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**Datasheet for the decision
of 26 June 2014**

Case Number: T 1834/12 - 3.5.04

Application Number: 05015337.8

Publication Number: 1608181

IPC: H04N7/26

Language of the proceedings: EN

Title of invention:

Selection of reference pictures for coding of interlaced video data

Applicant:

LG Electronics, Inc.

Headword:

Relevant legal provisions:

EPC 1973 Art. 76(1), 56

Keyword:

Divisional application - subject-matter extends beyond content of earlier application (no, after amendment)
Inventive step - (yes)

Decisions cited:

Catchword:



**Beschwerdekammern
Boards of Appeal
Chambres de recours**

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Case Number: T 1834/12 - 3.5.04

**D E C I S I O N
of Technical Board of Appeal 3.5.04
of 26 June 2014**

Appellant: LG Electronics, Inc.
(Applicant) 20, Yoido-Dong,
Yongdungpo-gu
Seoul (KR)

Representative: Diehl & Partner GbR
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted on 23 February
2012 refusing European patent application
No. 05015337.8 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman F. Edlinger
Members: C. Kunzelmann
T. Karamanli

Summary of Facts and Submissions

I. The appeal is against the decision of the examining division to refuse European patent application No. 05 015 337.8 under Article 97(2) of the European Patent Convention (EPC). The application had been filed as a divisional from earlier application No. 04 716 800.0 filed as international application PCT/KR/2004/000445 and published as WO 2004/080078 A1.

II. The decision under appeal made reference to documents D1 to D17. The application was refused on the ground that the subject-matter of claim 1 of both requests then on file did not involve an inventive step within the meaning of Article 56 EPC in view of D3 alone or in combination with D1 or D2.

D1 WANG L. et al. 'Macroblock Adaptive Frame/Field Coding for Interlace Sequences'.
Joint Video Team (JVT) of ISO/IEC MPEG & ITU-T VCEG (ISO/IEC JTC1/SC29/WG11 and ITU-T SG16 Q.6), 4th meeting: Klagenfurt, AT, 22 to 26 July 2002, document JVT-D108, XP030005380.

D2 FOGG C. et al. 'Adaptive Field/Frame Block Coding Experiment Proposal'.
ITU-T, SG16 Q.6 Video Coding Experts Group VCEG, Santa Barbara meeting, CA, USA, 24 to 27 September 2001, document VCEG-N76, pages 1 to 7, XP030003323.

D3 WIEGAND T. 'Study of Final Committee Draft of Joint Video Specification (ITU-T Rec. H.264 | ISO/IEC 14496-10 AVC)'.
Joint Video Team (JVT) of ISO/IEC MPEG & ITU-T VCEG (ISO/IEC JTC1/SC29/WG11 and ITU-T SG16 Q.6), 6th meeting: Awaji Island, JP,

5 to 13 December 2002, document JVT-F100,
pages i to xv, 1 to 226, XP030005665.

- III. The applicant appealed against this decision and filed claim 1 according to a main and a first auxiliary request with the statement of grounds of appeal. The applicant/appellant contested that D3 had been made available to the public before the priority date of the present application. The appellant also submitted arguments as to why the subject-matter of claim 1 of both requests involved an inventive step over D3 alone or in combination with D1 and/or D2.
- IV. In a letter dated 17 July 2012 the appellant proposed consolidation of the appeal proceedings in cases T 1807/12, T 1834/12, T 1808/12 and T 1833/12 since they concerned the refusals of four applications which all belonged to the same patent family derived from international application PCT/KR2004/000445. The four appeal cases dealt with essentially identical subject-matter. The appellant also requested acceleration of the appeal proceedings.
- V. In a communication pursuant to Rule 100(2) EPC the board informed the appellant that it intended to co-ordinate the four appeal cases as far as legally and practically possible but that it had not formally consolidated the proceedings according to Article 10(2) of the Rules of Procedure of the Boards of Appeal (RPBA). The board also indicated that it had given priority to these four cases. Moreover, the board gave a preliminary opinion that D3 was available to the public before the priority date of the present application.

