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**Datasheet for the decision
of 17 August 2011**

Case Number: T 0781/08 - 3.5.03

Application Number: 98914756.6

Publication Number: 0976303

IPC: H04R 25/00

Language of the proceedings: EN

Title of invention:

Method and apparatus for noise reduction, particularly in hearing aids

Applicant:

Emma Mixed Signal C.V.

Opponent:

Oticon A/S

Headword:

Noise reduction in hearing aids/Emma Mixed Signal

Relevant legal provisions:

EPC Art. 56, 111(1), 113(1)

Relevant legal provisions (EPC 1973):

-

Keyword:

"Inventive step (main request) - yes"

"Remittal to first instance - no"

"Substantial procedural violation - no"

Decisions cited:

T 0774/97, T 0849/03



Case Number: T 0781/08 - 3.5.03

D E C I S I O N
of the Technical Board of Appeal 3.5.03
of 17 August 2011

Appellant: Oticon A/S
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 15 February 2008
rejecting the opposition filed against European
patent No. 0976303 pursuant to Article 101(2)
EPC.

Composition of the Board:

Chairman: A. S. Clelland
Members: A. J. Madenach
M.-B. Tardo-Dino

Summary of Facts and Submissions

I. The present appeal arises from the decision of the opposition division posted on 15 February 2008 rejecting the opposition against European Patent No. 976 303.

The opposition was based on the grounds of Article 100(a) EPC and cited *inter alia* document

D1: US 4 628 529 A

The opposition division came to the conclusion that the subject-matter of claim 1 of the patent was both novel and inventive and that, for this reason, the opposition should be rejected.

II. An appeal was filed against this decision by the opponent (appellant) with letter received on 16 April 2008. The appropriate fee was paid and a statement of grounds filed. *Inter alia* document

D4: US 5 133 013 A

was filed together with the statement of grounds. It was requested that the appealed decision be set aside and that the patent be revoked in full. It was further requested that the appeal fee be refunded and the case be remitted to the first instance. Oral proceedings were requested as an auxiliary measure.

III. The patentee (respondent) in a response to the statement of grounds, requested that the patent be maintained as granted or as an auxiliary measure be

maintained on the basis of the claims of one of the auxiliary requests 1-13 as filed with the response. With respect to document D4, the respondent requested that it not be admitted into the procedure.

Oral proceedings were requested as an auxiliary measure.

IV. With letter of 14 February 2011, the board summoned the parties to oral proceedings and gave its preliminary opinion on the matters to be discussed.

V. With letter of 21 April 2011, the respondent confirmed its main request to dismiss the appeal and maintain the patent as granted, and filed 15 revised auxiliary requests.

VI. With letter of 27 April 2011, the appellant submitted further documents

D8: WO 94/18666 A and

D9: US 5 012 519 A

and requested that the documents be introduced into the proceedings.

VII. With letter of 6 May 2011, the respondent requested that these documents not be allowed into the proceedings. With letter of 17 May 2011, the respondent submitted a further auxiliary request 8A to be considered after auxiliary request 8.

VIII. Oral proceedings took place on 17 August 2011. The appellant requested that the decision under appeal be

set aside and that the patent be revoked. The requests for the reimbursement of the appeal fee and the remittal of the case to the first instance for further prosecution were maintained. The respondent requested that the appeal be dismissed, or alternatively that the patent be maintained on the basis of one of auxiliary requests 1-8; 9-15 as filed with the letter of 21 April 2011 or auxiliary request 8A as filed with the letter of 17 May 2011.

At the end of the oral proceedings, the chairman announced the board's decision.

IX. Claim 1 of the main request, which is identical to claim 1 as granted, reads as follows (the board reproduces the feature numbering as used by the appellant):

"A method of reducing noise in an input signal (10), said input signal (10) containing speech and having a signal to noise ratio, the method comprising the steps:

(1) detecting the presence and absence of speech;

(2) in the absence of speech, determining a noise magnitude spectral estimate ($|\hat{N}(f)|$);

(3) in the presence of speech, comparing the magnitude spectrum of the input signal ($|X(f)|$) to the noise magnitude spectral estimate ($|\hat{N}(f)|$);

characterized in that the method further comprises the steps of:

(4) calculating an attenuation function ($H(f)$) from the magnitude spectrum of the input signal ($|X(f)|$) and the noise magnitude spectral estimate ($|\widehat{N}(f)|$),

(5) the attenuation function ($H(f)$) being dependent on the signal to noise ratio; and

(6) modifying the input signal (10) by the attenuation function ($H(f)$), to generate a noise reduced signal (12, 14)

(7) wherein there is no substantial modification to the input signal (10) for very low and for very high signal to noise ratios."

