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Datasheet for the decision
of 8 June 2010

Case Number: T 1280/07 - 3.5.04

Application Number: 99307392.3

Publication Number: 0989756

IPC: H04N 7/24

Language of the proceedings: EN

Title of invention:
Splicing information streams

Applicant:
MEDIATEK USA INC.

Opponent:
-

Headword:
-

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 84

Keyword:
"Claims - clarity (no)"

Decisions cited:
G 0001/04

Catchword:
-

Case Number: T 1280/07 - 3.5.04

D E C I S I O N
of the Technical Board of Appeal 3.5.04
of 8 June 2010

Appellant: MEDIATEK USA INC.
                                  982 Hamlin Court
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                                  Ca 94089   (US)

Representative: Meldrum, David James
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Decision under appeal: **Decision of the Examining Division of the
                                  European Patent Office posted 8 March 2007
                                  refusing European application No. 99307392.3
                                  pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: F. Edlinger
Members: C. Kunzelmann
                   C. Vallet

Summary of Facts and Submissions

I.   The appeal is against the decision of the examining
        division to refuse European patent application
        No. 99 307 392.3.

II.   The reasons for the decision under appeal referred to
        Article 84 EPC 1973, Article 123(2) EPC, Article 83
        EPC 1973, and Article 56 EPC 1973.

III.   The applicant appealed and filed with the statement of
        grounds of appeal *inter alia* new claims upon which the
        appeal was based.

IV.   The board issued a communication pursuant to
        Article 15(1) of the Rules of Procedure of the Boards
        of Appeal (RPBA) annexed to a summons to oral
        proceedings and dated 9 March 2010. In this
        communication the board *inter alia* expressed doubts
        that objections under Article 123(2) EPC and Article 84
        EPC 1973 raised in the decision under appeal had been
        overcome with the claims filed with the statement of
        grounds of appeal.

V.   With a letter dated 6 May 2010 the appellant filed
        replacement claims and arguments.

VI.   Oral proceedings before the board were held on 8 June
        2010. During the oral proceedings the appellant filed
        claims 1 to 9 of a main request and of an auxiliary
        request, respectively. The appellant requested that the
        decision under appeal be set aside and that a patent be
        granted on the basis of claims 1 to 9 of the main
        request and, auxiliarily, of the auxiliary request,

both submitted in the oral proceedings before the board. At the end of the oral proceedings the chairman announced the board's decision.

VII.   Claim 1 of the main request reads as follows.

"A method for concatenating first (from) and second (to) MPEG-like transport streams to produce a spliced transport stream, comprising the steps of:
parsing (1010) a transport layer of each of said first transport stream and said second transport stream to identify packets associated with at least one of sequence headers, picture headers and predefined splicing syntax;
determining (1020), for each frame in each of said first transport stream and said second transport stream, a picture coding type, at least one of a picture number, a start of frame transport packet number, an end of frame transport packet number, a presentation time stamp (PTS) and a decode time stamp (DTS);
determining (805), for said first transport stream, a target out-frame representing a last frame of said first transport stream to be included in said spliced transport stream;
determining (905), for said second transport stream, a target in-frame representing a first frame of said second transport stream to be included in said spliced transport stream;
decompression decoding (710) when considered in display order, all frames of said first transport stream from and including the I frame preceding said target out frame up to and including said target out frame together with any other frame from which any of said all frames depend;

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decompression decoding (715) when considered in display
order said target in-frame of said second transport
stream and all subsequent non-I frames thereof
occurring before the next I-frame together with any
other frame from which said target-in-frame and said
all subsequent non-I frames depend;
re-encoding (720) some of said decoded frames of said
first and second transport streams, said some decoded
frames being all decoded frames following, in display
order, the actual transition out frame of the first
stream up to and including the target out frame,
wherein in the case that said target out-frame is a
B-frame, the said actual transition out frame is the
frame immediately preceding the anchor frame preceding
said target out-frame in transmission order; and in the
case that said out-frame is not a B-frame, the said
actual transition out frame is the frame immediately
preceding, in transmission order, said target out-frame,
and the target in-frame and the following frames in
display order up to the next I-frame of the second
transport stream,
forming a transition clip from said re-encoded frames
and encoded frames comprising in transmission order the
next I-frame and all frames between the next I-frame
and the following I-frame; and
wherein the re-encoding is responsively adapted to the
difference in VBV levels between the from-stream and
the to-stream;
transport encoding the said transition clip, and
concatenating, in the order named, the said first
transport stream up to the actual transition out frame
thereof, said transport encoded transition clip and the
said second transport stream following a transition
in-frame thereof, said transition in-frame being said

following I-frame and being the first frame of the
second transport stream to be transmitted."