- VI. In a letter of reply dated 23 October 2013 the appellant submitted observations on the public availability of D3. In a further letter dated 8 November 2013 the appellant drew the board's attention to decisions T 762/12 and T 763/12 in which the availability to the public of contributions to meetings of a standardisation group had been an issue.
- VII. In a communication pursuant to Article 15(1) RPBA dated 31 January 2014 the board expressed doubts that the subject-matter of claim 1 of both the main and the auxiliary request was disclosed in the earlier application as filed. Reference was made to Article 76(1) EPC 1973. The board also raised an objection under Article 84 EPC 1973. Furthermore, the board took note of the appellant's replies dated 23 October 2013 and 8 November 2013.
- VIII. With a letter of reply dated 23 May 2014 the appellant filed new sets of claims according to second to fifth auxiliary requests.
- IX. Oral proceedings before the board were held on 24 to 26 June 2014 for the four cases T 1807/12, T 1834/12, T 1808/12 and T 1833/12. During the oral proceedings for the present case T 1834/12 the appellant filed a new sole request comprising claim 1 received on 26 June 2014 and new description pages 1 to 19 (including page 4a) received on 26 June 2014.
- X. The appellant's final requests were that the decision under appeal be set aside and that a patent be granted in the following version:
Description, pages 1 to 19 filed during oral proceedings on 26 June 2014;

Claim 1 according to the sole request filed during oral proceedings on 26 June 2014; and
Drawings, sheets 1/12 to 12/12 as originally filed.

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

XII. Claim 1 according to the sole request reads as follows:

"A method of coding a current field macroblock of a B-frame, comprising:
obtaining a reference frame picture list including multiple reference frame pictures;
determining a reference frame picture index of the multiple reference frame pictures in the reference frame picture list based on display order information for the multiple reference frame pictures, the reference frame picture index numbers being allocated in a reverse order to the reference frame pictures whose display order is lower than the display order of a current frame picture and the remaining reference frame picture index numbers being allocated in the display order to the reference frame pictures whose display order is higher than the display order of the current frame picture, wherein the current frame picture includes the current field macroblock; and
reordering the reference frame picture index allocated to each reference frame picture in the reference frame picture list;
characterized by
alternately allocating reference field picture indexes that are increased by one to reference field pictures, starting from the reference field picture having a parity equal to the parity of a field picture containing the current field macroblock to the reference field picture having a parity different from

the parity of the field picture containing the current field macroblock, while starting from a reference field picture index value of "0" and sequentially visiting the reference frame pictures according to the order of the reference frame picture index, such that the reference field picture has a parity equal to the current field macroblock when the reference field picture index is even, and the reference field picture has a parity different from the current field macroblock when the reference field picture index is odd; and performing motion compensation for the current field macroblock in the B-frame by using the reference field picture indicated by the reference field picture index."

XIII. The reasons for the decision under appeal may be summarised as follows:

The exact publication date of D3 was not available. Nevertheless it was beyond any reasonable doubt that D3 was published before 3 March 2003, the priority date of the present application. For instance, a number of documents proposing changes to D3 had been finalised on 3 March 2003 or earlier.

D3 was considered as the closest prior art. A relevant paragraph of D3 was page 105, lines 10 to 19 in subclause 8.4.2.1. The subject-matter of claim 1 of the main and auxiliary requests differed from that known from D3 in that the selected reference field picture had the same parity as the current field macroblock if the reference field picture index was an even value. This differing feature solved the problem of reducing the code amount for coding reference field indices in a macroblock adaptive frame-field (MBAFF) coding mode. The

solution to this problem, as specified in claim 1, was obvious with respect to D3 alone and as well with respect to the combination of D3 with D1 or D3 with D2. D3 disclosed a field to frame indices mapping which was performed during decoding. From this mapping it was clear that during encoding always two field indices were associated with one frame index, using two equations, namely

- reference field picture index = 2 * reference frame picture index, and

- reference field picture index = 2 * reference frame picture index + 1.

D3 did not disclose which field of a reference frame received the higher index and which received the lower index for MBAFF. A person skilled in the art would have used context adaptive field mapping to reduce the code amount. Such a context adaptive field mapping was given in subclauses 8.2.6.2.4 and 8.2.6.2.5 of D3 for a closely related coding mode, adaptive frame-field selection on picture level (PAFF). This mapping led to even indices 0, 2, 4, ... for reference fields of the same parity as the current field and odd indices 1, 3, 5, 7, ... for reference fields of different parity. This adaptive selection would on average reduce the code amount for coding the reference field indices since lower indices would be entropy coded using shorter codes.

