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Datasheet for the decision
of 30 November 2012

Case Number: T 1118/10 - 3.5.03

Application Number: 02076018.7

Publication Number: 1261155

IPC: H04H 60/58

Language of the proceedings: EN

Title of invention:
Method and system for recognition of audio broadcast segments

Patentee:
Arbitron Inc.

Opponent:
GfK Telecontrol AG

Headword:
Recognition of audio broadcast segments/ARBITRON

Relevant legal provisions:
EPC Art. 56, 76(1)

Relevant legal provisions (EPC 1973):
-

Keyword:
"Main request - withdrawn"
"First auxiliary request" - intermediate generalisation with respect to parent application (yes)";
"Second auxiliary request - inventive step (yes)"

Decisions cited:
T 0331/87, T 0025/03

Catchword:
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C8053.D

Case Number: T 1118/10 - 3.5.03

D E C I S I O N
of the Technical Board of Appeal 3.5.03
of 30 November 2012

Appellant II: (Patent Proprietor)	Arbitron Inc. 9705 Patuxent Wood Drive Columbia, MD 21046 (US)
Representative:	Tucker, Nigel P. Boult Wade Tennant Verulam Gardens 70 Gray's Inn Road London WC1X 8BT (GB)
Appellant I: (Opponent)	GfK Telecontrol AG Obermattweg 9 CH-6052 Hergiswil (CH)
Representative:	AMMANN PATENTANWÄLTE AG BERN Schwarztorstrasse 31 Postfach 5135 CH-3001 Bern (CH)
Decision under appeal:	Interlocutory decision of the Opposition Division of the European Patent Office posted 16 March 2010 concerning maintenance of European patent No. 1261155 in amended form.

Composition of the Board:

Chairman: A. S. Clelland
Members: T. Snell
             M.-B. Tardo-Dino

C8053.D

Summary of Facts and Submissions

I.   This appeal was lodged by both the opponent
      (appellant I) and the proprietor (appellant II) against
      the decision of the opposition division which held that
      the European patent No. 1261155 as amended (in the
      version according to a second auxiliary request) met
      the requirements of the EPC. The application has a
      filing number of 02076018.7.

II.   The present application/patent was filed as a
      divisional application of the application EP 93910943.5,
      with the publication No. WO-A-93/22875 (the parent
      application).

III. Opposition had been filed on the grounds of
      Articles 100(a) EPC (novelty and inventive step) and
      100(c) EPC (added subject-matter).

IV.   The opposition division concluded, *inter alia*, that
      claim 1 of the main request complied with
      Articles 123(2) and 76(1) EPC but that its subject-
      matter lacked novelty with respect to document E6 (see
      point VI below). However, it decided that the claims of
      the second auxiliary request met the requirements of
      the EPC. The refused first auxiliary request is not
      relevant to the present decision.

V.   Appellant II (the proprietor) requested that the
      impugned decision be set aside and the patent
      maintained in accordance with the claims of a main
      request, or alternatively, one of first to fourth
      auxiliary requests, all as filed with the statement of
      grounds of appeal.

Appellant I (the opponent) requested that the impugned decision be set aside and that the patent be revoked in entirety.

Both parties conditionally requested oral proceedings.

VI. The following documents were cited during the opposition proceedings and/or the statement of grounds submitted by Appellant I:

E1: US-A-4739398

E2: WO-A-88/10540

E3: US-A-3919479

E4: US-A-4230990

E5: FR-A-2559002

E6: US-A-4624009

E7: GB-A-1456103

E8: US-A-4450531

E9: EP-A-385799

E10: US-A-4214125

E11: EP-A-0239809

E12: EP-A-0210609

E13: US-A-4672361

E14: US-A-2605361

E15: Wikipedia document concerning DPCM

VII. In a communication accompanying a summons to attend oral proceedings, the board gave a preliminary opinion that, *inter alia*, claim 1 [of the main request] did not comply with either Articles 76(1) or 123(2) EPC, and that its subject-matter was not new with respect to document E6. The board also drew attention to matters to be discussed with respect to the remaining requests,

inter alia added subject-matter, novelty and inventive step. The board observed in connection with the fourth auxiliary request that document E1 appeared to represent the closest prior art.

VIII.   In a response to the board's communication, Appellant II filed a new copy of the main request and claims of amended first to fourth auxiliary requests to replace all the requests on file.

IX.   Together with a fax letter received 28 November 2012 (ie two days before the oral proceedings), Appellant I submitted a new prior art document which it wished to have taken into account:

        E16: US-A-2630365

X.   Oral proceedings took place on 30 November 2012.

        At the oral proceedings, Appellant II withdrew the main request. It requested that the decision under appeal be set aside and the patent maintained in amended form on the basis of one of the first to fourth auxiliary requests, all as filed on 30 October 2012.