VIII.   Claim 1 of the auxiliary request has the same wording
         as claim 1 of the main request except that the feature
         of forming a transition clip reads as follows.

         "forming a transition clip from said re-encoded frames
         and encoded frames consisting of in transmission order
         the next I-frame and all frames which occur in display
         order after the next I-frame and occur in transmission
         order before the following I-frame; and"

IX.   The reasons for the decision under appeal can be
         summarised as follows.

         According to the description, the invention concerned
         frame accurate, seamless splicing. The scope of the
         claims, however, did not cover the case of frame
         accurate splicing. Some frames were included both
         before the transition clip and within the transition
         clip. Furthermore some frames were included both within
         the transition clip and after the transition clip.
         Therefore the claims were not supported by the
         description, contrary to Article 84 EPC 1973, and also
         contravened Article 123(2) EPC. In the description, the
         last frame of the first transport stream to be
         transmitted was the target out-frame. Thus the
         transition out-frame was the target out-frame. Using
         different terms for the same technical feature
         introduced a lack of clarity. As a consequence some
         frames were included twice in the spliced stream.
         Moreover, since the application as such did not allow
         executing the alleged invention of frame accurate,

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seamless splicing, the requirements of Article 83
EPC 1973 were not fulfilled either. Furthermore the
description and figure 8 of the application together
contained so many errors or contradictions that the
examining division was of the opinion that some of the
objections could not be repaired.

X.   The appellant's arguments which are applicable to the
            present amended claims can be summarised as follows.

            The specification did not disclose the apparent double
            transmission of frames identified by the examining
            division. The target out-frame was the final frame of
            the first transport stream which was going to be
            included in the spliced stream. The actual transition
            out-frame was the last frame of the first transport
            stream to be displayed as such. It was not included in
            the transition clip. All subsequent frames (in display
            order) following the actual transition out-frame from
            the first transport stream up to and including the
            target out-frame were included in the transition clip.
            The transition clip also included all frames (in
            display order) starting from and including the target
            in-frame of the second transport stream up to and not
            including the first frame of the second transport
            stream to be transmitted directly therefrom.

            The objective technical problem addressed by the
            present invention was to produce, in the context of a
            transport stream, a frame accurate, seamless splice in
            which differences in video buffer verifier (VBV) levels
            could be seamlessly accommodated. The invention
            addressed this problem by defining a transition clip
            which was a combination of re-encoded and encoded

frames and which was of a length allowing the VBV
levels to be adjusted. The transition clip bridged the
splice point. It comprised the last frames of the first
transport stream and the first frames of the second
transport stream, and the frames of the transition clip
were managed together as a unit. In particular, the
invention re-encoded the last frames of the first
transport stream together with the first frames of the
second transport stream to form a single group of
pictures (GOP). When these frames were re-encoded
together the VBV level could be adjusted from the first
frame of the transition clip to the last frame of the
re-encoded frames. There were a number of errors and
inconsistencies in the description as to which frames
were included in the transition clip, but a person
skilled in the art would nevertheless be able to
understand which frames were included in the transition
clip and how the re-encoding allowed the VBV level to
be adjusted. Those frames of the second transport
stream which were not re-encoded but merely copied as
encoded frames to the transition clip formed a second
GOP of the transition clip. This second GOP was
included in the transition clip in order to allow
restamping of the temporal reference fields. This
restamping was required because of the rearrangement of
the frames of the transition clip when the transition
clip was put in transmission order. Putting the
transition clip in transmission order did not change
the definition of which frames were included in the
transition clip. The invention was very flexible
because it always allowed the creation of a valid
spliced transport stream even though the structure of
the first GOP was not known beforehand. With some
structures of the first GOP the second GOP was

necessary to create a continuous valid spliced
transport stream. With other structures it was not
necessary, but the second GOP never prevented the
creation of a continuous valid spliced transport stream.

