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**Datasheet for the decision
of 11 November 2009**

Case Number: T 1655/06 - 3.5.02

Application Number: 97302019.1

Publication Number: 0800279

IPC: H03M 13/00

Language of the proceedings: EN

Title of invention:

Signal decoding for either Manhattan or Hamming metric based
Viterbi decoders

Applicant:

LUCENT TECHNOLOGIES INC.

Headword:

-

Relevant legal provisions:

EPC Art. 123(2)

Relevant legal provisions (EPC 1973):

-

Keyword:

"Added subject-matter (yes)"

Decisions cited:

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Catchword:

-



Case Number: T 1655/06 - 3.5.02

D E C I S I O N
of the Technical Board of Appeal 3.5.02
of 11 November 2009

Appellant: LUCENT TECHNOLOGIES INC.
600 Mountain Avenue
Murray Hill NJ 07974-0636 (US)

Representative: Sarup, David Alexander
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 10 April 2006
refusing European patent application
No. 97302019.1 pursuant to
Article 97(1) EPC 1973.

Composition of the Board:

Chairman: M. Ruggiu
Members: R. Lord
H. Preglau

Summary of Facts and Submissions

- I. This is an appeal of the applicant against the decision of the examining division to refuse European patent application No. 97 302 019.1.
- II. In the decision under appeal, the examining division held that the subject-matter of claims 1 and 10 as filed with a letter dated 17 June 2002 did not involve an inventive step within the meaning of Article 56 EPC.
- III. In the statement of grounds of appeal dated 10 August 2006 the appellant requested that a patent be granted on the basis of claims 1 and 10 filed with his letter dated 17 June 2002 and claims 2 to 9 and 11 to 16 filed with his letter dated 6 November 2001 (main request), or if that was not possible on the basis of claims 1 to 16 of the first auxiliary request or claims 1 to 10 of the second auxiliary request filed with that statement of grounds of appeal.

In a communication dated 2 June 2009 accompanying a summons to oral proceedings the board informed the appellant *inter alia* that it appeared that the independent claims of each of the requests contravened the requirements of Article 123(2) EPC. The appellant acknowledged receipt of this communication, but did not make any submission in reply to it.

Oral proceedings before the board took place on 11 November 2009, which the appellant did not attend, although he had not informed the board that he would not do so.

IV. Claims 1 and 10 according to the appellant's main request read as follows:

"1. A method for decoding a received digital signal carrying predetermined information, which may be represented in any one of two or more different binary number systems, with a decoder which decodes said received digital signal based on a metric scheme which requires said digital signal to be represented in a particular binary number system, comprising the steps of:

receiving said digital signal,

converting the received digital signal to the particular binary number system required by said decoder, and

decoding the predetermined information represented by said converted number system in a single pass through said decoder to provide the decoded predetermined information."

"10. Apparatus for decoding a received digital signal carrying predetermined information which may be represented in any one of two or more different binary number systems, with a decoder which decodes said received digital signal based on a metric scheme which requires said digital signal to be represented in a particular binary number system, comprising

means for receiving said digital signal;

means for converting the digital signal to said particular binary number system required by said decoder, if it is not already in it; and

means for decoding the predetermined information represented by said converted number system in a single

pass through said decoder to provide the decoded predetermined information."

V. Claims 1 and 10 according to the appellant's first auxiliary request read as follows:

"1. A method for decoding a received digital signal carrying predetermined information, which may be represented in any one of two or more different number systems, with a decoder which decodes said received digital signal based on a metric scheme which requires said digital signal to be represented in a particular number system, comprising the steps of:

receiving said digital signal,
converting the received digital signal to the particular number system required by said decoder, and
decoding the predetermined information represented by said converted number system in a single pass through said decoder to provide the decoded predetermined information, wherein said decoding step includes obtaining an accumulated cost difference and providing a symbol equal to said accumulated cost difference."

"10. Apparatus for decoding a received digital signal carrying predetermined information which may be represented in any one of two or more different number systems, with a decoder which decodes said received digital signal based on a metric scheme which requires said digital signal to be represented in a particular number system, comprising:

means for receiving said digital signal;
means for converting the received digital signal to the particular number system required by said

decoder; and

means for decoding the predetermined information represented by said converted number system in a single pass through said decoder to provide the decoded predetermined information, wherein said decoding means provides at its output a symbol equal to an accumulated cost difference."

