Datasheet for the decision
of 29 September 2006

Case Number: T 1507/05 - 3.5.03
Application Number: 97301656.1
Publication Number: 0797327
IPC: H04L 1/18
Language of the proceedings: EN

Title of invention:
Adaptive hybrid-ARQ coding schemes for slow fading channels in mobile radio systems

Applicant:
LUACENT TECHNOLOGIES INC.

Opponent:
-

Headword:
Adaptive hybrid-ARQ coding schemes/LUCENT

Relevant legal provisions:
EPC Art. 123(2), 113(1)
EPC R. 71(2)

Keyword:
"Amendments - added subject-matter (yes)
"Oral proceedings held in absence of appellant"

Decisions cited:
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Catchword:
-
Case Number: T 1507/05 - 3.5.03

DE C I S I O N
of the Technical Board of Appeal 3.5.03
of 29 September 2006

Appellant: LUCENT TECHNOLOGIES INC.
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Decision under appeal: Decision of the examining division of the
European Patent Office posted 8 August 2005
refusing European application No. 97301656.1
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: A. S. Clelland
Members: F. van der Voort
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. 97 301 656.1 (publication number EP 0 797 327 A) on the grounds of added subject-matter, Article 123(2) EPC, and lack of inventive step, Article 56 EPC.

II. With the statement of grounds of appeal the appellant filed an amended set of claims and submitted arguments in support of the appeal.

III. In a communication accompanying a summons to oral proceedings the board gave a preliminary opinion in which objections under Article 123(2) EPC in respect of claim 1 were raised. Further, if certain amendments which would overcome these objections were assumed, the subject-matter of the claim appeared to lack an inventive step particularly having regard to the disclosure of the following documents cited in the impugned decision:

D1 = "Adaptive Error Control For Slowly Varying Channels", M. Rice et al, IEEE Transactions on Communications 42, No. 2/3/4, February/March/April 1994, pages 917 to 926; and

IV. In response to the board's communication, the appellant submitted arguments and at least implicitly requested that the impugned decision be set aside and a patent be granted on the basis of the set of claims as filed with the statement of grounds of appeal. Further, the appellant informed the board that it would not attend the oral proceedings and requested that they be cancelled and that the procedure be continued in writing.

V. In a subsequent communication the board informed the appellant that the request to cancel the oral proceedings and to continue the procedure in writing could not be granted and that the date fixed for the oral proceedings was maintained. Reasons were given.

VI. Oral proceedings were held on 29 September 2006 in the absence of the appellant. After deliberation, the board's decision was announced at the end of the oral proceedings.

VII. Claim 1 reads as follows:

"1. A method of transmitting a signal to a receiver across a wireless communications channel, the method comprising the steps of:
   encoding a first portion of the signal with a first code to generate a first encoded signal portion;
   transmitting the first encoded signal portion across the channel to the receiver;
   receiving acknowledgement data from the receiver, said acknowledgement data comprising information representative of whether the transmitted signal
portion was received by the receiver without error including information representative of a number of errors detected by the receiver when the transmitted signal portion was not received by the receiver without error;

determining a second code based on the received acknowledgement data including said information representative of a number of errors detected by the receiver;

encoding a second portion of the signal with the second code to generate a second encoded signal portion; and

transmitting the second encoded signal portion across the channel to the receiver,

wherein at least one of the first and second codes comprises a combination of a convolutional code (43, 48) and an error correcting code (41, 47)."

Reasons for the Decision

1. **Procedural matters**

1.1 The board considered it to be expedient to hold oral proceedings for reasons of procedural economy (Article 116(1) EPC). Since the appellant did not give any reasons in support of its request to cancel the scheduled oral proceedings and the board did not see any reason for cancelling them, the request to cancel the oral proceedings and, consequently, the request to continue in writing were refused and the oral proceedings were held in the absence of the appellant pursuant to Rule 71(2) EPC.
1.2 The board is satisfied that the present decision complies with the requirements of Article 113(1) EPC, since in the communication accompanying the summons to oral proceedings the objection under Article 123(2) EPC as discussed below in respect of present claim 1 was already raised, so that the appellant had an opportunity to present comments on it.

2. Article 123(2) EPC

2.1 Claim 1 does not meet the requirements of Article 123(2) EPC for the following reasons:

2.2 The claim includes the step of "receiving acknowledgement data from the receiver, said acknowledgement data comprising information representative of whether the transmitted signal portion was received by the receiver without error including information representative of the number of errors detected by the receiver when the transmitted signal portion was not received by the receiver without error" (underlining by the board).

