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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:
LUCENT 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:
-

Catchword:
-

Case Number: T 1507/05 - 3.5.03

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

Appellant:	LUCENT TECHNOLOGIES INC. 600 Mountain Avenue Murray Hill, NJ 07974-0636 (US)
Representative:	Sarup, David Alexander Lucent Technologies EUR-IP UK Ltd Unit 18, Core 3 Workzone Innova Business Park Electric Avenue Enfield, EN3 7XU (GB)
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

        D4 =   "Performance of Type II Hybrid ARQ Systems
                using Concatenated Convolutional and Reed-
                Solomon Codes", C. F. Bradshaw et al,
                Proceedings of the Tactical Communications
                Conference 24 - 26 April 1990, Vol. 1, IEEE
                1990, pages 499 to 514.

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 <u>including information</u> 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 <u>further comprises</u> 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 <u>is based on said number of errors</u> detected by the receiver."

2.5 In the board's view, claim 10 was thereby restricted to embodiments in which the acknowledgement data comprised, <u>in addition to</u> 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

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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 <u>based on the number of errors</u> detected by the receiver, whereas according to present claim 1 the step of determining the second code is <u>based on the received acknowledgement data including the information representative of the number of errors</u> 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 <u>basis of the number of errors</u>
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
<u>not</u> 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

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