

Internal distribution code:

- (A) [-] Publication in OJ
- (B) [-] To Chairmen and Members
- (C) [-] To Chairmen
- (D) [X] No distribution

**Datasheet for the decision
of 20 July 2021**

Case Number: T 0748/17 - 3.5.04

Application Number: 12787579.7

Publication Number: 2772053

IPC: H04N7/26

Language of the proceedings: EN

Title of invention:

DETERMINING BOUNDARY STRENGTH VALUES FOR DEBLOCKING FILTERING
FOR VIDEO CODING

Applicant:

Qualcomm Incorporated

Headword:

Relevant legal provisions:

RPBA 2020 Art. 13(2)

Keyword:

main and sole request - admittance (no)

Decisions cited:

Catchword:



Beschwerdekammern
Boards of Appeal
Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 0748/17 - 3.5.04

D E C I S I O N
of Technical Board of Appeal 3.5.04
of 20 July 2021

Appellant: Qualcomm Incorporated
(Applicant) 5775 Morehouse Drive
San Diego, CA 92121-1714 (US)

Representative: Bentall, Mark James
Reddie & Grose LLP
The White Chapel Building
10 Whitechapel High Street
London E1 8QS (GB)

Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 9 November 2016
refusing European patent application
No. 12787579.7 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair B. Willems
Members: B. Le Guen
G. Decker

Summary of Facts and Submissions

- I. The appeal is against the decision to refuse European patent application No. 12 787 579.7, published as international application WO 2013/063117 A1.
- II. The decision was based on the grounds that the independent claims of all three requests then on file lacked clarity (Article 84 EPC) and their subject-matter lacked inventive step (Article 56 EPC).
- III. The applicant (appellant) filed notice of appeal. With the statement of grounds of appeal, the appellant re-filed the claims of the main request that had formed the basis of the decision under appeal. It also filed amended claims according to a first auxiliary request and a second auxiliary request. The appellant provided a basis for the claims in the application as filed, as well as arguments as to why the claims were clear and why their subject-matter involved an inventive step.
- IV. A summons to oral proceedings was issued on 20 November 2020. In a communication under Article 15(1) RPBA 2020 (OJ EPO 2019, A63), annexed to the summons, the board *inter alia* expressed its preliminary opinion that claim 1 of each request then on file lacked clarity (Article 84 EPC) because the expression "associated with" was not clear when it referred to either an association between a video block and a transform unit or an association between a video block and reference pictures or motion vectors.

- V. By letter dated 25 May 2021, the appellant requested that the oral proceedings scheduled for 20 July 2021 take place via videoconference over IP.
- VI. With a letter of reply dated 18 June 2021, the appellant filed amended claims according to a third and a fourth auxiliary request and submitted reasons why these requests should be admitted into the appeal proceedings in accordance with Article 13 RPBA 2020. The appellant stated *inter alia* that the amended claims of these requests addressed the objections raised by the board under Article 84 EPC.
- VII. On 20 July 2021, the oral proceedings before the board were held by videoconference, as requested by the appellant.

During the oral proceedings, the board referred to the clarity issue raised under point 3.5 of its communication with respect to the expression "associated with" (see section IV above). Using the "Share Screen" option in Zoom, it showed the appellant a document containing drawings that illustrated possible partitions of a coding unit into prediction units and transform units as well as possible meanings of the expression "associated with" ("document D"). A copy of the document was sent to the appellant via email.

During the oral proceedings, the appellant filed amended claims according to a new "Main Request 20 July 2021" in clean and marked-up versions. It declared that it was withdrawing all previous requests, meaning that the new main request was the appellant's sole request.

VIII. The appellant's final request was that the decision under appeal be set aside and that a European patent be granted on the basis of the claims of the main request filed during the oral proceedings on 20 July 2021.

