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Datasheet for the decision
of 12 April 2010

Case Number: T 0684/06 - 3.5.02

Application Number: 99308371.6

Publication Number: 0998047

IPC: H03M 13/39

Language of the proceedings: EN

Title of invention:
Reduced-state device and method for decoding data

Applicant:
LUCENT TECHNOLOGIES INC.

Headword:
-

Relevant legal provisions:
EPC Art. 83

Relevant legal provisions (EPC 1973):
-

Keyword:
"Insufficiency of disclosure - (yes)"

Decisions cited:
-

Catchword:
-

Case Number: T 0684/06 **-** 3.5.02

D E C I S I O N
of the Technical Board of Appeal 3.5.02
of 12 April 2010

Appellant:	LUCENT TECHNOLOGIES, INC. 600 Mountain Avenue Murray Hill NJ 07974-0636 (US)
Representative:	Sarup, David Alexander Alcatel-Lucent Telecom Limited 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 28 September 2005 refusing European application No. 99308371.6 pursuant to Article 97(1) EPC 1973.**

Composition of the Board:

Chairman: M. Ruggiu
Members: J.-M. Cannard
         H. Preglau

C3285.D

Summary of Facts and Submissions

I.   The appellant contests the decision of the examining
      division of 28 September 2005 to refuse European patent
      application No. 99 308 371.6. The reason for the refusal
      was that the application did not meet the requirements
      of Article 84 EPC.

II.   In a communication dated 23 January 2009, the Board
      observed, *inter alia*, that the application did not
      appear to disclose the invention in a manner
      sufficiently clear and complete for it to be carried out
      by a person skilled in the art, in particular because it
      did not give any indication regarding the data that were
      to be stored initially in an array 90 or regarding the
      selection of the non-selected states that should have a
      PQV ("predetermined quantized value") stored under the
      corresponding index in the array 90 (point 2.2 of the
      communication).

III. With a letter dated 27 May 2009, the appellant filed
      sets of claims according to amended main and first
      auxiliary requests and a second auxiliary request and
      replacement pages 10 and 12 of the description. Oral
      proceedings before the Board were not requested.

IV.   It can be understood from the written submissions of the
      appellant that he requests that the decision under
      appeal be set aside and that a patent be granted on the
      basis of claims 1 to 14 of the main request filed with
      the letter dated 27 May 2009, description pages 1 to 9,
      11, 13 to 17 as originally filed and description pages
      10 and 12 filed with the letter dated 27 May 2009, and
      sheets 1/6 to 6/6 of the drawings as originally filed,

subsidiarily on the basis of claims 1 to 14 of the first auxiliary request, or claims 1 to 14 of the second auxiliary request, both filed with the letter dated 27 May 2009.

V.   Claim 1 of the present main request reads as follows:

"A method for decoding encoded data (CC0, CC1), comprising the steps of:

sequentially counting all possible states of a shift register;

calculating, for each current state of the shift register, a pair of two possible previous states (PS1, PS2) of the shift register, one of the two possible previous states being a state of the shift register immediately preceding the current state of the shift register;

selecting one of the two possible previous states and a predetermined value (PQV) based on a control signal (ENA, DIS); wherein

for each selected pair of possible previous states, the method includes,

generating a pair of theoretical coefficients (TC0, TC1) corresponding to the pair of possible previous states,

generating conditional probability of each pair of theoretical coefficients for the encoded data,

adding a pair of values derived from the conditional
probabilities with a corresponding value (ACP) to
generate updated accumulated values for the current
state,

comparing the accumulated values for the current state
to identify a winning accumulated value and associated
winning previous state among the pair of possible, and

outputting one of the winning accumulated value and the
predetermined value, along with the associated winning
previous states for the current state; and

decoding the encoded data based on the stored previous
states."

VI.   Claim 1 of the first auxiliary request reads as follows:

"A method for decoding encoded data (CC0, CC1),
comprising the steps of:

sequentially counting all possible states of a shift
register;

calculating, for each current state of the shift
register, a pair of two possible previous states (PS1,
PS2) of the shift register, one of the two possible
previous states being a state of the shift register
immediately preceding the current state of the shift
register;

selecting one of the two possible previous states and a
predetermined quantized value (PQV) based on a control
signal (ENA, DIS); wherein

for each selected pair of possible previous states, the method includes,

generating a pair of theoretical coefficients (TC0, TC1) corresponding to the pair of possible previous states,

generating conditional probability of each pair of theoretical coefficients for the encoded data,

quantizing the conditional probabilities to generate a pair of quantized values,

adding each of the quantized values with a corresponding quantized value (ACP) to generate updated accumulated quantized values for the current state,

comparing the accumulated quantized values for the current state to identify a winning accumulated quantized value and associated winning previous state among the pair of possible previous states, and

outputting one of the winning accumulated quantized value and the predetermined quantized value, along with the associated winning previous states for the current state;

and decoding the encoded data based on the stored previous states."