In view of this decision it is not necessary to reproduce the claims of the auxiliary requests.

Reasons for the decision:

1. *Novelty and inventive step, claim 1 of the patent (main request):*

1.1 The patent in suit relates to a method of reducing noise in an input signal containing speech and finds application in hearing aids. An attenuation function is calculated from the magnitude spectrum of the input signal in the presence and in the absence of speech and is used to modify the input signal. No substantial modification is performed for input signals with very low and very high signal to noise ratios.

- 1.2 The appellant based the appeal essentially on the teaching of D1. According to the appellant, D1 shows all of the features 1-6.

For this decision it is not necessary to decide whether this is actually the case because the central issue in the present case is the question of whether feature 7 is known from the prior art. Feature 7 comprises two parts, *i.e.* feature 7a "there is no substantial modification to the input signal for very high signal-to-noise ratios" and feature 7b "there is no substantial modification to the input signal for very low signal-to-noise ratios".

Feature 7a is not known from D1. This finding was not contested by the appellant. For this decision it can be left undecided whether feature 7a was obvious on the basis of the skilled person's common general knowledge or on the basis of D1 or any of the further documents referred to by the appellant during the procedure because, as will be shown below, feature 7b is not known from D1 nor rendered obvious by any of the cited prior art documents or by the skilled person's common general knowledge.

- 1.3 With regard to feature 7b, the appellant in the statement of grounds refers to column 6, lines 1-5 of D1 according to which "One method of selecting gain values is to compare the SNR estimate with a pre-selected threshold, and to provide for unity gain when the SNR estimate is below the threshold, while providing an increased gain above the threshold." It was argued that if the signal-to-noise ratio is below a threshold, no modification of the signal occurs because

unity gain is applied. According to the appellant, this would correspond to feature 7b.

It is indeed correct that below a threshold the signal remains unmodified. However, the context of this passage of D1 makes clear that according to this embodiment of D1 a signal to be processed is modified by an amplification function and not by an attenuation function as in the contested patent. When comparing feature 7b with the teaching of D1, it is therefore necessary to consider the signal strength of the modified signal for very low signal-to-noise ratios relative to the signal strength for higher signal-to-noise ratios. Assuming a non-negative attenuation function (see e.g. column 6, lines 42-44 of the contested patent), feature 7b implies that the signal strength of the modified signal is **higher** at very low signal-to-noise ratios than at higher signal-to-noise ratios. According to D1 on the other hand, the application of a unity gain at very low signal-to-noise ratios (below a pre-selected threshold) as compared to a higher gain elsewhere results in the signal strength of the modified signal being **lower** at very low signal-to-noise ratios than at higher signal-to-noise ratios, contrary to the requirements of claim 1.

- 1.4 The above understanding of D1 in relation to the signal strength of the modified signal for very low signal-to-noise ratios relative to the signal strength for higher signal-to-noise ratios is further underpinned by the embodiment discussed at lines 9-28 of column 6 of D1 which relate to a third approach based on channel gain values from a channel gain table. According to this approach, a large SNR estimate results in a channel

gain value approaching unity and a low SNR estimate results in the channel gain approaching zero.

Again, the result is that the signal strength of the modified signal is **lower** at very low signal-to-noise ratios than at higher signal-to-noise ratios, contrary to the requirements of claim 1.

For these reasons, D1 does not disclose feature 7b. In fact, the passage quoted by the appellant in support of its arguments points away from the claimed invention.

- 1.5 The problem to be solved by feature 7b can be considered to reside in avoiding a less reliable noise reduction at low signal-to-noise ratios (column 7, lines 2-3 of the patent).

D1 acknowledges a corresponding problem, *i.e.* that in a relatively high background noise environment the speech/noise decision process becomes very difficult, and, consequently, the background noise estimate becomes highly inaccurate (column 6, lines 55-60).

