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**Datasheet for the decision
of 25 January 2013**

Case Number: T 0589/08 - 3.4.01

Application Number: 01304496.1

Publication Number: 1160770

IPC: G10L 19/02

Language of the proceedings: EN

Title of invention:

Perceptual coding of audio signals using separated irrelevancy reduction and redundancy reduction

Patentee:

Agere Systems LLC

Opponent:

Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.

Headword:

-

Relevant legal provisions:

EPC Art. 123(2)(3)

RPBA Art. 13(1)

Relevant legal provisions (EPC 1973):

EPC Art. 84, 83, 54, 56

Keyword:

-

Decisions cited:

T 0190/99

Catchword:

-



Case Number: T 0589/08 - 3.4.01

DECISION
of the Technical Board of Appeal 3.4.01
of 25 January 2013

Appellant: Fraunhofer-Gesellschaft zur Förderung der
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
3 January 2008 concerning maintenance of the
European patent No. 1160770 in amended form.

Composition of the Board:

Chairman: G. Assi
Members: P. Fontenay
M. J. Vogel

Summary of Facts and Submissions

- I. The appeal lies from the interlocutory decision of the opposition division to maintain European patent No. EP-B-1 160 770 in amended form according to a main request filed by the patentee during the oral proceedings before the opposition division on 16 October 2007. The decision was announced during the oral proceedings and dispatched on 3 January 2008.
- II. The appellant (opponent) filed an appeal against said decision by letter dated 13 March 2008 and paid the prescribed appeal fee on the same day. In the notice of appeal, the appellant requested that the decision of the opposition division be set aside and the patent be fully revoked.
- In the statement setting out the grounds of appeal, filed on 13 May 2008, the appellant presented its arguments as to why, in its view, the independent claims of the opposed patent as maintained did not meet the requirements of Article 84, 83 and 54 EPC 1973.
- III. With a facsimile received on 22 December 2008, the respondent (patentee) requested, as its main request, that the patent be maintained in the form in which it had been maintained by the opposition division. Alternatively, maintenance of the patent on the basis of sets of claims according to a first to third auxiliary requests was requested.
- IV. With letter dated 17 April 2009, the appellant commented on the reply of the respondent, presenting

further arguments in support of its request for revocation of the patent.

- V. Both parties requested oral proceedings.
- VI. On 27 September 2012, the Board issued a communication pursuant to Article 15(1) Rules of Procedure of the Boards of Appeal (RPBA), expressing its provisional opinion with regard to the requests then on file.

Particular attention was drawn by the Board, *ex officio*, to various shortcomings under Article 84 EPC 1973 with regard to the independent claims of the respondent's requests then on file. Novelty and inventive step were also considered.

- VII. In advance of the oral proceedings, the respondent filed on 7 November 2012 fourth and fifth additional auxiliary requests. However, with letter dated 22 November 2012, a new main request as well as new first, second and third auxiliary requests were filed, which replaced all previous requests on file.

Moreover, by letter of 6 December 2012 the respondent filed documentation concerning the transfer of the European patent.

- VIII. Oral proceedings before the Board of appeal were held on 7 December 2012, both parties being represented. The appellant and respondent confirmed their respective requests on file.

- IX. The following documents are referred to in the present decision:

- D1: US-A-6 029 126;
- D2: W.B. Kleijn et al., *Speech Coding and Synthesis*, Elsevier Science B. V., (1995); Chapter 1, "An Introduction to Speech Coding", pages 1-47;
- D3: Archived version of Internet page http://cm.bell-labs.com/cm/ms/departments/sia/seminars/abs_seminars.html retrieved from <http://web.archive.org>, "Statistical Prediction for Low-Bit Rate/High Quality Sound Coding", D. Huang et al.;
- D15: K. Brandenburg; AES 17th International Conference on High Quality Audio coding, "MP3 and AAC explained", pages 1-12;
- D18: M. Bosi et al., "ISO/IEC MPEG-2 Advanced Audio Coding", *J. Audio Eng. Soc.*, Vol. 45, No. 10, October 1997;
- D19: ISO/IEC 13818-7: (1997) (E), pages 1-153.