There was no requirement that every feature in a claim
have a technical effect. Hence it was not necessary
that the second GOP in the transition clip have a
technical effect. Furthermore a technical effect of the
second GOP would have to be considered when comparing
the claimed invention with the prior art, not when
assessing whether the claim was clear.

Reasons for the Decision

1.   The appeal is admissible.

2.   *Main request: clarity of claim 1 (Article 84 EPC 1973)*

2.1   Article 84 EPC 1973 requires that the claims define the
        subject-matter for which patent protection is sought,
        and that they shall be clear. This signifies that "an
        independent claim within the meaning of Rule 29
        EPC [1973] should explicitly specify all of the
        essential features needed to define the invention, and
        that the meaning of these features should be clear for
        the person skilled in the art from the wording of the
        claim alone", see the opinion of the Enlarged Board of
        Appeal G 1/04 (OJ EPO 2006, 334), point 6.2. It is also
        established case law that all features which are
        necessary for solving the technical problem with which
        the application is concerned have to be regarded as
        essential features (see Case Law of the Boards of

Appeal of the European Patent Office, 5th edition 2006,
II.B.1.1.3).

2.2   In the present case it is common ground that the
        invention as defined in the present amended claims is
        concerned with solving the technical problem of
        producing, in the context of an MPEG-like transport
        stream, a frame accurate, seamless splice in which
        differences in video buffer verifier (VBV) levels can
        be seamlessly accommodated (see for instance page 15,
        paragraph 2, of the description). In the application a
        "seamless splice" is explicitly defined as "a splice
        which results in a continuous, valid MPEG stream" (see
        page 1, lines 23 and 24). Hence claim 1 should
        explicitly specify the features of the invention which
        solve this technical problem disclosed in the
        application, and the meaning of these features should
        be clear from the wording of claim 1 alone.

2.3   A frame accurate seamless splice from a first
        information stream into a second information stream
        requires that, considered in display order, all the
        frames of the first stream up to and including the
        target out-frame (last frame) and all the frames
        starting from the target-in frame and the following
        frames of the second stream be included in the spliced
        stream. However, an MPEG-like transport stream
        (including B frames) is transmitted in a different
        "transmission order", where I- or P-frames which are
        not intended for display in the spliced stream are
        transmitted before the target out-frame (see the top
        and bottom drawings of figure 5 of the application).

2.4   The present application proposes a transition clip
        which comprises frames of both the first and second
        streams. This transition clip necessitates a change in
        the last frames of the original first stream and in the
        first frames of the original second stream. It is
        common ground that this transition clip is one of the
        essential features of the invention. Thus claim 1
        should explicitly specify the frames which are included
        in the transition clip such that the splice is frame
        accurate and also specify how the transition clip is
        formed such that a seamless splice results.

2.5   If the concatenated combination of the first stream,
        the transition clip and the second stream is to form a
        seamless splice, the transition clip has to contain all
        those frames of the original first stream up to and
        including the target out-frame and all those frames
        including and following the target in-frame of the
        original second stream which are no longer contained in
        the new first and second streams, everything considered
        in display order. In the example of figures 5 and 6,
        the last frame to be displayed which is still
        transmitted in the first stream, is frame 13 (see
        page 17, lines 8 and 9 and page 21, lines 2 to 5). Thus
        frame 14 and the target out-frame 15 (also called exit
        frame) of the original first stream should be contained
        in the transition clip (see page 22, lines 18 to 21).
        Likewise if the first frame to be displayed and
        contained in the newly created second stream
        ("to-stream") is frame 25 (see page 18, lines 4 to 6),
        then frames 23 and 24 should also be contained in the
        transition clip. If these frames are not contained in
        the transition clip, they should be part of the second
        stream (as actually hinted at in the bottom drawing of

figure 6). Although the display order should remain
unchanged, the transmission order of the frames in the
newly created spliced stream may be different, in
particular because frames of the transition clip are
re-encoded. Confusion in the definition of claim 1 has
been created by referring to display order,
transmission order - sometimes within the same feature
- and first and second streams without clearly
distinguishing between original and newly created
transmission order.

