to matrix P, and only claim 9 had been amended in the auxiliary request, claim 10 would have to be amended in the same way in order to overcome the

objection. Thus, the auxiliary claim set also did not appear to fulfil the requirements of Article 123(2) EPC.

In addition, the board informed the appellant of its intention to remit the file to the first instance for further prosecution (Article 111(1) EPC) if the objections were overcome, since the appealed decision was based solely on Article 123(2) EPC and, in particular, the requirements of Article 52, 54 and 56 EPC had not yet been examined by the first instance.

IV. With a letter dated 2 April 2009 the appellant filed an amended set of claims 1-10 as a new main request and expressed its belief that the objections in the appealed decision had been overcome and the file could be remitted to the first instance for further prosecution as had been indicated in the official communication.

V. The sole independent claim 1 reads as follows:

"A device for use in a wireless communication system (20), comprising:
a receiver (24) for receiving signals having a plurality of available symbol combinations and including a decoder that determines an incremental cost of candidates within a portion of the available symbol combinations, wherein the decoder comprises a search unit (102) for determining the cumulative cost of the portion of the available symbol combinations using a depth first search;
characterized in that the search unit (102) comprises a stack memory (114) that at least temporarily contains the cumulative cost (124) of each considered candidate

with identifier information (120, 122) regarding a level of each considered candidate within a tree structure (32) containing all of the available candidates."

Reasons for the Decision

Objections under Article 123(2) EPC

1. *Claim 1*

1.1 In contrast to the original set of claims which was directed to method claims only, the present claims are directed to a device (product type claims). The only concrete device disclosed in the original application is found in figures 1, 3 and 5 which are all described as showing a receiver "that includes" or "having" a decoder (see p. 3, l. 29 to p. 4, l. 6 and p. 11, l. 21 onwards). The board does not agree with the arguments made by the appellant in the statement of grounds of appeal that there is only a functional relationship between the receiver and the decoder. The term receiver as used in the application refers to the device as a whole and, hence, there is a structural relationship. However, amended claim 1 no longer omits the feature that the receiver includes a decoder ("a receiver ... including a decoder") and therefore overcomes the corresponding objection raised in the appealed decision and the board's communication.

1.2 In the appealed decision an objection was raised against the omission of the feature that the decoder is a spherical decoder.

The figures, in particular figure 3, show an apparatus according to the invention, but are explicitly directed to a spherical decoder (see p. 3, l. 29 to p. 4, l. 6). Whenever the application mentions a decoder as a structural feature the term "spherical decoder" is used. There is no explicit basis indicating that any other decoder can be used for the invention. However, the original claims do not refer to spherical decoders or decoding. Also on p. 2, l. 31 onwards the invention is disclosed in a more general way and not limited to spherical decoding. The original disclosure as a whole was therefore not limited to spherical decoders and provides a proper antecedent basis for a decoder in general as claimed in amended claim 1.

- 1.3 The term "location" in the claims refused, against which an objection was raised in the decision, is not found in the original application. The board agrees with the appellant that the stack memory stores information that allows the retrieval of a certain node in a tree structure for restarting a search on the remaining candidates (see e.g. on p. 11, l. 32, "A stack memory 114 at least temporarily contains the cost function values along with sufficient identifier information for the values within the stack memory 114 to be used by the candidate search module as it progresses through the hierarchy representing the available combinations of transmitted symbols", and on p. 13, l. 5 "The exemplary stack searcher stores three pieces of information onto the stack 114: the current level in the tree 120, the candidates for each previous antenna used to reach this level in the tree 122, and the cumulative T_{outer} sum 124. With these three pieces of

information, the searcher 110 can restart a search on the remaining candidates"). However the board does not consider this a direct and unambiguous disclosure for the storage of a "location", which would require the level and information about all the parent nodes. There is no clear indication in the original application documents that all the parent node information is stored in the stack. On p. 13, l. 3-4 only an example with a single parent node is disclosed.

The passages mentioned above, however, are a direct and unambiguous disclosure of the expression "level of each considered candidate within a tree structure" of claim 1 as now amended, which therefore overcomes the corresponding objection raised in the appealed decision against the term "location".

2. *Claims 5 to 7*

In claim 5 the feature "average of X valid candidates" objected to under Article 123(2) EPC has been replaced by "average number of valid candidates" for which a direct and unambiguous disclosure is found on p. 14, l. 12-14 of the application. In amended claims 5 to 7 the reference to the same parameter X objected to under Article 123(2) EPC has been replaced by the expression "the generated average number". The amendments in claims 5 to 7 are thus disclosed by p. 14, l. 12-14 and l. 21-25 of the application.

3. *Claims 9 and 10*

- 3.1 The subject-matter of claims 9 and 10 has been amended by specifying that triangular matrices V and P are upper triangular matrices.

The application provides a basis for matrices V and P being upper triangular matrices (see p. 16, l. 4 and l. 27) and for how to calculate the formulae with upper triangular matrices.

4. Thus, the objections raised under Article 123(2) EPC in the appealed decision have been overcome by amendment.

5. The appealed decision was solely based on Article 123(2) EPC. In particular, the requirements of Article 52, 54 and 56 EPC have not yet been examined by the first instance for the subject-matter of the present claims on file, which include the aspect of a stack memory. The board therefore informed the appellant in the communication dated 18 December 2008 that it intended to remit the file to the first instance for further prosecution (Article 111(1) EPC) if the objections under Article 123(2) EPC were overcome.

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 claims 1-10 of the main request filed with letter dated 2 April 2009, description pages 1-19 as originally filed, pages 2A and 4A received with letter dated 29 June 2005, and drawing sheets 1 to 5 as originally filed.

The Registrar

The Chairman

K. Götz

D. H. Rees