X. Claims 1 and 6 of the main request relate to methods for encoding a signal. They read as follows:

"1. A method for encoding a signal, comprising the steps of:

filtering said signal using an adaptive filter controlled by a psychoacoustic model for irrelevancy reduction, said adaptive filter producing a filter output signal and having a magnitude response that approximates an inverse of the masking threshold; and

quantizing and encoding the filter output signal together with side information for filter adaptation control for redundancy reduction, wherein the spectral and temporal resolutions of the irrelevancy reduction and redundancy reduction are different."

"6. A method for encoding a signal, comprising the steps of:

filtering said signal using an adaptive filter controlled by a psychoacoustic model for irrelevancy reduction, said adaptive filter producing a filter output signal and having a magnitude response that approximates an inverse of the masking threshold; and transforming the filter output signal using a plurality of subbands suitable for redundancy reduction; and quantizing and encoding the subband signals together with side information for filter adaptation control, wherein the spectral and temporal resolutions of the redundancy reduction and the irrelevancy reduction are different."

Independent claims 13 and 14 of the main request relate to methods for decoding a signal and read as follows:

"13. A method for decoding a signal encoded with different spectral and temporal resolutions for redundancy reduction and irrelevancy reduction, the method for decoding comprising the steps of:

decoding and dequantizing said signal;
decoding side information for filter adaptation control transmitted with said signal; and
filtering the dequantized signal with an adaptive filter controlled by said decoded side information, said adaptive filter producing a filter output signal and having a magnitude response that approximates the masking threshold, wherein the spectral and temporal resolutions of the dequantizing are different from the spectral and temporal resolutions of the filtering."

"14. A method for decoding a signal transmitted using a plurality of subband signals, and encoded with different spectral and temporal resolutions for redundancy reduction and irrelevancy reduction, the method for decoding comprising the steps of:

 decoding and dequantizing said transmitted subband signals;

 decoding side information for filter adaptation control transmitted with said signal;

 transforming said subbands to a filter input signal; and

 filtering the filter input signal with an adaptive filter controlled by said decoded side information, said adaptive filter producing a filter output signal and having a magnitude response that approximates the masking threshold, wherein the spectral and temporal resolutions of the dequantizing are different from the spectral and temporal resolutions of the filtering."

Independent claims 19 and 20 of the main request concern encoders for encoding a signal. They read as follows:

"19. An encoder for encoding a signal, comprising:

 an adaptive filter controlled by a psychoacoustic model for irrelevancy reduction, said adaptive filter producing a filter output signal and having a magnitude response that approximates an inverse of the masking threshold; and

 a quantizer/encoder for quantizing and encoding the filter output signal together with side information for filter adaptation control for redundancy reduction, wherein the spectral and temporal resolutions for the

redundancy reduction and irrelevancy reduction are different."

"20. An encoder for encoding a signal, comprising:

an adaptive filter controlled by a psychoacoustic model for irrelevancy reduction, said adaptive filter producing a filter output signal and having a magnitude response that approximates an inverse of the masking threshold; and

a plurality of subbands suitable for redundancy reduction for transforming the filter output signal; and

a quantizer/encoder for quantizing and encoding the subband signals together with side information for filter adaptation control for redundancy reduction, wherein the spectral and temporal resolutions for redundancy and irrelevancy reduction are different."

Independent claims 21 and 22 of the main request relate to decoders for decoding a signal. They read as follows:

"21. A decoder for decoding a signal encoded with different spectral and temporal resolutions for redundancy reduction and irrelevancy reduction, the decoder comprising:

a decoder/dequantizer for decoding and dequantizing said signal and decoding side information for filter adaptation control transmitted with said signal; and

an adaptive filter controlled by said decoded side information, said adaptive filter producing a filter output signal and having a magnitude response that approximates the masking threshold, wherein the

spectral and temporal resolutions of the decoder/dequantizer are different from the spectral and temporal resolutions of the adaptive filter."