2.6   Claim 1 specifies that the transition clip is formed
        from re-encoded frames which are determined by the step
        of re-encoding specified in claim 1 and from "encoded
        frames comprising in transmission order the next
        I-frame and all frames between the next I-frame and the
        following I-frame". From the application as a whole it
        is clear that the next I-frame (figure 6: 19) and the
        frames between the next I-frame and the following
        I-frame (figure 6: 25) are the encoded frames of the
        second transport stream which follow the re-encoded
        frames of the second transport stream. Since the claim
        uses the expression "comprising", other encoded frames
        of the second transport stream may be included in the
        transition clip as well. But in the given technical
        context the frames between the next I-frame (19) and
        the following I-frame (25) depend on whether the
        display order or the transmission order is being
        considered (see the top and bottom drawings of figure 6
        of the application). Claim 1 specifies that the
        transmission order is being considered for the
        specified encoded frames. This is in contrast to the
        step of re-encoding "some of said decoded frames"
        specified in claim 1, namely all decoded frames of the

first transport stream following the actual transition
out-frame up to and including the target out-frame and
the decoded target in-frame and the following decoded
frames up to the next I-frame of the second transport
stream, in which the display order is being considered.
The actual transition out-frame is defined in claim 1
as the frame immediately preceding the anchor frame
preceding the target out-frame in transmission order
(if the target out-frame is a B-frame), which anchor
frame is frame 16 according to the example of figure 5
(the actual transition out-frame (12) being the frame
after which the first stream is left; see also pages 20
and 21, bridging paragraph). Frame 13 in this example
follows the actual transition out-frame (12) in display
order and would thus have to be re-encoded according to
claim 1, but is not contained in the transition clip
according to the description (see page 17, lines 8 and
9 and page 21, lines 1 to 5).

2.7   When the (original) transmission order is being
       considered for the encoded frames and the display order
       is being considered for the re-encoded frames, some of
       the encoded frames may be the same frames as frames
       which have been re-encoded. Furthermore, depending on
       the manner of re-encoding, the re-encoded frames in the
       transition clip may have a transmission order different
       from the transmission order in the original streams. In
       the example of figure 6 of the application, for
       instance, the "next I-frame" is frame 19 and the
       "following I-frame" is frame 25. Since the (original)
       transmission order is being considered (bottom drawing
       of figure 6), frames 17 and 18 are between the next
       I-frame and the following I-frame. Frames 17 and 18,
       however, are also included in the transition clip as

decoded and re-encoded frames (see the top drawing of
figure 6). On the other hand frames 23 and 24 in the
original transmission order (see bottom drawing of
figure 6) are not between frame 19 and frame 25 and
hence are not included in the transition clip specified
in claim 1 even though they should be present in the
resulting spliced transport stream if frame 25
constitutes the "first frame to be displayed from the
to-stream" as stated in the description, page 18,
lines 4 to 6. Although from the overall disclosure it
may be assumed that copied frames in the transition
clip and the new second stream may be transmitted in
the original transmission order since the frame types
remain the same, nothing is said about the transmission
order of the re-encoded frames in the transition clip,
except that the transition clip may be encoded as a
closed GOP structure, that is a self-contained video
clip (see page 22, lines 25 to 27).

2.8   Since the expression "encoded frames comprising in
        transmission order" covers the possibility that one and
        the same frame is present in a transition clip both as
        a re-encoded frame and as one of the frames forming
        part of the encoded frames, the transition clip is not
        clearly defined and the claimed method over its whole
        range would not result in a frame accurate splice.
        Hence claim 1 does not make clear which frames are
        included in the transition clip.

        In this context the board has taken note of the
        appellant's argument that frames 17 and 18 were
        re-encoded frames and therefore did not form part of
        the encoded frames set out in claim 1. This argument
        does, however, not resolve the above ambiguity since

claim 1 specifies "encoded frames comprising in transmission order the next I-frame and **all** frames between the next I-frame and the following I-frame" (emphasis by the board). Furthermore the appellant's argument that the frames of the transition clip were independent of whether display order or transmission order was being considered is not reflected in the definition of the transition clip given in claim 1 and does not resolve the confusion created in the definition of the claimed subject-matter as set out in point 2.5 above.

