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**Datasheet for the decision  
of 16 September 2009**

**Case Number:** T 1615/06 - 3.5.02

**Application Number:** 97204146.1

**Publication Number:** 0929150

**IPC:** H03G 3/20

**Language of the proceedings:** EN

**Title of invention:**

A method of and a circuit for automatic gain control (AGC)

**Applicant:**

TELEFONAKTIEBOLAGET LM ERICSSON (publ)

**Headword:**

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**Relevant legal provisions:**

EPC Art. 83

**Relevant legal provisions (EPC 1973):**

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**Keyword:**

"Main and first to third auxiliary requests - insufficiency of disclosure (yes)"

**Decisions cited:**

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**Catchword:**

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Case Number: T 1615/06 - 3.5.02

**D E C I S I O N**  
of the Technical Board of Appeal 3.5.02  
of 16 September 2009

**Appellant:** TELEFONAKTIEBOLAGET LM ERICSSON (publ)  
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**Representative:** Dohmen, Johannes Maria Gerardus  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 4 May 2006  
refusing European patent application  
No. 97204146.1 pursuant to  
Article 97(1) EPC 1973.

**Composition of the Board:**

**Chairman:** M. Ruggiu  
**Members:** J.-M. Cannard  
E. Lachacinski

## Summary of Facts and Submissions

- I. The appellant contests the decision of the examining division to refuse European patent application No. 97 204 146.1. The reason for the refusal was that the subject-matter of claims 1 and 7 of the main, first and second auxiliary requests then on file did not involve an inventive step in the sense of Article 56 EPC.
- II. With the notice of appeal dated 4 July 2006, the main and first and second auxiliary requests refused by the examining division were maintained on appeal.
- III. With a communication dated 12 May 2009 annexed to summons to oral proceedings, the Board informed the applicant that the application refused by the examining division seemed, *inter alia*, to contravene Article 83 EPC because it did not clearly and completely disclose at least one way enabling the skilled person to carry out the invention claimed in the main and auxiliary requests on file. Moreover, the applicant was told that he was free to file a witness report concerning the AGC circuit of document D1 (US-A-3 310 745), if he so wished. The appellant responded with a letter faxed on 5 August 2009 which contained a third auxiliary request.
- IV. As announced in a letter faxed on 2 September 2009, the appellant did not attend the oral proceedings before the Board held on 16 September 2009. The appellant requested in writing 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 letter of 15 January 2003, subsidiarily, claims 1 to 14 of the

first auxiliary request filed with letter of 22 February 2006, or claims 1 to 14 of the second auxiliary request received in the oral proceedings on 15 March 2006, or claims 1 to 13 of the third auxiliary request filed with letter of 5 August 2009.

V. Independent claims 1 and 7 of the main request read as follows:

Claim 1:

"Method of controlling an Automatic Gain Control (AGC) circuit by decreasing its gain if its output signal is above a set first signal level, such that said output signal is at a set second signal level below said first signal level after a first time period, and by increasing its gain if its output signal is below a set third signal level, such that said output signal is at a set fourth signal level above said third signal level after a second time period, characterized in that said output signal is a phase or frequency modulated signal and said first time period is longer than said second time period."

Claim 7:

"Receiver circuit comprising an Automatic Gain Control (AGC) circuit, which AGC comprises a Gain Controllable Amplifier (GCA) having input, output and gain control terminals, and a Gain Control Circuit (GCC) having input and output terminals, wherein an input terminal of said GCC operatively connects to either one of said input and output terminals of said GCA and an output terminal of said GCC operatively connects to said gain control

terminal of said GCA for controlling the gain of said GCA in response to an input signal level at said input terminal of said GCC, such that if an output signal level of said AGC is above a set first signal level the gain of said GCA is decreased such that said output signal is at a set second signal level below said first signal level after a first time period, and wherein if said output signal of said AGC is below a set third signal level the gain of said GCA is increased such that said output signal is at a fourth signal level above said third signal level after a second time period, characterized in that said receiver circuit is arranged for receiving and processing phase or frequency modulated signals, and said GCC is arranged such that said first time period is longer than said second time period."

- VI. Independent claims 1 and 7 of the first auxiliary request differ from independent claims 1 and 7 of the main request only in that the last feature of said claims now reads "said first time period is essentially longer than said second time period".
  
- VII. Independent claims 1 and 7 of the second auxiliary request differ from independent claims 1 and 7 of the main request essentially in that they incorporate the following additional feature: ", wherein said time periods are set for further processing of said output signal."
  
- VIII. Claim 1 of the third auxiliary request filed with the letter faxed on 5 August 2009 comprises all the features of claim 1 of the main request except for the phrase "said output signal is a phase or frequency modulated

signal and" which has been deleted. Claim 7 of the third auxiliary request relates to a receiver circuit having receiver means comprising an Automatic Gain Control (AGC) circuit which comprises all the features of the Automatic Gain Control (AGC) circuit of claim 7 of the main request except for the phrase "said receiver circuit is arranged for receiving and processing phase or frequency modulated signals, and" which has been deleted.

- IX. The written applicant's arguments filed in response to the objection of insufficiency of disclosure raised by the Board can be summarized as follows.

The Guidelines for examination in the EPO essentially distinguished two cases in which there was a fundamental insufficiency of disclosure: a first instance in which the successful performance of the invention was dependent on chance and a second instance where successful performance of the invention was inherently impossible because it would be contrary to well-established physical laws. None of these instances applied to the present application.