"22. A decoder for decoding a signal transmitted using a plurality of subband signals encoded with different spectral and temporal resolutions for redundancy reduction and irrelevancy reduction, the decoder comprising:

a decoder/dequantizer for decoding and dequantizing said transmitted subband signals and decoding side information for filter adaptation control transmitted with said signal;

means for transforming said subbands to a filter input signal; and

an adaptive filter controlled by said decoded side information, said adaptive filter producing a filter output signal and having a magnitude response that approximates the masking threshold, wherein the spectral and temporal resolutions of the decoder/dequantizer are different from the spectral and temporal resolutions of the adaptive filter."

In the following decision, reference shall be made to the "encoding claims" when referring, generally, to the group of claims relating to methods for encoding or encoders. Similarly, reference shall be made to the "decoding claims" when referring to the group of claims directed to methods for decoding or decoders.

XI. The first auxiliary request differs from the main request in that the encoding claims have been amended "to address potential clarity issues". The decoding

claims of the first auxiliary request are the same as the corresponding claims of the main request.

The second auxiliary request differs from the main request in that the decoding claims have been deleted.

The third auxiliary request differs from the main request in that the encoding claims have been amended "*to address potential clarity issues*", as for the first auxiliary request, and in that the decoding claims have been deleted.

XII. In this decision, reference is made to the provisions of the EPC 2000, which entered into force as of 13 December 2007, unless the former provisions of the EPC 1973 still apply to pending applications, in which case the evocation of the Article or Rule is followed by the indication "1973".

Reasons for the Decision

1. The appeal meets the requirements of Articles 106 to 108 EPC and Rule 99 EPC. It is thus admissible.
2. *Admissibility of the respondent's requests*

The appellant submitted that the respondent's requests filed by letter of 22 November 2012 were late filed and did not represent a reaction to the objections raised. Thus these requests should not be admitted into the proceedings.

The Board holds that although filed late, the new requests appear to solve various issues under clarity

raised by the Board in its preliminary opinion. Moreover, the new requests do not raise any new complex issue which would imply intensive investigations for the appellant and the Board. The Board notes that the encoding claims of the first auxiliary request differ from the encoding claims of the main request by amendment of the claims' wording without substantial consequences on the technical meaning of the claims and that the second and third auxiliary requests merely differ from the main request and first auxiliary request, respectively, by the deletion of all decoding claims. On the whole, the content of the new requests appears to simplify the issues to be addressed when compared with the requests previously on file. Furthermore, the structure of the new requests makes it immediately apparent to what extent a request differs from the previous ones, whether by way of rephrasing of a technical feature or by deletion of claims. Since these findings directly contribute to the procedural economy of the appeal procedure, the admission of said requests into the proceedings is justified.

In conclusion, the Board - exercising its discretionary power under Article 13(1) RPBA - admits the new main request and first to third auxiliary requests filed with letter of 22 November 2012 into the appeal proceedings.

3. *Respondent's main request (Article 123(2) EPC)*

The appellant submitted that the wherein-clause in claims 13 and 14 represented an intermediate generalisation contravening Article 123(2) EPC. A

similar contravention would apply to the wherein clause in claims 21 and 22.

The Board notes that the independent claims relating to methods for decoding a signal (claims 13, 14) or to decoders (claims 21, 22) have indeed been similarly amended. Independent claims 13 and 14 include namely the clause that "*the spectral and temporal resolutions of the dequantizing are different from the spectral and temporal resolutions of the filtering*", whereas independent claims 21 and 22 incorporate the additional feature that "*the spectral and temporal resolutions of the decoder/dequantizer are different from the spectral and temporal resolutions of the adaptive filter*".

It is, firstly, observed that there is no literal basis in the original application documents for present claims relating to methods for decoding or decoders as recited in claims 13, 14, 21 and 22. In particular, the teaching of paragraph [0011] of the published application, which would concern the amendment referred to, does not relate to a decoder but to a coder.