        Appellant I requested that the decision under appeal be set aside and the patent revoked in its entirety.

        At the conclusion of the oral proceedings, after due deliberation, the board gave its decision.

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

"A method (300-312) of producing a signature
characterizing an audio broadcast signal from the audio
broadcast signal for use in broadcast signal
recognition, comprising the steps of:
forming a first group of a plurality of frequency band
values, each value derived from a segment of said audio
broadcast signal within a respective predetermined
frequency band;
forming a second group of a plurality of frequency band
values, each value derived from a segment of said audio
broadcast signal within a respective predetermined
frequency band, wherein values of the second group
represent segments of said audio broadcast signal
within the same respective predetermined frequency
bands as values in the first group;
comparing each of the first group of said plurality of
frequency band values with a respective one of the
second group of said plurality of frequency band values
representing a segment of said audio broadcast signal
within the same respective predetermined frequency
band, each respective one of the second group of said
plurality of frequency band values representing a
segment of said audio broadcast signal at least a part
of which was broadcast before the segment of said audio
broadcast signal represented by the corresponding one
of said first group of said plurality of frequency band
values;
and characterized by
forming said signature based upon the comparisons of
the first and second groups of said plurality of
frequency band values, wherein the comparisons comprise
producing difference values representing differences

between the first and second frequency band values and comparing the difference values to zero, and wherein forming said signature comprises including in the signature data produced from the difference values by setting bits according to the comparison of the difference values to zero."

XII.   Claim 1 of the **second auxiliary request** is the same as claim 1 of the first auxiliary request except that the wording "and a mask word" has been added at the end of the first line following "signature", and in that the characterising part reads as follows:

"and characterized by:
the comparisons comprising, for each frequency band, producing a difference value representing a difference between the first and second frequency band values,
producing a sum value representing a sum of the first and second frequency band values, and
producing a value DVAL by dividing the difference value by the sum value;
forming said signature by setting a signature bit for each frequency band to 0 if the value DVAL for that frequency band is greater than zero or to 1 if the value DVAL for that frequency band is less than or equal to zero; and
forming said mask word by setting a mask bit for each frequency band to 0 if the value DVAL for that frequency band is greater than a predetermined guard band value or to 1 if the value DVAL for that frequency band is less than or equal to the predetermined guard band value."

Independent claim 4 is a corresponding "system" claim.

XIII.   In view of the board's decision, it is not necessary to
        reproduce the claims of the third and fourth auxiliary
        requests.

Reasons for the decision

1.   *First auxiliary request – Article 76(1) EPC*

1.1   In accordance with Article 76(1) EPC, "[a European
        divisional application] may be filed only in respect of
        subject-matter which does not extend beyond the content
        of the earlier application as filed". In the present
        case the earlier application is the parent application
        as referred to at point II above. The established
        criterion, analogous to Article 123(2) EPC, is that the
        subject-matter of a divisional application must be
        directly and unambiguously derivable from the parent
        application. This is the criterion adopted by the board
        in the present case.

1.2   Claim 1 includes the feature "wherein the comparisons
        comprise producing difference values representing
        differences between the first and second frequency band
        values and comparing the difference values to zero".

        This feature was said by Appellant II to be based on
        the description of the parent application on pages 43
        and 44, the relevant part of which reads:

                "The signature generation module 312 utilizes
                a NOW-THEN processing technique to produce
                sixteen-bit audio signatures such that each

signature bit is obtained based on a current
value (or NOW value) of a corresponding
frequency band and a previously obtained value
(or THEN value) of the same frequency band
produced from a frame preceding the current
frame by a predetermined frame offset.

....

The signature generation module 312 produces a
value DVAL for each frequency band in
accordance with the following relation:
DVAL=(NOW-THEN)/(NOW+THEN)
The value of each of the 16 bits in the audio
signature for the current frame and the bit
values of corresponding mask word are
determined in accordance with the value DVAL.
That is, a signature bit is set to 0 if DVAL
for the corresponding band is greater than 0,
otherwise it is set to a value of 1."

1.3   Claim 1 includes the step of forming a difference "NOW-
       THEN" and comparing it to zero, but omits any division
       by the value "NOW+THEN". Claim 1 is therefore at
       variance with the description to the extent that a
       feature has been omitted from an originally disclosed
       feature combination, leading to a so-called
       "intermediate generalisation".

1.4   Appellant II argued that the so-called "essentiality
       test" should be applied as set out in T 331/87. This
       decision sets out various tests to determine whether a
       claim may be broadened by omission of an inessential
       feature. In the present case, it was argued that the

skilled person would recognise that division by the value NOW+THEN, which Appellant II referred to as "normalisation", was not essential to the signature formation and clearly only had relevance to the forming of the mask word, for the reason that the ensuing comparison with zero would produce the same result with or without normalisation.