VI. Claims 1 and 6 according to the appellant's second auxiliary request read as follows:

"1. A method for decoding a received digital signal carrying predetermined information, which may be represented in any one of two or more different number systems, with a decoder which decodes said received digital signal based on a metric scheme which requires said digital signal to be represented in a particular number system, comprising the steps of:

receiving said digital signal,

converting the received digital signal to the particular number system required by said decoder, and

decoding the predetermined information represented by said converted number system in a single pass through said decoder to provide the decoded predetermined information, wherein:

if said predetermined information carried by said received digital signal is represented in a signed binary system, said decoded predetermined information is desired to be represented in an unsigned binary number system and said decoder is designed to compute a Manhattan branch metric, converting an absolute value of an accumulated cost difference into the unsigned binary number system; or

if said predetermined information carried by said

received digital signal is represented in an unsigned binary system, said decoded predetermined information is desired to be represented in a signed complement system and said decoder is designed to compute a Hamming branch metric, computing a signed complement of an absolute value of an accumulated cost difference."

"6. Apparatus for decoding a received digital signal carrying predetermined information which may be represented in any one of two or more different number systems, with a decoder which decodes said received digital signal based on a metric scheme which requires said digital signal to be represented in a particular number system, comprising:

means for receiving said digital signal;

means for converting the received digital signal to the particular number system required by said decoder; and

means for decoding the predetermined information represented by said converted number system in a single pass through said decoder to provide the decoded predetermined information, said decoder including means for obtaining an absolute value of an accumulated cost difference, said decoder including means for:

if said decoded predetermined information is desired to be represented in an unsigned binary number system and said decoder is designed to compute a Manhattan branch metric, converting said absolute value of said accumulated cost difference into the unsigned binary number system; or

if said decoded predetermined information is desired to be represented in a signed complement system and said decoder is designed to compute a Hamming branch metric, computing a signed complement of said

absolute value of said accumulated cost difference."

Reasons for the Decision

1. The appeal is admissible.
2. *Added subject-matter (Article 123(2) EPC) - main request*
 - 2.1 The independent claims 1 and 10 according to the appellant's main request both define that the information in the received signal "*may be represented in any one of two or more different binary number systems*". The claims as originally filed however referred only to "*a first number system*" and "*a second number system*", and the application as originally filed provided no teaching of the use of anything other than these two defined number systems. The definitions in the present independent claims that the received signal may be represented by more than two different number systems thus introduces teaching extending beyond the content of the application as originally filed.
 - 2.2 The independent claims 1 and 10 according to the appellant's main request also both define that the decoding is carried out "*in a single pass through said decoder*", which definition was not present in the original claims. The application as originally filed did not contain any disclosure as to whether the decoding is carried out in a single pass through the decoder or in multiple passes (e.g. iteratively), so that the addition of this definition to the claims introduces subject-matter extending beyond the content

of the application as originally filed.

2.3 For both of the above reasons, the appellant's main request contravenes the requirements of Article 123(2) EPC.

3. *Added subject-matter (Article 123(2) EPC) - auxiliary requests*

3.1 Independent claims 1 and 10 of the appellant's first auxiliary request and independent claims 1 and 6 of his second auxiliary request all include both of the amendments discussed in paragraphs 2.1 and 2.2 above, except for the insignificant difference that in these requests the number systems are not defined as being binary. Both requests therefore contravene the requirements of Article 123(2) EPC for the same reasons as for the main request.

3.2 In addition, independent claims 1 and 10 of the first auxiliary request and independent claims 1 and 6 of the second auxiliary request all define the provision of a symbol equal to an obtained accumulated cost difference. This feature was defined in the originally filed claims only in dependent claims 7 and 13, but both of those claims defined also that the decoder was a Viterbi decoder producing a soft symbol output, so only disclosed the accumulated cost difference as an output of such a decoder. Moreover the remainder of the original application only disclosed the provision of an accumulated cost difference in that context. The definition in the independent claims of the auxiliary requests of this accumulated cost difference outside the context of a Viterbi decoder producing a soft

symbol output thus introduces teaching beyond the content of the application as originally filed, so that these claims contravene the requirements of Article 123(2) EPC also for this reason.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

U. Bultmann

M. Ruggiu