Secondly, the Board rejects the respondent's view that the conditions recited with regard to the spectral and temporal resolutions of the adaptive filter and quantizer on the encoding side would necessarily also apply to the decoding operations since it was the very nature of a decoding process to reverse the operations performed during encoding. As a matter of fact, while the notions of spectral and temporal resolutions may indeed be associated to predetermined time frames (windows) of the input signal and to the shaping performed by the prefilter when referring to the

encoding process, these notions do not appear to have any recognised meaning when relating to a dequantizer whose input signal consists of a succession of bits. It is further emphasised, in this context, that the original disclosure did not associate these notions of spectral and temporal resolutions with the operation of dequantizing. It follows that the comments made in the original disclosure with regard to the coder cannot be construed as to imply similar functionalities for the decoding process or the decoder.

Paragraphs [0013], [0021], [0022] and [0030] of the published application, which were referred to by the respondent in its letter of 22 November 2012 in support of the decoding claims, do also not provide the required basis for the amendments. The cited paragraphs merely stress that the prefilter and postfilter should support the appropriate frequency dependent temporal and spectral resolutions and do not elaborate on the spectral and temporal resolutions of the dequantizer.

In the Board's judgement, the unsupported reference in the claims to the concepts of spectral and temporal resolutions of the dequantizer extends beyond the content of the application as filed in violation of Article 123(2) EPC.

Consequently, the respondent's main request is not allowable.

4. *Respondent's first auxiliary request*

Claims 13, 14, 21 and 22 of the first auxiliary request are identical to the corresponding claims of the main

request. Therefore, the same conclusion drawn above for the main request applies to the first auxiliary request.

The respondent's first auxiliary request is hence not allowable.

5. *Respondent's second auxiliary request*

The second auxiliary request differs from the main request in that the decoding claims, i.e. the claims directed to methods of decoding and decoders, have been deleted. The claims have been accordingly renumbered and include independent claims 1 and 6 relating to methods for encoding and independent claims 13 and 14 relating to encoders.

5.1 *Clarity (Article 84 EPC 1973)*

The appellant contended that independent claims 1 and 6 of the second auxiliary request did not meet the requirements of Article 84 EPC 1973 as to clarity because of the ambiguity resulting from the mentions "*for irrelevancy reduction*" or "*for redundancy reduction*" when relating to the filtering and quantising steps, respectively. In its view, these mentions could be construed as referring to actual steps of the claimed methods or, alternatively, as simply defining the intended purposes of said methods. Moreover, the wording used in said claims associated the notion of "*psychoacoustic model*" with the effect of irrelevancy reduction thus suggesting that this model was alone sufficient for achieving the effect of the invention. This, however, was in complete contradiction

with the fact that such irrelevancy reduction could only be achieved after quantisation has been performed.

In the appellant's view, a further ambiguity resulted from the different formulations used in independent claims 1 and 6 when defining, respectively, the step of quantizing and encoding the filter output signal and the step of transforming the filter output signal. More specifically, the step of "*transforming the filter output signal using a plurality of subbands suitable for redundancy reduction*" in claim 6 conveyed a teaching which differed from the one resulting from claim 1 where this effect is associated to the step of "*quantizing and encoding*".

In the Board's judgement, however, the appellant's submissions are not justified. It is namely established jurisprudence of the boards of appeal that a "*patent must be construed by a mind willing to understand not a mind desirous of misunderstanding*" (cf. decision T 190/99, not published, Reasons, point 2.4). In this respect, the skilled person would exclude any interpretation of the claims which is not technically meaningful. Hence, any interpretation of the claim's wording which implies that the psychoacoustic model is, as such, able to perform the irrelevancy reduction, as submitted by the appellant, is to be excluded. Statements in the description which seem to suggest the contrary (cf. paragraph [0011]) do not affect this finding and would have been understood as mere simplifications of the basic idea underlying the present invention of separating irrelevancy reduction and redundancy reduction.