1.5   However, with regard to intermediate generalisations, the approach followed by the boards is that such amendments are only justified in the absence of any clearly recognisable functional or structural relationship between the features presented in combination (cf. eg T 25/03, not published). In the present case, in the board's view, when elements are presented in the same formula they are prima facie related. The skilled person who is only presented with the instruction "The signature generation module .. produces a value DVAL for each frequency band ... DVAL = (NOW-THEN)/(NOW+THEN)" would not conclude, even implicitly, that division by "NOW+THEN" was an optional step. In particular he would not conclude from the information given in the description that an embodiment was envisaged in which both the mask word and the division step could be dispensed with; this would be a new embodiment developed by the skilled person.

1.6   The board concludes that claim 1 of the first auxiliary request includes an intermediate generalisation not directly and unambiguously disclosed in the parent application as filed, contrary to Article 76(1) EPC.

2.   *Second auxiliary request*

2.1   *Article 76(1) EPC*

        Claim 1 is based on claim 17 of the parent application
        combined with details taken from the description on
        page 43, line 15 to page 44, line 16. Claim 1 therefore
        complies with Article 76(1) EPC. Appellant I did not
        argue otherwise.

2.2   *Articles 123(2) and (3) EPC*

        Claim 1 is based on original claim 1 together with
        paragraphs [0111] and [0112] of the published
        application. Further, the scope of claim 1 is more
        limited than that of claim 1 as granted. It therefore
        complies with Articles 123(2) and (3) EPC, which was
        not contested by Appellant I.

2.3   *Article 84 EPC*

        Neither the board nor Appellant I saw any reason to
        object to claim 1 on the ground of lack of clarity
        (Article 84 EPC).

2.4   *Novelty and inventive step (Article 52(1) EPC)*

2.4.1   *Background*

        The present invention relates to the recognition of
        audio signal "segments" in a broadcast audio signal.
        More particularly, it concerns the formation of a
        signature, ie a digital signal (in general, highly

compressed) derived from and representative of the
audio signal segment.

2.4.2 *Closest prior art*

There was agreement at the oral proceedings that
document E1 represents the closest prior art in respect
of the subject-matter of claim 1 of the second
auxiliary request.

E1 discloses a method for forming a signature primarily
from a broadcast video signal, although it is also
mentioned that the broadcast signal can be a radio
broadcast for which audio information is used for the
recognition process (cf. col. 3, lines 41-43).

E1 only describes in any detail how to form a signature
from a video signal. The video signature is formed from
luminance values of particular areas of the video field
or frame. An average value is calculated for each area.
This value is "normalized to a bit value of 0 or 1",
by, in one embodiment, "comparing the value to the
average luminance of the same area in some previous
field or frame" (col. 5, lines 18-25 and 29-30).

E1 further discloses the generation of a "mask word".
As disclosed in col. 6, line 2 ff.,

> "The mask word represents the reliability of
> the frame signature. For each bit in the frame
> signature, if the absolute value of the
> luminance difference used to calculate that bit
> value is less than a threshold or "guard band"
> value, the luminance value is assumed to have

been susceptible to error (because of noise in
transmission), and so the mask bit for that bit
is set to 0, indicating suspect data. If the
absolute value of the luminance difference is
greater than or equal to the guard band value,
the luminance value is assumed to be much
greater than the noise level and the
corresponding mask bit is set to 1, indicating
reliable data."

2.4.3   It was not in dispute that the subject-matter of
        claim 1 of this request was new, either with respect to
        E1 or to any other document on file (Article 54 EPC).

2.4.4   Starting out from the method disclosed in E1 for
        creating a signature and a mask word for a video signal,
        with a hint towards forming an audio signature,
        Appellant I argued that the problem to be solved by the
        skilled person was to create a signature for a
        broadcast audio signal. The board agrees.

2.4.5   In order to solve this problem, Appellant I argued that
        the skilled person would arrive at the subject-matter
        of claim 1 in the following manner:

        (i)   E1 teaches that an audio signature should be
        derived in the same way as for a video signal. In this
        respect, Appellant I referred to col. 6, lines 17-21,
        which reads:

                "An audio "'frame' signature", if such a
                signature is used, can be constructed in the
                same format as a video frame signature so that
                it can be processed in the same way".

(ii)   E1 teaches that instead of luminance values, the audio signature should be based on the frequency spectrum (cf. claim 11). It is well-known to the skilled person, see eg document E2, to represent the frequency spectrum in terms of a spectral analysis to determine frequency band values. Analogous to the method for producing a video signature based on the difference between a current and a previous frame, it would be obvious to form an audio signature based on the difference between frequency band values representing a current segment and corresponding values of a previous segment.