2.3 Claim 1 as originally filed provides a basis for the first part of this feature, i.e. "receiving acknowledgement data from the receiver, said acknowledgement data comprising information representative of whether the transmitted signal portion was received by the receiver without error". This information is in the context of the present application to be understood as a generalisation of the acknowledgement (ACK) and negative acknowledgement (NACK) signals as are sent in an automatic repeat request (ARQ) system, see for example col. 1, lines 52
to 58, of the application as published: "In a system that uses ARQ, the receiver returns (i.e., transmits back to the transmitter) an acknowledgement which indicates whether the given transmitted packet was received free of errors (in which case an acknowledgement signal, or "ACK" is sent), or whether it was received erroneously (in which case a negative acknowledgement signal, or "NACK" is sent)". This information will hereinafter be referred to as the ARQ information.

2.4 The appellant essentially argued that the second part of the above feature was based on claim 10 of the set of claims as was decided on by the examining division. This claim 10 is identical to claim 10 as originally filed and reads as follows (underlining by the board):

"10. The method of claim 1 wherein the acknowledgement data received from the receiver further comprises information representative of a number of errors detected by the receiver when the transmitted signal portion was not received by the receiver without error, and wherein the step of determining the second code is based on said number of errors detected by the receiver."

2.5 In the board's view, claim 10 was thereby restricted to embodiments in which the acknowledgement data comprised, in addition to the above-mentioned ARQ information, information representative of the number of errors detected by the receiver. This is also in line with all of the embodiments described in the description as originally filed in which use is made of the information representative of the number of errors
detected by the receiver, i.e. each of the second to
fourth embodiments. More specifically, with respect to
the second embodiment, it is explicitly stated at
col. 7, line 57, to col. 8, line 2, of the application
as published that "In accordance with this second
illustrative embodiment, the receiver not only sends
back ACK signals and NACK signals, but also sends the
number of byte errors that occurred in the most
recently received packet". The third embodiment is said
to differ from the second embodiment only in the type
of the code used (see col. 8, line 57, to col. 9,
line 7) and, consequently, also makes use of the ARQ
information. Further, with respect to the fourth
embodiment, Fig. 7, which shows a transmitter state
flow graph of this embodiment, illustrates that both
the ARQ information ("ACK", "NACK") and the number of
errors ("n") are used for the selection of the
appropriate code. The general statement at the end of
the description (col. 9, lines 45 to 57) does not
suggest otherwise either, since it does not refer to
the number of errors but merely discusses various ARQ
protocols.

2.6 However, present claim 1 does not require that the ARQ
information is sent in addition to the information
representative of the number of errors. The claim
thereby covers an embodiment in which the
acknowledgement data no longer includes the ACK/NACK
signals but only the number of errors detected by the
receiver, in which, for example, a number of errors
equal to zero is interpreted as an acknowledgement that
the transmitted signal portion was received by the
receiver without error. As follows from the above, the
application as originally filed does not however provide a basis for such an embodiment.

2.7 The board further notes that according to claim 10 as originally filed the step of determining the second code is based on the number of errors detected by the receiver, whereas according to present claim 1 the step of determining the second code is based on the received acknowledgement data including the information representative of the number of errors detected by the receiver.

2.8 The appellant argued that the determination of the second code based on acknowledgement data that includes the number of errors detected by the receiver is supported by the passages at page 4, lines 2 to 7, and page 9, line 10, to page 10, line 31, of the application as originally filed (see the application as published, col. 3, lines 24 to 33, and col. 7, line 33, to col. 8, line 53).

2.9 However, the first passage referred to by the appellant includes the following sentence:

"If the acknowledgement indicates a large number of errors at the receiver, the code rate of the FEC may be advantageously reduced in response thereto."

(col. 3, lines 30 to 33);

and the second passage referred to by the appellant includes the following sentences:

"Specifically, the transmitter begins in state 59, sending data using the RS(40,36) code. Upon receiving
an indication that \( n > 0 \), the transmitter transitions to state 60 where it uses a punctured convolutional code with RS(29,27) in the next packet." (col. 8, lines 22 to 26),

in which "\( n \)" is the number of errors that are fed back from the receiver (see col. 8, lines 16 to 18).

From these sentences, it follows that in the embodiments described in these passages the second code is also determined on the basis of the number of errors detected by the receiver.

However, present claim 1 merely requires that the step of determining the second code is based on the acknowledgement data, i.e. not necessarily based on the information representative of the number of errors included in this acknowledgement data. Consequently, the claim covers a method in which the second code is not based on the information representative of the number of errors included in the acknowledgement data.

2.10 The board therefore concludes that the subject-matter of claim 1 cannot be directly and unambiguously derived from the application as filed. The claim thus contains subject-matter which extends beyond the content of the application as filed and, hence, contravenes Article 123(2) EPC.

3. The appellant's sole request for the grant of a patent is therefore not allowable.
4. In view of the foregoing, it is not necessary to consider the further objection of lack of inventive step as set out in the communication accompanying the summons to oral proceedings.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

D. Magliano A. S. Clelland