Moreover, the differing feature was also known from D1 and D2. Hence the subject-matter of claim 1 of the main and the auxiliary request did not involve an inventive step.

XIV. The appellant's arguments may be summarised as follows:

D3 did not qualify as prior art under Article 54(2) EPC. D3 had not been distributed in printed form and

its public availability before the priority date of the present application was not established. Nowadays D3 was available in the internet archive at http://wftp3.itu.int/av-arch/jvt-site/2002_12_Awaji/ but it had been put there only in 2005. It might have been available from another ftp site earlier but it was not clear whether the other ftp site was freely accessible to the public. None of the contributions commenting on D3 had been submitted prior to the priority date of the present application but at the earliest **on** the priority date. The finalisation date of these contributions was no proof of an earlier availability of D3 itself as D3 was based on a previous version so that contributions only needed to be checked against modifications made to the previous version of that document. This was possible within 24 hours.

According to D3, starting from a picture number of a macroblock on a field basis the picture number of a frame on a frame basis was derived using a formula. However, this derivation was ambiguous and thus not reversible. It was clear from subclause 8.4.2.1 of D3 that the video experts drafting D3 were uncertain whether the formula given in D3 was correct at all.

The invention sought to provide an effective and reversible method of reliably addressing macroblocks on a field basis when starting from frames on a frame basis and vice versa. The general teaching of the invention was a reversible allocation of reference field picture indices on the basis of reference frame picture indices (reversible in the sense that it allowed the reconstruction of the reference frame picture indices from the reference field picture indices) and which could be used for both coding and decoding moving pictures. This reversibility had the

advantage that only the reference field picture indices (but not the reference frame picture indices) had to be transmitted to the decoder. This reduced the required code amount. Claim 1 related to one specific reversible allocation. The allocation was based on the reordered reference frame picture list. A number of reversible allocations was in principle conceivable, and none of the documents D1 to D3 suggested the specific allocation of claim 1. Hence the method of claim 1 involved an inventive step. The examining division's considerations were based on hindsight since a person skilled in the art, starting from the irreversible allocation disclosed in D3, would have had no reason to provide a reversible allocation.

Reasons for the Decision

1. The appeal is admissible.
2. *Amendments (Article 76(1) EPC 1973, Article 123(2) EPC) and clarity (Article 84 EPC 1973)*
 - 2.1 The precharacterising portion of claim 1 is derivable *inter alia* from page 1, lines 4 to 8 and 18 to 20, page 3, lines 5 to 18, and page 4, lines 12 to 18 of the published earlier application. The characterising portion is derivable from page 12, lines 20 to 28 and page 11, lines 13 to 25. The starting reference field picture index value of 0 and the resulting relationship between the parity of the current field macroblock and the reference field picture index value (odd or even) is disclosed in figure 11 of the published earlier application. The description of this divisional application is essentially the same as that of the published earlier application, with the text of the

claims of the published earlier application added at the end of the description, and the figures of the two applications are the same. The description of the present divisional application has been amended so that it is in line with the claim, and the prior-art documents whose public availability is undisputed have been acknowledged. Minor editorial amendments made in the first-instance proceedings have been maintained in the appeal proceedings. Thus the board is satisfied that the requirements of Article 76(1) EPC 1973 and of Article 123(2) EPC are met.

2.2 The claim clearly specifies a method for coding a current field macroblock of a B frame and in particular the allocation of indices described as "case 3" for B frames and reference frame list 0 illustrated in figure 11. Thus the board is satisfied that the requirements of Article 84 EPC 1973 are met.

3. *Novelty and inventive step (Articles 54(1), 56 EPC 1973)*

3.1 The steps of alternately allocating reference field picture indices (upon correct interpretation, reference field picture index numbers) as specified in the characterising portion of claim 1 are not disclosed in any of the available prior art documents. Thus the method of claim 1 is new (Article 54(1) EPC 1973).

3.2 The board has made an assessment of inventive step (Article 56 EPC 1973) on the basis of the hypothesis that D3 is state of the art according to Article 54(2) EPC 1973. Concerning the relevant disclosure of D3, the appellant has not contested that D3 may be considered as the closest prior art and discloses the features of the precharacterising portion of claim 1. These

features are also indicated in the description (pages 1 to 4 of the published earlier application) as features of the background art.