(iii) The division by the sum value required by claim 1, ie normalisation, is a routine measure for the person skilled in the art.

In consequence, Appellant I argued that the subject-matter of claim 1 did not involve an inventive step.

2.4.6 The board however finds the above arguments unconvincing for the following reasons:

Re (i): The expression "in the same format" appears to the board to refer to the format of the signature and/or mask word rather than the method of their production, ie this passage plausibly means that these signatures should each have the same structure in order to be subsequently processed (by being compared to a database of stored signatures) in the same way.

Re (ii): Claims 11 and 12 of E1 read as follows:

> "11. The method of claim 3 wherein said
> signatures and said parametized signals are
> derived at least in part from the frequency
> spectrum of said audio portion.
>
> 12. The method of claim 11 wherein said
> signature and said parametized signals each
> comprise a plurality of digital words, each
> digital word of said signatures and said
> paramatized [sic] signals being derived by
> comparing selected frequency bands of said
> audio portion to at least one reference band,
> each of said selected bands providing a bit of
> said digital word."

These claims, which are the only part of the disclosure
containing any detail concerning the generation of the
audio signature, thus teach comparing frequency bands
to a reference band or bands, with no suggestion that
the reference band should be associated with a previous
segment, or might be the corresponding frequency band
value of a previous segment, as required by claim 1. In
fact, E1 teaches (for the video signature) in col. 5,
lines 33-35 that the goal in selecting a comparison to
make is to maximise entropy, ie to minimise
correlation. However, audio frequency signals are
highly correlated in time. Therefore E1 arguably
teaches away from the claimed solution of comparing to
the corresponding frequency band value of a previous
segment.

Re (iii): Even if it might occur to the skilled person
to carry out some form of normalisation of the
difference value on the basis of common knowledge
(despite the lack of any suggestion in E1), there are
plausibly other ways to calculate the normalising
parameter. For example, it would be possible to divide
by the sum taken over all the bands of the frequency
spectrum.

2.4.7 *Remaining documents*

The board considers that none of the remaining
documents cited in the procedure could be combined with
document E1 to arrive at the subject-matter of claim 1.

During the written proceedings, Appellant I referred to
the combination of E1 with any of the documents E2 to
E9 (albeit not in connection with claim 1 of the second
auxiliary request). Appellant I also cited further
documents E11 to E16.

In the first place, the board considers that only
documents in the same field as E1, ie recognition of
audio broadcast signals, would be likely to be
considered by the skilled person. These are: E2, E3,
E4, E5, E8 and E12.

However, although E2, E4, E5, E8 and E12 make use of a
spectral analysis, they do not suggest forming
differences between corresponding frequency band values
collected at different times. E3 does not use any
spectral analysis at all. Hence, none of these
documents in combination with E1 could render obvious
the subject-matter of claim 1.

All other documents are considered to concern fields
sufficiently remote from E1 that the skilled person
would not consider them in combination: E6 resides in
the field of speech recognition. E7, E9, E13 and E14
relate to speech coders, E10 relates to speech
synthesising, E11 to identifying signals on a telephone
line, and E15 relates to modulation.

E16 was filed shortly before the oral proceedings. It
is a patent document with publication date of 1953, and
discloses an arrangement with analogue circuitry. Prima
facie, the board considers that the skilled person
would not combine any teaching from this document with
E1. The board therefore disregarded this late-filed
document (Article 114(2) EPC).

2.4.8   The board accordingly concludes that claim 1 of the
second auxiliary request meets the requirements for
novelty and inventive step (Articles 52(1), 54 and 56
EPC).

3.   *Independent Claim 4 and dependent claims (Second
auxiliary request)*

3.1   The above remarks in connection with claim 1 apply,
mutatis mutandis, to independent system claim 4. No
objection was raised with respect to dependent claims 2
and 3.

4.   *Third and fourth auxiliary requests*

The board concludes that the claims of the second
auxiliary request are allowable. Hence, there is no

need to consider Appellant II's third and fourth
auxiliary requests.

5.   *Conclusion*

In view of the above, the board concludes that the
patent can be maintained as amended on the basis of the
claims of the second auxiliary request
(Article 101(3)(a) EPC).

Order

For these reasons it is decided that:

1.   The decision under appeal is set aside.

2.   The case is remitted to the department of first
       instance with the order to maintain the patent on the
       basis of claims 1-4 of the second auxiliary request
       submitted with the letter of 30 October 2012, with a
       description and drawings to be adapted as necessary.

The Registrar: The Chairman:

L. Fernández Gómez   A. S. Clelland

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