The appellant argued that this passage implied that the previous instances in D1 according to which the modified signal is of lower amplitude at very low signal-to-noise ratios than at higher signal-to-noise ratios only applied if the signal-to-noise ratio was not too low. If the signal-to-noise ratio was too low, D1 proposed a different solution which also considered the output signal energy for the purpose of the speech/noise decision (column 6, lines 61-66). This would, according to the appellant, lead the skilled person towards considering a higher instead of a lower

modified signal at very low signal-to-noise ratios compared to higher signal-to-noise ratios.

The board does not accept this argument. As set out in more detail in column 10, lines 37-64, and column 14, lines 20-49 of D1, gain values from a channel gain table to modify the input signal are *inter alia* based on SNR estimates, as in the third approach of D1 (see point 1.4 above). In addition, the overall background noise level is used to select one of a plurality of gain tables. There is nothing in D1 which would allow the conclusion that one of the plurality of gain tables would provide a signal strength of the modified signal which is **higher** at very low signal-to-noise ratios than at higher signal-to-noise ratios.

Therefore, there is no disclosure in D1 which would lead the skilled person to find the provision of feature 7b obvious.

- 1.6 It was also argued by the appellant that the attenuation function in claim 1 could embrace an attenuation function which is independent of frequency. The claimed method would then amount to an equal attenuation of the signal over the whole frequency range, and at very low signal-to-noise ratios no attenuation of the whole signal would be performed. It was also argued that it was common sense to leave a noisy signal untouched in order to allow the listener to extract possible useful information.

With respect to this argument it is not necessary to decide whether the attenuation function defined in claim 1 may actually be independent of frequency since

it does not alter the reasoning set out at points 1.3 - 1.5 above.

- 1.7 In the statement setting out the grounds of appeal, reference was made to Figures 2a and 3c of D4.

D4 relates to a noise reduction system for noisy speech signals (see abstract) and Figure 2a shows a typical non-linear characteristic exhibited by the processing stage (reference numeral 2 of Figure 4) of such a system. The situation of a low signal-to-noise ratio is explained in column 4, lines 21-33 and in connection with Figure 2b. In particular, see column 4, line 27, a characteristic is employed by which noise is effectively reduced.

This again points to a modified signal which is **lower** in strength at very low signal-to-noise ratios than at higher signal-to-noise ratios, contrary to what is claimed.

- 1.8 The appellant furthermore introduced with letter of 27 April 2011 documents D8 and D9 and requested them to be introduced into the procedure.

Both documents relate to a noise reduction system for noisy speech signals (D8: page 1, lines 1-7; D9: abstract).

On page 4, lines 19-34 of document D8 the subtraction of a noise power estimate from the input signal is described. The noise power estimate is multiplied by a scaling factor before being subtracted. A higher

scaling factor is used for lower signal to noise ratios resulting in a higher noise suppression.

This again points to a modified signal which is **lower** in strength at very low signal-to-noise ratios than at higher signal-to-noise ratios contrary to the requirement of claim 1.

Similarly, D9 considers the use of a gain limiter (column 10, lines 19-29) to avoid "musical noise". Although not further explained in D9, the problem of "musical noise" is understood to occur if there is too much noise suppression at very low signal-to-noise ratios, as is the case in D8. Therefore, D9 must also be considered to point to a modified signal which is **lower** in strength at very low signal-to-noise ratios than at higher signal-to-noise ratios because of a more substantial subtraction due to a higher scaling factor.

Hence, feature 7b is not known from or rendered obvious by the teaching of D8 or D9.

Since neither D8 or D9 render the feature 7b obvious to the skilled person or require a modification of the reasoning set out at points 1.2 to 1.5 above there is no need admit these documents formally into the procedure.

1.9 None of the further documents submitted by the appellant were argued to show feature 7b.

1.10 The appellant furthermore argued that it would be common sense to leave a very noisy signal untreated instead of damping it completely in order to maintain

possibly valuable information in a noisy environment, e.g. a car horn in background street noise.

Although this argument may appear intuitively persuasive, in the face of a complete lack of documentary evidence in its favour it remains a mere assertion.

1.11 For the reasons set out above, the subject-matter of claim 1 according to the main request involves an inventive step.

