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Datasheet for the decision of 4 April 2017

Case Number: T 1018/12 - 3.5.05

Application Number: 02767022.3

Publication Number: 1438800

IPC: H04L1/20

Language of the proceedings: EN

Title of invention:
METHOD AND APPARATUS FOR CHANNEL QUALITY MEASUREMENTS

Applicant:
Apple Inc.

Headword:
OFDM channel quality measurement/APPLE

Relevant legal provisions:
EPC Art. 56, 123(2)

Keyword:
Amendments - added subject-matter (yes)
Inventive step - (no)

Decisions cited:

Catchword:

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Case Number: T 1018/12 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 4 April 2017

Appellant: (Applicant)	Apple Inc. One Infinite Loop Cupertino, CA 95014 (US)
Representative:	Lang, Johannes Bardehle Pagenberg Partnerschaft mbB Patentanwälte, Rechtsanwälte Prinzregentenplatz 7 81675 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 15 December 2011 refusing European patent application No. 02767022.3 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair	A. Ritzka
Members:	P. Cretaine
	D. Prietzel-Funk

Summary of Facts and Submissions

I. The appeal is against the decision of the examining division, posted on 15 December 2011, to refuse European patent application No. 02767022.3. The application was refused on the grounds of non-compliance with the requirements of Article 123(2) EPC and lack of inventive step (Article 56 EPC) having regard to the disclosure of

D1: WO 99/08425 in combination with

D2: US 6 215 827.

II. Notice of appeal was received on 10 February 2012 and the appeal fee was paid on the same day. The statement setting out the grounds of appeal was received on 13 April 2012. It was apparent from this statement that the appellant was requesting that the decision under appeal be set aside and that a patent be granted on the basis of a set of claims 1 to 17 filed with the statement setting out the grounds of appeal. Oral proceedings were not requested.

III. The board considered it expedient to summon to oral proceedings, and a summons to oral proceedings was issued on 22 November 2016. In an annex to this summons, the board gave its preliminary opinion on the appeal pursuant to Article 15(1) RPBA. An objection under Article 123(2) EPC was raised against independent claims 1 and 4. Further, an objection of lack of inventive step (Article 56 EPC) was raised against all claims having regard to D2 in combination with D1.

IV. By letter dated 5 January 2017, the appellant informed the board that neither the appellant nor the representative would be attending the oral proceedings. Further, the appellant requested that a decision be issued on the basis of the documents on file.

V. With a communication dated 18 January 2017, the board informed the appellant that the oral proceedings had been cancelled.

VI. Claim 1 of the sole request reads as follows:

"A channel quality measurement apparatus characterized by being adapted to indirectly measure a quality of a channel over which has been transmitted a sequence of symbols produced by encoding and constellation mapping a source data element sequence (213), the apparatus comprising:
a symbol de-mapper (236), receiving as input a sequence of received symbols over the channel whose quality is to be measured, said symbol de-mapper (236) being adapted to perform symbol de-mapping on said sequence of received symbols to produce a sequence of soft data element decisions;
a soft decoder (238), receiving as input the sequence of soft data element decisions produced by the symbol de-mapper (236), said soft decoder (238) being adapted to decode the sequence of soft data element decisions to produce a decoded output sequence;
an encoder (240), receiving as input the decoded output sequence produced by the soft decoder (238), said encoder (240) being adapted to re-encode the decoded output sequence with an identical code to a code used in encoding the source data element sequence to produce a re-encoded output sequence; and

a correlator (250), receiving as input the sequence of soft data element decisions produced by the symbol de-mapper (236), and the re-encoded output sequence produced by the encoder (240), said correlator (250) being adapted to produce a channel quality indicator output by determining a correlation between the sequence of soft data element decisions and the re-encoded output sequence, the channel quality indicator output of the correlator being independent of a rate at which a symbol is repeated in the sequence of received symbols;
the correlator feeding the channel quality indicator output back to a transmitter (200,240,220) for use in determining and applying an appropriate coding rate and modulation to the source data element sequence (213)."

The request contains further independent claims directed to a corresponding method (claim 4) and computer program product (claim 17), both however with the feedback feature omitted.

Reasons for the Decision

1. The appeal is admissible.

2. Article 123(2) EPC

The board agrees with the decision under appeal that the wording "...the channel quality indicator output of the correlator being independent of a rate at which a symbol is repeated in the sequence of received symbols", present in the independent claims, has no support, explicit or even implicit, in the application documents as originally filed.

The appellant argued in that respect that, since the correlator correlated two input sequences irrespective of their symbol rates, its output was also independent of the symbol rate. The appellant further pointed to the passage from page 22, line 25 to page 23, line 3 of the published application and argued that, since the likelihood (or correlation) value did not rely on code type or decoding method, the correlation value was generated irrespective of symbol rate. The board is however not convinced by these arguments, since the symbol rate, which is defined by the coding and modulation schemes applied at the transmitter and known to the receiver, does have an influence on the quality of the received signal, as also acknowledged in the description (see page 1, lines 7 to 28 of the published application).

Therefore, independent claims 1, 4 and 17 do not meet the requirements of Article 123(2) EPC.

3. Article 56 EPC

3.1 For the following assessment of inventive step, the added feature mentioned in section 2 has not been taken into consideration. Moreover, the term "indirectly" added in the independent claims for defining the type of channel quality measurement is vague and could equally be applied to the quality measurement disclosed in D1 and D2.

3.2 The board agrees with the finding of the decision under appeal (see Reasons 2.1 and 2.2.) that D1 discloses a channel quality measurement apparatus comprising a symbol de-mapper, a soft decoder, an encoder and a correlator as defined in claim 1, the only difference being that the correlator in claim l feeds the channel

quality indicator output back to a transmitter for use in determining and applying an appropriate coding rate and modulation to the source data element sequence. In D1, the data source has a variable data rate, among possible data rates, and each received data frame is decoded at each of the possible rates. The channel quality indicator and two other metrics, namely a CRC check and a Yamamoto metric, are provided to a rate selector for determining the most probable rate at which the incoming symbols were transmitted.

D2 discloses a channel quality measurement apparatus wherein a channel quality indicator ("signal to interference plus noise ratio SIR") is estimated using a Viterbi decoder metric and is fed back to the transmitter for determining an encoding and modulation scheme (see column 14, lines 7 to 42 and Figure 16).

In the board's view, D2 represents the closest prior art to the subject-matter of claim 1, since it relates to a channel quality measurement apparatus having the same aim, namely to adapt the coding and modulation scheme at the transmitter.

The difference between the subject-matter of claim 1 and the disclosure of D2 is that the channel quality indicator in claim 1 is the result of the correlation between the soft decoded symbol sequence and the re-encoded symbol sequence, and not based on a Viterbi metric as in D2.

The technical effect of this distinguishing feature is that the channel quality indicator is an easily implementable measurement of the overall channel quality, not just of one factor such as the SIR.

The objective technical problem can thus be formulated as how to calculate an alternative, reliable channel quality indicator.

In the board's view, the skilled person would be aware of document D1 and would obviously consider combining documents D1 and D2 and implementing the channel quality measurement disclosed in D1 in the adaptive system of D2.

Therefore the board judges that the subject-matter of claim 1 does not involve an inventive step (Article 56 EPC), having regard to the disclosure of D2 in combination with D1.

3.3 Independent claims 4 and 17 correspond to claim 1 in terms of a method claim and a computer program claim, respectively, with the feedback feature omitted. Thus, they too do not meet the requirements of Article 56 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

K. Götz-Wein A. Ritzka

Decision electronically authenticated