Similarly, the Board does not share the view according to which the mentions "*for irrelevancy reduction*" or "*for redundancy reduction*" in the claims are somehow equivocal. On the contrary, the meaning of the claim appears to be clear when read as a whole in an attempt to make technical sense. This understanding is further confirmed by the content of the patent specification. It is emphasized that the claims are directed to methods for encoding or encoders and not to methods preparing a signal for later encoding. It follows, in this context, that the evocation of the irrelevancy and redundancy reductions do not define mere aims but describe effective functionalities of the claimed methods or encoders in order to solve the problem of reverberation addressed in paragraph [0010] of the patent application.

Finally, the Board fails to identify any contradiction or inconsistency between independent claims 1 and 6 (or 13 and 14). In this respect, the association of the effect of redundancy reduction with the step of transforming the filter output signal using a plurality of subbands appears to reflect, more specifically, the second alternative envisaged in the patent specification where a contribution to redundancy reduction is achieved by appropriately transforming the filter output signal.

In conclusion, the requirement of clarity according to Article 84 EPC 1973 is met.

5.2 *Added subject-matter (Article 123(2) EPC)*

5.2.1 The appellant submitted that independent claims 1, 6, 13 and 14 of the second auxiliary request, which included the wherein-clause that "*the spectral and temporal resolutions for the redundancy reduction and irrelevancy reduction are different*", defined an intermediate generalisation of the originally disclosed subject-matter, and thus contravened Article 123(2) EPC.

In the Board's view, this clause derives from paragraph [0011] of the published application which immediately follows the mention "*Summary of the invention*". It reads: "*Generally, a perceptual audio coder is disclosed for encoding audio signals, such as speech or music, with different spectral and temporal resolutions for the redundancy reduction and irrelevancy reduction. The disclosed perceptual audio coder separates the psychoacoustic model (irrelevancy reduction) from the redundancy reduction, to the extent possible. The audio signal is initially spectrally shaped using a prefilter controlled by a psychoacoustic model. The prefilter output samples are thereafter quantized and coded to minimize the mean square error (MSE) across the spectrum.*"

Paragraph [0011] also provides a sufficient basis for the generalisation resulting from the claim's wording. It is namely considered that the independent encoding claims do not need to recite all the features present in the sole embodiment of the encoder actually disclosed. It is stressed, in this respect, that the skilled person knows about filtering techniques and also knows about alternative solutions whether by way of design or according to "*online*" implementations.

5.2.2 The appellant also objected to a further amendment carried out with regard to the originally filed claims concerning the evocation of the psychoacoustic model which now reads: "*psychoacoustic model for irrelevancy reduction*".

As already explained above under section "*Clarity*" the Board is convinced that this concept is not only clear in the context of the present invention but also reflects the content of the original disclosure from which follows that the psychoacoustic model contributes to the irrelevancy reduction, for which ample evidence in the original disclosure may be found (cf. paragraphs [0011], [0018], [0024]).

5.3 *Extension of protection (Article 123(3) EPC)*

Independent claims 1, 6, 13 and 14 of the respondent's second auxiliary request differ, in essence from the corresponding granted claims 1, 7, 20 and 21, respectively, in that the claims incorporate the additional limitation that the spectral and temporal resolutions for the redundancy and irrelevancy reductions are different. These amendments contribute to a limitation of the protection conferred by the patent. The claims 1, 6, 13 and 14 according to the second auxiliary request meet thus the requirements of Article 123(3) EPC.

5.4 *Sufficiency of disclosure (Article 83 EPC 1973)*

The appellant submitted that the patent specification did not include sufficient information in order for the skilled person to carry out the invention over the

whole scope of the claims. It was stressed that the sole embodiment of the invention actually disclosed did not permit to implement any alternative way of separating irrelevancy and redundancy reduction.

The Board is not convinced by this approach. In this respect, it is observed, firstly, that the principle underlying the present invention is clearly identified and consists in having different spectral and temporal resolutions for irrelevancy and redundancy reduction. Secondly, it was not contested that the description outlined one way of carrying out the invention (cf. paragraph [0021] of the granted patent). This embodiment was referred to as the "*design implementation*" by the appellant.

The issue of sufficiency of disclosure thus appears to hinge on the question whether the skilled person would also have had the ability to implement the so called "*online solution*" on the sole basis of the present patent specification.