2.9   The appellant's argument that the person skilled in the art would understand from the description which frames were included in the transition clip did not convince the board. First, claim 1 itself should make clear which frames are included in the transition clip (see point 2.3 above). Second, in the present case the transition clip is described in the context of a specific embodiment having GOPs of a specific structure in the original streams. The description does not give a general definition or even explanation of the transition clip for GOPs of different original structure. Furthermore the description also comprises errors and inconsistencies in particular in those parts which describe the transition clip in the context of the specific embodiment.

2.10   In addition to the lack of clarity as to which frames are included in the transition clip, there is also a lack of clarity as to the technical meaning and effect of the "encoded frames" which are included in the transition clip. In the context of the technical problem underlying the invention (see point 2.2 above)

the mere presence of these encoded frames in the
transition clip does not have a technical function or
effect that can be understood from the description,
since the difference in VBV levels is accommodated by
responsively adapting the re-encoding. It is not clear
how the copied encoded frames can contribute to an
adjustment of the VBV levels. Therefore their technical
meaning in the context of claim 1 does not help in
deciding which frames have to be included and which
have not. In this context the appellant has argued that
the temporal reference fields were restamped in order
to achieve a seamless splice when the transition clip
was put in transmission order. However claim 1 does not
specify a restamping of temporal reference fields. The
appellant has also argued that the presence of these
encoded frames allowed for a smoothing of the
transition resulting from the reordering of the frames
in transmission order. However the appellant did not
specify which parameter was smoothed by the reordering,
nor does the description disclose how smoothing can be
achieved by merely copying encoded frames.

The appellant's argument that there was no requirement
in the EPC that every feature in a claim have a
technical effect did not convince the board in the
context of the objection raised against claim 1. The
transmission clip is necessary for solving the
technical problem with which the application is
concerned and is thus an essential feature of the
invention (see points 2.1 to 2.4 above). In particular
the transmission clip is formed from re-encoded frames
and encoded frames. Thus the technical meaning of both
the re-encoded frames and the encoded frames in the
context of the technical problem with which the

application is concerned must be clear from the wording
of claim 1 alone.

2.11   In view of the above the board judges that claim 1
        according to the main request is not clear (Article 84
        EPC 1973).

3.   *Auxiliary request: clarity of claim 1 (Article 84
        EPC 1973)*

        The objection as to lack of clarity raised in
        point 2.10 above applies to claim 1 according to the
        auxiliary request as well. More specifically, claim 1
        according to the auxiliary request specifies that the
        transition clip is formed from the re-encoded frames
        and the "encoded frames consisting of in transmission
        order the next I-frame and all frames which occur in
        display order after the next I-frame and occur in
        transmission order before the following I-frame". Hence
        the encoded frames are selected from the second
        transport stream so as to comply with two different
        conditions. Nevertheless the technical meaning of this
        selection is not clear from claim 1. If it is assumed
        that the original transmission order in the second
        stream is maintained in the first part of the spliced
        stream (i.e. the order as shown in the bottom drawing
        of figure 6: 25, 23, 24, 28), then the first frame to
        be displayed, which is transmitted in the second stream,
        would be frame 23 contrary to what is stated in the
        description (see page 18, lines 4 to 6). The
        description does not provide support which could serve
        as guidance as to how the copied frames have to be
        selected since it does not set out how the inclusion of
        these frames contribute to an adjustment of the VBV

levels. Moreover, the mere selection of frames specified in claim 1 of the auxiliary request does not result in a seamless splice. As discussed in the context of the main request, the appellant has argued that the temporal reference fields were restamped in order to achieve a seamless splice when the transition clip was put in transmission order. However claim 1 of the auxiliary request does not specify a restamping of temporal reference fields. Hence the board judges that claim 1 according to the auxiliary request is not clear (Article 84 EPC 1973).

4.   Under these circumstances the decision under appeal cannot be set aside and the appeal must be dismissed. Furthermore there is no need to decide whether the application meets the other provisions of the EPC referred to in the reasons for refusing the application given in the decision under appeal.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

L. Fernández Gómez   F. Edlinger

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