3.3 In respect of the characterising portion of claim 1, the following parts of D3 are relevant:

- subclause 8.4.2 "Decoding process for Inter prediction samples", in particular subclause 8.4.2.1 "Reference picture selection process", more particularly page 105, lines 10 to 19,
- subclauses 8.2.6 "Decoding process for reference picture lists construction" and 8.2.7 "Decoded reference picture marking process".

3.4 In particular, subclause 8.4.2.1 is concerned with the derivation of the reference picture on the basis of an input reference index and a reference picture list, the reference index being an index into the reference picture list. *Inter alia*, the subclause indicates by means of a formula which reference field is output if the reference pictures are frames and the current macroblock is a field macroblock. However, as indicated by the appellant, this formula is incorrect (and indeed, in later versions of the draft standard D3 another formula is used). An expert editing D3 even inserted a note in subclause 8.4.2.1 that the formula appeared to be incorrect.

3.5 Thus, subclause 8.4.2.1 is concerned with determining the reference field to be output in the decoding process. It is not concerned with the coding process and in particular not with method steps of allocating reference field picture indices (i.e. index numbers) to reference field pictures in the context of coding a current field macroblock of a B frame. For instance,

- the parity of the current field macroblock is not considered in this subclause.
- 3.6 The other parts of D3 are not more relevant than those listed in point 3.3 above. Thus, even taking into account that the index numbers allocated to reference pictures in the coding and decoding processes must correspond to each other, D3 does not comprise any specific teaching as to how reference field picture index numbers should be allocated to reference field pictures of reordered reference frame pictures in a process of coding a current field macroblock of a B frame.
- 3.7 The decision under appeal dealt with different claims. In the context of the claims then on file the examining division considered that a person skilled in the art would have used context adaptive field mapping to reduce the code amount. Such a context adaptive field mapping was given in D3 for a closely related coding mode, adaptive frame-field selection on picture level (PAFF) and would on average reduce the code amount for coding the reference field indices. Reference was made to subclauses 8.2.6.2.4 and 8.2.6.2.5. The board notes that the mapping considered in the decision under appeal may lead to the same indices as the allocation specified in present claim 1.
- 3.7.1 Subclauses 8.2.6.2.4 and 8.2.6.2.5 of D3 concern initialisation processes, the reordering taking place on reference picture lists output by the initialisation processes (see subclauses 8.2.6.3 to 8.2.6.3.2). However, as convincingly argued by the appellant, according to present claim 1 the allocation of reference field picture index (numbers) is based on the reordered reference frame picture index. Thus applying

- context adaptive field mapping as considered in the decision under appeal in the context of subclause 8.4.2.1 would not result in the method of claim 1.
- 3.8 Similar consideration are valid for D1 and D2. In particular, D2 discloses a correspondence between "code numbers" and reference frames in that codes 0 and 1 correspond to the two fields of a reference frame "1 frame back", codes 2 and 3 correspond to two fields of a reference frame "2 frames back" etc., same-parity fields having even code numbers and opposite-parity fields having odd code numbers. However, D2 is silent as to the method with which this correspondence is achieved and also as to how any reordering of the reference frame picture index is taken into account.
- 3.9 Moreover, as convincingly argued by the appellant, the method of present claim 1 involves a reversible allocation of reference field picture index numbers on the basis of reference frame picture index numbers (reversible in the sense that it allows the reconstruction of the reference frame picture index numbers from the reference field picture index numbers). This reversibility has the advantage that only the reference field picture index (but not the reference frame picture index) needs to be transmitted to the decoder, even though this advantage is not explicitly discussed in the description. Also the discussion of the reference frame picture indices and reference field picture indices in D1, D2 and D3 does not mention this advantage of particular allocations.
- 3.10 In view of the above, the board judges that the method of present claim 1 was not obvious in view of D1, D2

and D3 and the common general knowledge of a person skilled in the art.

4. In view of the considerations in points 3.2 to 3.10 above, there is no need for the board to decide whether D3 is state of the art according to Article 54(2) EPC 1973 for the present application.
5. The board does not see any other objection to granting a patent with the present application documents.

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 grant a patent in the following version:

Description:

Pages 1 to 19 received during oral proceedings on 26 June 2014;

Claims:

Claim 1 of the sole request received during oral proceedings on 26 June 2014; and

Drawings:

Sheets 1/12 to 12/12 as originally filed.

The Registrar:

The Chairman:



K. Boelicke

F. Edlinger

Decision electronically authenticated