Although the appellant contested the feasibility of this alternative approach, it did not present convincing arguments or evidence as to why the skilled person would have indeed been prevented or hindered in implementing this solution. The Board fails to identify any real obstacle, insofar as the principle of irrelevancy and redundancy separation is clearly identified, which would have prevented the skilled person from implementing such alternatives and further observes that a patent specification does not need to reproduce all the details regarding each step of a complete process.

The Board thus concurs with the respondent's view according to which the fact that the description describes only one way of putting the invention into practise is nevertheless sufficient, under the circumstances, to implement the invention over the whole scope of the invention.

In conclusion, the provision of Article 83 EPC 1973 is met.

5.5 *Novelty (Article 54 EPC 1973)*

5.5.1 In the appellant's view, the subject-matter of claim 1 and 13 of the second auxiliary request was not new in view of document D1. In particular, the system of document D1 (cf. Figure 5) implemented a method of encoding a signal which comprised a step of filtering an input signal using an adaptive filter (510, 516, dividing unit) controlled by a psychoacoustic model (cf. column 8, lines 40-52; column 13, lines 26-30), which step produced a filter output signal. This adaptive filter had a magnitude response that approximated an inverse of the masking threshold. Indeed, as also noted by the opposition division, the step of dividing each frequency component $X(k)$ by the corresponding weighting coefficient $w(k)$, representative of the ordinary masking threshold, was equivalent with the step of multiplying said frequency component $X(k)$ by the inverse of said masking threshold.

According to Figure 5 in D1, the filter output signal was further quantised and encoded (512, 514) together with side information for filter adaptation control

(cf. column 17, line 40 - column 18, line 33).

Moreover, runs of zeros were replaced in the run-length and Tunstall coding unit 514 by specific symbols when the number of zeros in the run fell within a certain range. According to the appellant, the condition specified in claim 1 that the frequency resolution at the output of unit 514 would differ from the resolution at the output of unit 510 was therefore also met. Finally, the step of quantising and encoding also contributed to the redundancy reduction.

However, in the Board's judgement, it is not correct to conclude that the frequency resolution at the output of the transform unit 510 (or the divider) is affected by the presence of the run-length and Tunstall coding unit 514. The fact that runs of quantized zero values are replaced in the run-length encoder by symbols defining the run lengths does not affect the spectral and temporal resolutions of the input signal. In this respect, the output of the run-length and Tunstall encoder, although including a limited number of bits compared with the sequence of quantised zeros representative of a multiplicity of spectral bandwidths, still contains information representative of each and every bandwidth of its input signal. In other terms, the time and spectral resolutions on the input and output side of unit 514 are the same. This becomes even more evident if one considers the theoretical situation where all input data, i.e. all the data provided by the adaptive filter, differ from zero. In such a case, the output of the run-length encoder shall merely reproduce the content of the signal output by the adaptive filter.

5.5.2 According to a second interpretation of D1 put forward by the appellant during the oral proceedings before the Board, the spectral and temporal resolutions of the irrelevancy reduction and redundancy reduction were different when considering the processing taking place in the weighting function computation block. This block was responsible for shaping the input signal using the psychoacoustic model. As underlined by the appellant with regard to Figure 13 of D1, the power of the input signal was calculated in block 516 (cf. Figure 5) for each of the 25 bands actually considered (cf. D1, column 13, lines 36-47; column 13, line 62 - column 14, line 20), i.e. with a resolution which differed from the resolution of the transform unit 510 and thus also differed from the resolution which applied to the group consisting of the quantisation and coding unit (512, 514).

In the Board's view, however, it follows from this analysis that the temporal resolution characterising the processes taking place in both the weighting function computation block and the quantisation unit would be the same. It thus fails to acknowledge the fact that the current wording of claim 1, or claim 13, indeed requires that both the spectral and temporal resolutions are different.

5.5.3 The appellant contested the interpretation of document D19 made by the opposition division and reiterated the view that the teaching of document D19 deprived claim 1 from its novelty.