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

IX. Claim 1 of the main request reads as follows:

"A method of coding video data, the data comprising one or more coding units, each coding unit comprising video blocks of samples including a first video block and a second video block wherein the first video block and second video block are neighboring coding units, CUs, transform units, TUs, or prediction units, PUs, the method comprising:

associating (260), without determining whether an edge between the first video block (102) and the second video block (104) is a coding unit, CU, edge, a first boundary strength value (262) with the edge in response to determining that the first video block or the second video block is associated with an intra-predicted CU wherein the first boundary strength value (262) equals 2 indicating that a deblocking filter is enabled having a threshold value, t_c determined based on an offset, $TcOffset$, equal to 2 and wherein the boundary strength value is computed including 4 lines of values parallel to the edge and 4 lines of values perpendicular to the edge;

associating (264) a second boundary strength value (266) with the edge in response to determining that the first video block and the second video block are not associated with an intra-predicted CU and that

the first video block or the second video block are associated with a transform unit, TU, with a non-zero transform coefficient level and wherein the first video block or the second video block are associated with the transform unit when sample values in each of the first video block or second video block are based on a residual video block associated with the Transform Unit and wherein the second boundary strength value (266) equals 1 indicating that the deblocking filter is enabled having a threshold value, t_c determined based on an offset, TcOffset, equal to 0;

associating either the second boundary strength value (266) or a third boundary strength value (280) with the edge when the first video block and the second video block are not associated with an intra-predicted CU and the first video block and the second video block are not associated with a TU with a non-zero transform coefficient level, wherein the second boundary strength value is associated with the edge when one or more of the following additional conditions are satisfied and wherein the third boundary strength value equals 0 indicating that the deblocking filter is disabled, and

wherein the reference pictures and the motion vectors in the following additional conditions are reference pictures and motion vectors of the prediction units associated with the video blocks, wherein the video blocks are associated with a prediction unit when sample values of each video block are based on a predicted video block associated with the PU, and wherein the third boundary strength value (280) is associated with the edge when all of the following additional conditions are not satisfied:

a first condition that the first video block and the second video block are associated (268) with different reference pictures or are associated with different numbers of motion vectors,

subsequent to the first condition, a second condition that the first video block and the second video block are each associated (272) with one motion vector and the absolute value of the difference between horizontal dimension components of the motion vectors associated with the first video block and the second video block is greater than or equal to one,

subsequent to the second condition, a third condition that the first video block and the second video block are each associated (274) with one motion vector and the absolute value of the difference between vertical dimension components of the motion vectors associated with the first video block and the second video block is greater than or equal to one,

subsequent to the third condition, a fourth condition that the first video block and the second video block are each associated (276) with two motion vectors and, for at least one pair of the motion vectors associated with the first video block and the second video block, the absolute value of the difference between horizontal dimension components of the motion vectors in the pair is greater than or equal to one, and

subsequent to the fourth condition, a fifth condition that the first video block and the second video block are each associated (278) with two motion vectors and, for at least one pair of the motion vectors associated with the first video block and the second video bloc [sic], the absolute value of the difference between

vertical dimension components of the motion vectors in the pair is greater than or equal to one; and

applying the deblocking filter to samples associated with the edge when the edge is associated with the first boundary strength value (262) or the second boundary strength value (266), but not the third boundary strength value (280)."

- X. The appellant's arguments, in so far as relevant to the present decision, may be summarised as follows.

The complexity of the case and the fact that the clarity issue as regards the expression "associated with" was not clear to the appellant until the oral proceedings, when the board shared document D, were cogent reasons for filing the main request. Therefore, the main request should be admitted into the appeal proceedings.

Reasons for the Decision

1. The appeal is admissible.
2. *Background of the invention*
 - 2.1 Partitioning a picture into blocks is standard practice in the domain of video coding. A block may relate *inter alia* to a coding unit for which a prediction mode (intra/inter) is defined, to a prediction unit within a coding unit or to a transform unit within a coding unit.
 - 2.2 A drawback of block-based video coding is the "blocking artefact" that may appear at the boundary between

blocks after the video is decoded and reconstructed, especially when high compression factors are used.

2.3 To reduce this artefact, it is standard practice to apply a deblocking filter to the samples on each side of the boundaries between blocks.

2.4 The latest working draft of the High Efficiency Video Coding (HEVC) standard before the application's priority date specifies a deblocking filter process that includes steps of identifying the edges of prediction units and transform units in a coding unit and determining boundary strength values for these edges. The boundary strength values are then used to determine whether and how to apply the deblocking filter to samples on each side of the edges.