Automatic Gain Control (AGC) circuits were well-known to the skilled person and figure 5 of the application as filed provided a detailed circuit diagram of a conventional AGC circuit, namely with a fast attack-time and a slow decay-time, comprising RC circuits and a gating diode. Document D1 and page 199 of the document "LEERBOEK voor de ZENDAMATEUR" (published by VERON in the Netherlands, second edition 1983) considered during examination both showed AGC circuits comprising RC circuits and gating diodes. The skilled person facing

the task to implement an AGC circuit according to the invention would consider using prior art RC circuits and gating diodes. Selecting suitable values of the resistors and capacitors for providing a slow attack-time and a fast decay-time were obvious measures for the skilled person using only very basic common general knowledge in the field of electrical components and circuits.

Furthermore, document D2 (FR-A-2 699 768) that was cited as closest prior art in the communication accompanying the summons to oral proceedings did not show any detailed circuit diagram. However, the Board apparently was able to understand the content of D2.

The block circuit diagrams shown in figures 3 and 4 as well as the related parts of the description of the present application were sufficiently clear and complete to enable the skilled person to put the invention into practice, in accordance with Article 83 EPC.

## **Reasons for the Decision**

1. The appeal is admissible.

### *Main request*

2. The pre-characterising part of independent claims 1 and 7 of the main request identifies a first time period during which the gain of a Gain Controllable Amplifier (GCA) is decreased if its output signal is above a set first signal level, such that said output signal is at a set second signal level below said first

signal level after said first time period, and a second time period during which the gain of the amplifier is increased if its output signal is below a set third signal level, such that said output signal is at a set fourth signal level above said third signal level after said second time period. The characterising part of claims 1 and 7 specifies, *inter alia*, that "said first time period is longer than said second time period". However, the application as originally filed does not contain any example of method steps for controlling the gain of the GCA amplifier, or any example of a Gain Control Circuit (GCC), which would explain, for instance with reference to flow or block diagrams, or schematic circuits, how the first time period is to be made longer than the second time period. More specifically:

- 2.1 The summary of the invention given in the description (see paragraphs [0013] and [0019] of the published specification EP 0 929 150 A1) discloses the method and AGC circuit of the invention in the same terms as claims 1 and 7, respectively. Figures 1 to 2c merely show signals defining a dynamic range of an AGC circuit, an input signal of an AGC circuit, as well as output signals of a conventional AGC circuit and an AGC circuit according to the invention. Figures 3 and 4 show schematic block diagrams which comprise a gain control circuit (GCC) 22 according to the invention. In figures 3 and 4, feed-forward and feed-back AGC circuits have conventional structures and the figures give no detail of blocks 22 which, according to the description (see the published application, paragraphs [0043] and [0044]), are arranged such that the attack-time is longer than the decay-time. Figure 5 shows a prior art amplitude detector. However, it



results from the expressions for the values of the attack-time and decay time given in the description (see published application, paragraphs [0045] and [0046]) that this prior art circuit provides an attack-time which is necessarily shorter than the decay-time and, thus, would not be able to provide a first time period longer than a second time period in the sense of the invention. More specifically, the skilled person would understand from the given values that the attack-time equals the product of the decay time and a factor  $R_s/R_s+R_p < 1$ . Figure 6 is a mere block diagram of a radio receiver which does not show a detailed arrangement of the AGC circuit.

2.2 The circuit shown on page 199 of the "LEERBOEK voor de ZENDAMATEUR" also concerns a fast attack/slow decay AGC circuit. As regards D2, although no detailed circuit is shown in the figures of that document, D2 contains a detailed description of the method and device that automatically control the gain of the receiver (see in particular page 4, line 28 to page 7, line 8, and claims 1 and 5 of D2). In any case, the question is not whether the Board understands the content of D2 or of the present application, but whether the present application discloses the claimed subject-matter in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

2.3 Therefore, the application fails to explain how the first time period can be made longer than the second one whatever the set signal levels and the increasing and decreasing rates of the input signal may be, as recited in claims 1 and 7 of the main request; how the second period of time can be set below three to five times a

signal period of the output signal and how the first time period can be set equal to or above five times the signal period of the output signal, as specified in particular in claims 2, 3, 8 and 9 of the main request. In conclusion, in respect of the first and second time periods, i.e. the attack-time and decay-time, the application merely specifies an object to be achieved by the invention. Merely specifying such a result to be achieved does not allow the skilled person to carry out the invention without undue burden. Accordingly, the application according to the main request contravenes Article 83 EPC because it does not clearly and completely disclose at least one way enabling the skilled person to carry out the claimed invention.

*Auxiliary requests*

3. The independent claims of the first auxiliary request have been amended to further specify that the first time period is essentially longer than the second time period.

The independent claims 1 and 7 of the second auxiliary request have been amended to incorporate the feature according to which "said time periods are set for further processing of said output signal".

The independent claims 1 and 7 of the third auxiliary request have been amended in substance by deleting the feature "said output signal is a phase or frequency modulated signal", or "said receiver circuit is arranged for receiving and processing phase or frequency modulated signals, and", respectively.

4. Therefore, the independent claims of the first, second and third auxiliary requests still include the feature of the main request that the first time period is longer than the second time period. Hence, the application as amended in the first, second and third auxiliary requests still contravenes Article 83 EPC because it does not clearly and completely disclose at least one way enabling the skilled person to carry out the invention.
  
5. In response to the communication annexed to summons to oral proceeding, no witness report concerning the AGC circuit of document D1 has been filed by the applicant.
  
6. Since the application according to the main and auxiliary requests on file does not meet the requirement of Article 83 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