In its view, the opposition division erred when equating the iterative processes defined as inner and

outer loops in D19 (cf. Section B.2.7) with the quantization process and therefore concluded that the quantising step belonged as a whole to the adaptive filter. In this regard, the appellant emphasised that the quantization which really mattered for the further processing was actually the Huffman encoding which took place subsequently to the iterative processing by the inner and outer loops.

The Board, however, disagrees about equating the Huffman encoding with a quantising process since such an interpretation appears to be at odd with the usual understanding of the concept of quantising in the field of data processing. It is namely stressed that document D19 explicitly uses, in section B.2.7, the term "*Quantization*" and, in section B.2.8, the term "*Coding*" when describing, respectively, the iterative processes carried out by the inner and outer loops and the ensuing Huffman coding. Furthermore, it is observed that the terminology used in D19 does not differ from the one used in the present application where the step of employing an adaptive Huffman coding technique is presented as constitutive of the encoding process (cf. paragraph [0021] and claim 6 of the application as published). Finally, the Board contests the view according to which the definition of scalefactor bands, as such, affects the spectral and temporal resolution of the output signal of the adaptive filter.

5.5.4 Document D18 concerns the same coding standard of MPEG-2 AAC audio coding as document D19. It reproduces, for the essential the teaching of document D19 and therefore also fails to disclose the feature of a

different spectral and temporal resolutions for irrelevancy and redundancy reduction.

5.5.5 Concerning document D15, although Figure 2 illustrates the basic idea underlying the present invention of having different temporal and spectral resolutions for the irrelevancy reduction and the redundancy reduction, it refers to an alternative implementation which differs substantially from the claimed methods and encoders. Concretely, a time frequency transform of an input audio signal is performed in the audio coder of D15 (cf. page 4, Section 3.3.1) by a first filterbank including 32 subbands and a following second transform (MDCT). A psychoacoustic model is used in parallel and applied to the input audio signal following its time-frequency conversion by means of a 1024 points FFT. The thus obtained coefficients, which consist of values for the masking thresholds or allowed noise for each coder partition, are then applied to the MDCT whose output are then quantised (cf. page 5, section 3.3.2 "*perceptual Model*"). There is however no mention in D15 of the adaptive filter having a filter response inverse of the masking threshold. Moreover, the adaptive filter output data generated by the association of the 1024 points FFT and psychoacoustic model are applied directly to the MDCT and thus not quantised or encoded, as required by claims 1 or 13. The adaptive filter output signal, i.e. the signal generated by the 1024 points FFT associated to the psychoacoustic model, is also not transformed using a plurality of subbands, as recited in claims 6 or 14.

5.5.6 In conclusion, the subject-matter of independent claims 1, 6, 13 and 14 is thus new in the sense of

Article 54 EPC 1973 with regard to documents D1, D15, D18 and D19.

5.6 *Inventive step (Article 56 EPC 1973)*

5.6.1 In the appellant's opinion, the objective technical problem solved by the claimed inventions consisted, when starting from document D1 as closest prior art, in searching for an alternative for computing the masking thresholds. In its view, this broad definition of the objective problem to be solved appeared fully justified considering the absence of any technical effect actually resulting from the claim's wording. Such an alternative configuration for the calculation of the masking coefficients was known from Figure 2 in D15. It would, hence, have been obvious for the skilled person to solve said problem by replacing the weighting function computation unit 516 of D1 (cf. Figure 5) with the block consisting of the 1024 points FFT and psychoacoustic model in Figure 2 of D15.

The Board does not share this view. In effect, the argument justifying the replacement of one functional unit in D1 by an alternative construction would have only been convincing, if the two functional blocks were indeed equivalent. This would have implied that neither the functional block of D15 to be incorporated in the system of D1 nor the hosting system of D1 would have had to be otherwise amended. This is clearly not the case under the present circumstances since the output of the block consisting of the 1024 points FFT and psychoacoustic model generates coefficients which are applied directly to a filterbank, whereas in D1 the output $w(k)$ of the weighting function computation unit

are applied to the corresponding terms of the transform coefficients $X(k)$ for division. The introduction of the filter block of D15 would thus require major adaptations of both the prior art and the block to be incorporated in order to be effective.

