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Datasheet for the decision
of 4 December 2017

Case Number:	T 1146/12 - 3.4.01
Application Number:	08840635.0
Publication Number:	2082396
IPC:	G10L19/00
Language of the proceedings:	EN

Title of invention:
AUDIO CODING USING DOWNMIX

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

Headword:

Relevant legal provisions:
EPC Art. 54(1), 54(2)
RPBA Art. 13(1)

Keyword:
Priority - basis in priority document (no)
Novelty - main request (no)
Late-filed auxiliary requests - request clearly allowable (no)
- admitted (no)

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Decisions cited:

Catchword:

Case Number: **T 1146/12 - 3.4.01**

D E C I S I O N
of Technical Board of Appeal 3.4.01
of 4 December 2017

Appellant: Fraunhofer-Gesellschaft zur Förderung der
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Decision under appeal: **Decision of the Examining Division of the**
                          European Patent Office posted on 1 December 2011
                          refusing European patent application No.
                          08840635.0 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman   G. Assi
Members: T. Zinke
                   D. Rogers

Summary of Facts and Submissions

I.   The examining division refused European patent
        application No. 08 840 635.

        In its decision the examining division held that a main
        request then on file did not meet the requirement of
        Art. 123(2) EPC, a first auxiliary request then on file
        did not meet the requirements of Art. 84 EPC and a
        second auxiliary request then on file met neither the
        requirements of Art. 84 EPC nor those of Art. 123(2)
        EPC.

II.   The appellant (applicant) filed an appeal against the
        decision.

        With the appeal, the appellant requested that the
        decision be set aside and that a patent be granted on
        the basis of an amended claim set according to a main
        request filed together with the statement setting out
        the grounds of appeal.

III.   At the appellant's request, a summons to attend oral
        proceedings was issued.

IV.   In a communication pursuant to Art. 15(1) RPBA, the
        appellant was informed of provisional objections under
        Art. 123(2) EPC, and under priority and novelty (Art.
        54(1),(2) EPC).

V.   In reply the appellant filed a revised claim set for a
        new main request replacing the claim set as filed with
        the statement setting out the grounds of appeal, filed
        a revised sole claim according to an auxiliary request
        and provided arguments with regard to the Board's
        provisional objections.

VI.   At the oral proceedings the appellant's final requests
        were that the decision under appeal be set aside and
        that a patent be granted in accordance with claims 1 to
        11 of the main request or in accordance with claim 1 of
        the Auxiliary Request, both filed with letter of 23
        November 2017.

VII.   Independent claim 1 of the main request reads as
        follows:

        *"1. Audio decoder for decoding a multi-audio-object
        signal having an audio signal of a first type and an
        audio signal of a second type encoded therein, the
        multi-audio-object signal consisting of a downmix
        signal (56) and side information (58), the side
        information comprising level information (60) of the
        audio signal of the first type and the audio signal of
        the second type in a first predetermined time/frequency
        resolution (42), and a residual signal (62) specifying
        residual level values in a second predetermined time/
        frequency resolution, the audio decoder comprising
        means (52) for computing prediction coefficients (64)
        based on the level information (60); and
        means (54) for up-mixing the downmix signal (56) based
        on the prediction coefficients (64) and the residual
        signal (62) to obtain a first up-mix audio signal
        approximating the audio signal of the first type and/or
        a second up-mix audio signal approximating the audio
        signal of the second type,
        wherein the audio signal of the first type corresponds
        to a background object (104) and is a stereo audio
        signal having a first and a second input channel,
        wherein the audio signal of the second type corresponds
        to a foreground object, and*

wherein the downmix signal is a stereo audio signal having a first and second output channel, wherein the level information describes spectral energies of the first input channel, the second input channel and the audio signal of the second type, respectively, at the first predetermined time/frequency resolution, wherein the the side information further comprises intercorrelation information defining inter-signal correlation between the first and second input channel, wherein the means for computing is configured to perform the computation further based on the intercorrelation information, wherein the means (52) for computing and the means (54) for up-mixing comprise a two-to-three box (126) having left/right outputs carrying an approximation of the background object and a center output carrying an approximation of the foreground object."

Independent claim 7 is a correspondingly formulated claim for an audio object encoder. Claims 2 to 6 and 8 are dependent claims.

Independent claims 9 and 10 claim a correspondingly formulated method for decoding a multi-audio-object signal and a multi-audio-object encoding method, respectively, wherein it is additionally claimed that *"the inter-correlation information defining level similarities between the first and second input channel in a third predetermined time/frequency resolution"*.

Claim 11 claims a program code for executing, when running on a processor, a method according to claim 9 or according to claim 10.