VII. Claim 1 of the second auxiliary request comprises all features of claim 1 of the first auxiliary request, except the feature:

"comparing the accumulated quantized values for the
current state to identify a winning accumulated
quantized value and associated winning previous state
among the pair of possible previous states, and", which
now reads:

"comparing the accumulated quantized values for the
current state to identify a winning accumulated
quantized value and associated winning previous state
among the pair of possible (*sic*), and",

and the last feature of the claim "and decoding the
encoding data based on the stored previous states",
which now is replaced by the additional features:

"storing the winning accumulated quantized values and
associated winning previous states for each of the
possible states;

generating a threshold value (h) based on a user input
and one of the winning accumulated quantized value and
the predetermined quantized value;

comparing the threshold value to one of the winning
accumulated quantized value and the predetermined
quantized value; wherein

if the winning accumulated quantized value is greater
than the threshold, the method includes,

storing the associated winning previous state,

decoding the encoded data based on the stored associated
winning previous states."

VIII. As regards the objection of insufficiency of disclosure
     raised in point 2.2 of the communication of the Board,
     the appellant's arguments can be summarized as follows:

     According to the example embodiment, the process of
     storing in the data array 92 of array 90 took place
     until all 256 possible states (ACPs and PQVs) were
     stored in data area 92 (e.g., <u>starting at state 1 and
     ending at state 256</u>). The disclosure made clear that the
     PQVs were "<u>predetermined</u> quantized values". It was
     unnecessary to specify <u>how</u> the PQVs were predetermined
     since it was "neither necessary nor desirable that
     details of <u>well-known ancillary features</u> should be
     given" (EPO Guidelines C.II.4.9.). At least one
     essential feature was manipulation of the PQVs, not how
     to predetermine values.

Reasons for the Decision

1.   The appeal is admissible.

2.   The application does not disclose the invention in a
      manner sufficiently clear and complete for it to be
      carried out by a person skilled in the art (Article 83
      EPC).

2.1   According to page 12, lines 6 to 11, of the description
      as filed, "the memory unit 60A includes other circuits
      for outputting the enable and disable signals ENS and
      DIS to the state selector 46 based on the data stored
      in the array 90. <u>If the PQV is stored in the data area
      92 corresponding to the index number matching the</u>

current state count, then the disable signal DIS is
output to the state selector 46. Otherwise, the memory
unit 60A outputs the enable signal ENS to the state
selector 46" (emphasis added). Page 12, lines 20 to 23,
states: "If the maximum selector 58 receives the PQVs
prestored in the memories 75A and 75B of the state
selector 46 for the current state count, the maximum
selector 58 updates the ACP/PQV currently stored under
index 5 with the PQV" (emphasis added). The index 5
corresponds to the current state count (state 5) as
appears from page 12, line 12. Thus, the originally
filed description indicates that, if a PQV is stored in
the array 90 of the first memory unit 60A under the
index matching the current state count, then the same
PQV is stored again under the same index. This implies
that the states for which a PQV is stored in the array
90 are predetermined and are not changed by the decoder
(see also page 1, lines 2 to 5 and page 6, lines 3 to 9
of the description as filed). However, the original
application does not seem to give any indication
regarding the data that are to be stored initially in
the array 90 or regarding the selection of the non-
selected states that should have a PQV stored under the
corresponding index in the array 90.

2.2   Initially storing data in the array 90, and selecting
        the non-selected states appear, however, to be
        essential steps of the invention, particularly because
        the "present invention is directed to a reduced-state
        device and method for decoding data that uses less
        memory for storing winning previous states (PSs)
        associated with accumulated conditional probabilities
        (ACPs) because less ACPs are generated. The reduced-
        state device and method select only certain current

states from all possible states of an encoder for each
encoded data based on a control signal, and generate
ACPs for the selected current states" (see page 6,
lines 3 to 8 of the application as filed, emphasis
added). Moreover, such essential steps are comprised in
the only embodiment disclosed in the description as
filed and the method set out in the original claims.

2.3   The method according to claim 1 of the present main
        request and first and second auxiliary requests
        comprises steps of:

        - sequentially counting all possible states of a shift
        register,

        - calculating, for each current state of the shift
        register, a pair of two possible previous states,

        - selecting one of the two possible previous states and
        a predetermined quantized value (PQV) based on a control
        signal (ENA, DIS),

        - and further steps for each selected pair of possible
        previous states.

        Therefore, in order to carry out the method according to
        claim 1 of any of the present requests, it is necessary
        to determine which data are initially stored in the
        array 90 so as to determine the non-selected states.

        The appellant submits that it is neither necessary nor
        desirable to give details of well-known ancillary
        features. However, the appellant does not give any
        information or evidence about which features should be

well-known. The determination of the non-selected states is consistently presented in the application as an essential feature of the invention.

2.4   The application does not include any indication of the data initially stored in the array 90 or of how the non-selected states should be determined and thereby fails to disclose the claimed invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. Accordingly, the application contravenes Article 83 EPC.

3.   Since the application does not meet the requirements of the EPC, the appeal has to be dismissed.

Order

For these reasons it is decided that :

The appeal is dismissed.

The Registrar: The Chairman:

U. Bultmann   M. Ruggiu