2.5 One aim of the application in hand is to simplify the determination of the boundary strength values (see paragraphs [0027] and [0126] of the description).

3. *Main request, admittance (Article 13(2) RPBA 2020)*

3.1 The main request was filed after notification of the summons to oral proceedings. Since this notification was issued after the date on which the RPBA 2020 entered into force (i.e. 1 January 2020; see Article 24(1) RPBA 2020), Article 13(2) RPBA 2020 applies to the question of whether to admit this request (see Article 25(1) and (3) RPBA 2020).

3.2 Under Article 13(2) RPBA 2020, any amendment to a party's appeal case made after notification of a summons to oral proceedings will, in principle, not be taken into account unless there are exceptional

circumstances, which have been justified with cogent reasons by the party concerned.

Article 13(2) RPBA 2020 imposes the most stringent limitations on appeal submissions made at an advanced stage of the proceedings (see document CA/3/19, section VI, Explanatory remarks on Article 13(2), first paragraph, second sentence).

- 3.3 When exercising its discretion under Article 13(2) RPBA 2020, the board may also rely on criteria set out in Article 13(1) RPBA 2020 (document CA/3/19, section VI, Explanatory remarks on Article 13(2), fourth paragraph).

In the case of an amendment to a patent application, one of the criteria set out in Article 13(1) RPBA 2020 is "*whether the party has demonstrated that any such amendment, prima facie, overcomes the issues raised ... by the Board and does not give rise to new objections*".

- 3.4 In the case in hand, the board is not convinced that the discussion regarding the expression "associated with" that took place during the oral proceedings went beyond the clarity issue it had raised in its communication (see point IV. *supra*). Hence, it is not convinced that there were cogent reasons for not filing the main request until the oral proceedings.
- 3.5 Moreover, the appellant has not demonstrated that claim 1 of the main request *prima facie* overcomes this clarity issue.

In its letter dated 18 June 2021 (see page 15, penultimate paragraph) the appellant submitted that the video block used as a processing unit could operate

within one transform unit. At the oral proceedings, the appellant further submitted that the expression "associated with" meant "within". In the discussions regarding the objection raised under point 3.5 of the board's communication (see also section IV above and document D), the board pointed out that one of the options in claim 1 of the main request filed with the statement of grounds of appeal was that a coding unit comprised one video block, i.e. that a video block was a coding unit. In that case, claim 1 of the main request filed with the statement of grounds of appeal would imply verifying whether a coding unit was within a transform unit with a non-zero transform coefficient level. This would run counter to the normal meaning of coding units and transform units, i.e. that transform units are within coding units because they are obtained by recursively partitioning a coding unit (see also paragraph [0052] of the description of the application in hand).

Amended claim 1 of the main request filed during the oral proceedings specifies that "*the first video block and second video block are neighboring coding units, CUs, transform units, TUs, or prediction units, PUs*". Hence, one of the options defined by the claim is that the video blocks used as processing units for computing boundary strength values are coding units.

The appellant did not submit any arguments addressing the issue that the claim encompassed the option whereby coding units were within transform units.

Therefore, the appellant did not demonstrate that the amendment *prima facie* overcame the clarity issue raised by the board.

3.6 In addition, paragraph [0026] of the description of the application as filed - cited by the appellant as basis for the expression "*the first video block and second video block are neighboring coding units, CUs, transform units, TUs, or prediction units PUs*" - *prima facie* does not disclose that the video blocks used as processing units for computing boundary strength values are coding units, transform units or prediction units. Although this paragraph states that "*the first and second video blocks [sharing an edge] may be decoded video blocks associated with neighboring coding units (CUs), or transform units (TU) or prediction units (PU) of the CUs*", it does not specify the meaning of "associated with" or whether the first and second video blocks are processing units for computing boundary strength values.

Therefore, claim 1 of the main request *prima facie* gives rise to a new objection under Article 123(2) EPC.

3.7 In view of the above, the board, exercising its discretion under Article 13(2) RPBA 2020, does not admit the main request into the appeal proceedings.

4. *Conclusion*

Since the sole request on file is not admitted into the appeal proceedings, the appeal is to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chair:



A. Chavinier-Tomsic

B. Willems

Decision electronically authenticated