VIII.   Sole claim 1 of the auxiliary request reads as follows:

"1. Method for reconstructing a background object and a foreground object from
an SAOC (Spatial Audio Object Coding) downmix signal (122) being a combination of the background object and the foreground object,
an SAOC parametrization (114) describing spectral energies of the background object and the foreground object and an inter-signal correlation between two channels of the background object, and
a residual coding (132),
the method comprising
calculating channel prediction coefficients (64) based on the spectral energies and the inter-signal correlation; and
reconstructing from the SAOC downmix signal (56), based on the channel prediction coefficients (64) and the residual coding, an approximation of the background object and an approximation of the foreground object by using a TTT (Two to Three) box (126) for the reconstruction and enhancing the reconstruction by using the residual coding (132) for cancelling an interference between the background object and the foreground object so that left/right TTT outputs (L, R) carry the approximation of the background object and a center TTT output (C) carries the approximation of the foreground object."

Reasons for the Decision

1.   The appeal is admissible.

2.   Main request

2.1   Admissibility

The amended claim set according to the pending main
request was filed in response to the Board's
communication under Art. 15(1) RPBA. In this claim set
- as compared to the claim set as filed as a main
request with the statement setting out the grounds of
appeal - only dependent claims were cancelled. Since
the independent claims remained the same, the Board
admitted the new main request into the appeal
proceedings according to Art. 13(1) RPBA.

2.2   Priority

2.2.1   With the amendments made to the claims for the pending
        main request the appellant re-introduced the wording
        "in a first predetermined time/frequency resolution",
        "in a second predetermined time/frequency resolution"
        and *"in a third predetermined time/frequency
        resolution"* that was already present in the claim set
        as originally filed. Already in the international
        preliminary examination report objections were raised
        against these wordings with regard to the priority
        claimed.

2.2.2   The appellant argued in the statement setting out the
        grounds of appeal that these features were present in
        the priority documents, since *"the information such as
        the "energies of downmixed signals" at the "inter-
        signal correlation" ... as well as the residual
        signal... have to be inevitably specified in some
        "predetermined time/frequency resolution""* (cf. page 4,
        second paragraph) and repeated this argument in its

reply to the Board's communication and during oral proceedings.

2.2.3   This argument, however, is not convincing. In neither of the two priority documents (US 60/991,335; US 60/980,571) is there a disclosure for a predetermined time/frequency resolution for the level information, nor for residual level values, nor for level similarities. In particular, there is no disclosure that the time/frequency resolution is the same (i.e. the *"predetermined first time/frequency resolution"*) for the level information of the audio signal of the first type and the audio signal of the second type, that the time/frequency resolution might be different (i.e. the *"second predetermined time/frequency resolution"*) for the residual level values nor that it might be further different (i.e. the "*third predetermined time/frequency resolution"*) for the level similarities between the first and second input channels (cf. claims 9 and 10).

2.3   Novelty

2.3.1   Since the priority is not valid, document D1 (Engdegard J. et al., *"Spatial Audio Coding (SAOC) - The Upcoming MPEG Standard on Parametric Object Based Audio Coding"*, 124th AES Convention, Audio Engineering Society, Paper 7377, 17-20 May 2008, pages 1-15, XP002541458) is considered as prior art that has to be taken into account.

2.3.2 Document D1 discloses all features of claim 1.

In particular:

an audio decoder (*"TTN element"*, page 10, right-hand column, line 23, see fig.6) for decoding a multi-audio object signal having an audio signal of a first type (*"BGO"*, page 10, right-hand-column, line 22) and an audio signal of a second type (*"FGO"*, page 10, right-hand-column, line 22) encoded therein,

the multi-audio-object signal consisting of a downmix signal (*"stereo downmix"*, page 10, right-hand-column, line 26) and side information (*"OLDs"*, page 11, left-hand column, line 24),

the side information (*"OLDs"*) comprising level information of the audio signal of the first type (*"BGO"*) and the audio signal of the second type (*"FGO"*) in a first predetermined time/frequency resolution (*"Object Level Differences (OLD), describing the relative energy of one object to the object with most energy for a certain time and frequency band"*, page 5, left-hand-column, third paragraph), and a residual signal (*"residual signals"*, page 10, right-hand-column, line 26) specifying residual level values in a second predetermined time/frequency resolution (refer to the description of the application at page 12, lines 12 to 16, which states that the second predetermined time/frequency resolution may be equal to or different to the first predetermined time/ frequency resolution),

the audio decoder (*"TTN element"*) comprising means for computing prediction coefficients (*"channel prediction*

coefficients", page 11, left-hand-column, line 23)
based on the level information (*"OLDs"*),
and means (see equation 14) for up-mixing the downmix
signal (*"stereo downmix"*) based on the prediction
coefficients (*"channel prediction coefficients"*) and
the residual signal (*"residual signals"*) to obtain a
first up-mix audio signal (*"l_B, r_B"*, see equation 14)
approximating the audio signal of the first type
(*"BGO"*) and/or a second up-mix audio signal (*"$s_{F,i}$"*,
see equation 14) approximating the audio signal of the
second type (*"FGO"*),