1.12 Since there were no further objections raised with respect to the contested patent, the patent is maintained.

2. *Remittal (Article 111(1) EPC):*

2.1 Article 111(1) EPC leaves it to the board's discretion to either exercise any power within the competence of the department which was responsible for the decision appealed or remit the case to that department for further prosecution.

2.2 According to the case law of the Boards of Appeal, cases are remitted following substantial amendments to claims or after introducing new evidence in the appeal proceedings.

Neither of these two reasons for remittal applies since the claims on which this decision is based are the claims as granted and on which the opposition division's decision is based. Likewise, the most relevant document adduced by the appellant, *i.e.* D1,

had also already been considered during the opposition procedure. The board is competent to consider the further documents submitted during the appeal procedure, especially since the central issue to be decided in the present case, *i.e.* whether feature 7b was obvious to the skilled person, remains unchanged.

A further reason for remittal could be a fundamental procedural violation by the department of first instance pursuant to Article 11 RPBA.

Since for the reasons set out at point 3 below the board does not find any such procedural violation this reason does not apply either.

2.3 The request for remittal is accordingly refused.

3. *Reimbursement of appeal fee (Rule 103(1)(a) EPC):*

3.1 The request for reimbursement of appeal fee cannot be allowed because the first prerequisite set out in Rule 103(1)(a) EPC, *i.e.* that the appeal is deemed to be allowable, is not met.

3.2 The board also considered the question of whether the alleged violation was a substantial procedural violation justifying the remittal of the case to the department of first instance pursuant to Article 11 RPBA.

The appellant argued that its right to be heard (Article 113(1) EPC) had been violated because the opposition division did not inform the parties of its evaluation of the patent proprietor's arguments prior

to issuing the decision, even though a request for a written statement had been made by the appellant (then opponent).

- 3.3 The board sees no procedural violation in the mere fact that the opposition division did not inform the opponent of its evaluation of the patent proprietor's arguments prior to its decision. As stated explicitly in T 774/97 (not published in the EPO OJ), point 2 of the reasons, Article 113 EPC requires that a decision should only be made on grounds on which the parties have had an opportunity to comment. If this opportunity is given by the written submissions from the parties without a communication from the opposition division there is no obligation to issue such a communication, even if a party requests one. In the present case the appellant has objected that it did not have an opportunity to elaborate on the reasons given in the notice of opposition because it had not had an opportunity to respond to the opposition division's perception of the case. However, contrary to what the appellant has alleged, the board cannot see that it was taken by surprise by the reasoning on which the decision was based, which in essence accepts the patentee's counterarguments. It is the responsibility of each party to present its arguments and counterarguments, bearing in mind that the purpose of any communication from the opposition division is merely to facilitate, and if necessary, to streamline, the discussion of the case. The absence of a communication in these circumstances does not amount to a procedural violation.

3.4 The appellant argued that in accordance with decision T 849/03, taken by this board in a different composition, the right to be heard is not only violated if the grounds of a decision are not transmitted to the opponent prior to the decision, but also if the opponent cannot, at the given point of time, expect such a decision. The appellant submitted that after having requested a preliminary opinion of the opposition division and after a delay of three years after the patentee had filed its observations on the opposition, the decision of the opposition division could only be described as surprising.

The board does not accept this argument. In case T 849/03, which was *ex parte*, the examining division issued a decision after informing the applicant that they intended to call oral proceedings as a second and final action if after the applicant's response they did not find the case allowable. However, instead of appointing oral proceedings the application was refused. The board considered that this was a substantial procedural violation as the appellant could have expected the examining division to summon to oral proceedings as announced.

In the present case, no oral proceedings were requested by the opponent nor were they conditionally announced by the opposition division. The argument of the opponent with respect to a lack of inventive step in the subject-matter of claim 1 of the patent based on D1 and the common general knowledge, was answered in the patentee's first response in particular as regards feature 7. The appellant thus had ample opportunity to submit further observations after having received the

patentee's response. The opposition division by basing its decision on the written submissions of the parties did not go beyond the factual and legal framework determined by these submissions. Therefore, the appellant cannot claim that the content of the decision of the opposition division was surprising.

3.5 For these reasons, the decision of the opposition division complies with the requirements of Article 113(1) EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar

The Chairman

G. Rauh

A. S. Clelland