More fundamentally, the Board fails to identify any motivation for the skilled person to depart from the configuration disclosed in D1. It is reminded, in this respect, that the objective problem to be solved is normally to be defined taking due account of the information provided in the description with regard to the identified distinguishing features. Only under certain circumstances is it justified to depart from such an approach. This is, for example, the case when the claims are drafted in excessively broad terms or when the problem identified by the applicant is not solved by the claimed invention.

Hence, it appears that the objective problem defined above by the appellant with regard to document D1 needs to be completed under the current circumstances. Taking due account of the comments in paragraph [0010] of the original patent application, a more realistic definition of the objective problem would thus be to provide an alternative way of processing audio data which does not suffer from the drawbacks resulting from the need to compromise between irrelevancy reduction and redundancy reduction.

Consequently, in the absence of any indication in document D15 that this purpose could be fulfilled with the configuration disclosed therein (cf. Figure 2), the Board rejects the view that the skilled person would

have considered implementing the perceptual model disclosed in Figure 2 of D15 in the system disclosed in Figures 5 or 6 of D1.

5.6.2 The Board observes that the possibility of individual fine tuning of the irrelevancy and redundancy reductions is explicitly addressed in document D3. It is however considered that the absence of details in document D3 makes an implementation of this basic idea in the coder of D1 hardly conceivable.

5.6.3 The appellant further submitted that document D3 constituted another realistic starting point when deciding on the inventive merits of the invention.

Acknowledging the fact that D3 did not provide any information regarding the response of the adaptive filter, it was submitted that these features would result in a straightforward manner from the choices that the skilled person would have to make. In this respect, particular reference was made to document D2 (cf. page 32). More specifically, starting from the teaching of D3, the skilled person would have selected linear predictive coefficients (LPC) filters, known in the art to model the spectral envelope of speech signals. It was also normal practise to flatten the spectrum of the signal to be encoded. Therefore, the response of the LPC filter would have corresponded to the inverse of the masking thresholds as recited in claims 1 and 13. The coefficients would have then been forwarded to the decoder in order for it to perform the reverse operation and the quantization would have been performed in the time domain as done in the patent in suit.

In summary, the skilled person had solely to take two decisions regarding the choice of an adaptive filter and its steering with the inverse of the masking thresholds. In the appellant's view both decisions were obvious and would have led to the claimed invention.

The Board acknowledges the relevance of document D3 which appears indeed to address the basic principle underlying the present invention. However, document D3 constitutes only a summary regarding a new coding paradigm that separates irrelevancy and redundancy reductions. It does not provide any details as to the implementation of said new coding paradigm. For this very reason, the Board concurs with the respondent that the analysis developed by the appellant relies on too many assumptions. To start with, document D3 does not permit to establish without any doubts whether the filter output is quantised and encoded as actually recited in claim 1, or whether a system similar to the one disclosed in Figure 2 in D15 is meant where the adaptive filter output consists of values to be used for each coder partition. Moreover, even if it is indeed known in the art to flatten the spectrum of the filter output signal, it cannot be established with certainty that this would have been the solution chosen by the skilled person.

5.6.4 For these reasons, the Board concludes that the methods of claims 1 and 6 and the encoders of claims 13 and 14 of the second auxiliary request do not result in an obvious manner from the cited prior art. Their subject-matter is therefore considered to involve an inventive step as required by Article 56 EPC 1973.

5.7 In conclusion, the respondent's second auxiliary request is allowable.

6. *Respondent's third auxiliary request*

Since the respondent's second auxiliary request is allowable, there is no need for the Board to decide on the allowability of the third auxiliary request.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division with the order to maintain the patent with:
 - claims 1 to 14 filed by letter of 22 November 2012 as second auxiliary request, and
 - a description and drawings to be adapted.

The Registrar

The Chairman

R. Schumacher

G. Assi