wherein the audio signal of the first type corresponds
to a background object and is a stereo audio signal
having a first and a second input channel (*"the BGO is
considered a static stereo object"*, page 10, right-
hand-column, lines 5-6),

wherein the audio signal of the second type corresponds
to a foreground object (*"FGO"*, see above), and
wherein the downmix signal is a stereo audio signal
having a first and second output channel (*"a common
SAOC stereo downmix signal"*, page 10, right-hand-
column, line 1),

wherein the level information describes spectral
energies of the first input channel, the second input
channel and the audio signal of the second type,
respectively, at the first predetermined time/frequency
resolution (*"Object Level Differences (OLD), describing
the relative energy of one object to the object with
most energy for a certain time and frequency band"*,
page 5, left-hand-column, third paragraph),

wherein the side information further comprises inter-
correlation information defining inter-signal

correlation between the first and second input channel
(*"Inter-Object Cross Coherence (IOC), describing the
amount of similarity, or cross-correlation for two
objects in a certain time and frequency band"*, page 5,
left-hand-column, fourth paragraph),

wherein the means for computing is configured to
perform the computation further based on the inter-
correlation information (*"optionally IOCs"*, page 11,
left-hand-column, lines 24 to 25),

wherein the means for computing and the means for up-
mixing comprise a two-to-three box having left/right
outputs carrying an approximation of the background
object and a center output carrying an approximation of
the foreground object (*"TTN element, a generalized,
more flexible version of the TTT box known from the
MPEG Surround specification"*, page 10, right-hand-
column, lines 23 to 25; *"The element's output, the
stereo BGO (I_B,r_B) and up to four FGO signals"*, page
11, left-hand-column, lines 2 to 3).

2.3.3   No counter-arguments with regard to lack of novelty
        were provided by the appellant.

2.3.4   Hence, claim 1 of the main request is not novel (Art.
        54(1),(2) EPC).

3.   Auxiliary request

3.1   Admissibility

3.1.1   According to Art. 13(1) RPBA, *"Any amendment to a
        party's case after it has filed its grounds of
        appeal ... may be admitted and considered at the
        Board's discretion"*.

In accordance with established jurisprudence of the
boards of appeal (cf. Case Law of the Boards of Appeal
of the EPO, 8th edition, July 2016, section IV.E.4.4,
"Criteria for consideration of amended claims", pages
1151-1160), *"As a rule, the boards' decisions should be
based on the issues in dispute at first instance, which
does not rule out the admission of new submissions, but
does subject it to the fulfillment of certain criteria,
given that no entirely "fresh case" should be created
on appeal ... . Thus, in addition to the factors
referred to in Art. 13(1) RPBA, the following criteria
may ... likewise be decisive: there must be sound
reasons for filing a request at a late stage in the
proceedings, as may be the case where amendments are
occasioned by developments during the proceedings or
where the request addresses still outstanding
objections. The amendments must be prima facie clearly
allowable, ..."*, i.e. it must be immediately apparent
to the board that the amendments made successfully
address the issues raised, without giving rise to new
ones.

3.1.2   In the present case, the appellant removed the features
        with regard to the *"predetermined time/frequency
        resolution"* for the level information, the residual
        level values and the level similarities from the sole
        independent claim. These features had been considered
        by the Board in its communication under Art. 15(1) RPBA
        as not being disclosed in the priority applications
        resulting in a lack of novelty as compared to document
        D1 (see above). Hence, the removal of these features
        could be considered as a sound reason for filing
        amended claims.

However, apart from said removal, the appellant has replaced further features. For instance, the use of a *"residual signal specifying residual level values"* as claimed in the main request has been replaced by the broader term *"residual coding"*. Hence, a fresh case has resulted. Such a major shift in the claimed subject-matter is not appropriate at a late stage of the proceedings. An admission of this claim would result in a completely new case requiring a further search and examination of the newly claimed subject-matter.

3.1.3   Furthermore, the amendments made also give rise to new objections under Art. 123(2) EPC.

In particular, sole claim 1 of the new auxiliary request claims: *"using the residual coding (132) for cancelling an interference between the background object and the foreground object"*. This feature, however, was disclosed in the originally filed specification only with the additional constraint *"Ideally (i.e. for infinitely fine quantization in the residual coding and the coding of the downmix signal), the interference between the background (MBO) and the FGO signal is cancelled."* (cf. page 22, fifth paragraph). The essential feature of *"infinitely fine quantization"* is missing in the current claim wording.

Hence, the amendments to claim 1 do not meet the requirements of Art. 123(2) EPC, and this request is therefore not clearly allowable.

3.1.4   Therefore, the Board did not admit the auxiliary request into the appeal proceedings in accordance with Art. 13(1) RPBA.

4.   In conclusion, the main request is not allowable and
        the auxiliary request is not admissible.

Order

For these reasons it is decided that:

1.   The appeal is dismissed.

The Registrar: The Chairman:

R. Schumacher   G. Assi

Decision electronically authenticated