

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NETFLIX, INC.,
Petitioner,¹

v.

DIVX, LLC,
Patent Owner.

IPR2020-00052
Patent 8,139,651 B2

Before MONICA S. ULLAGADDI, SCOTT B. HOWARD, and
IFTIKHAR AHMED, *Administrative Patent Judges*.

AHMED, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision on Remand
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)

¹ The caption is updated to remove Petitioner Hulu, LLC (“Hulu”) because Hulu is no longer a party to this proceeding. *See* Paper 95 (Termination due to Settlement After Institution of Trial Only as to Hulu, LLC).

I. INTRODUCTION

We address this case on remand after a decision by the U.S. Court of Appeals for the Federal Circuit in *Netflix, Inc. v. DivX, LLC*, No. 2021-1931, 2022 WL 2298983 (Fed. Cir. June 27, 2022).

II. BACKGROUND

A. *Procedural History*

Netflix, Inc. (“Petitioner”) and Hulu, LLC² requested an *inter partes* review of claims 1, 2, 4, and 17–19 (the “challenged claims”) of U.S. Patent No. 8,139,651 B2 (Ex. 1001, “the ’651 patent”). Paper 1 (“Petition” or “Pet.”). In view of the preliminary record, we concluded that Petitioner satisfied the burden, under 35 U.S.C. § 314(a), to show that there was a reasonable likelihood that Petitioner would prevail with respect to at least one of the challenged claims. Accordingly, we instituted an *inter partes* review of all the challenged claims on the asserted grounds. Paper 31 (“Inst. Dec.”); Paper 42 (public version).

After institution, DivX, LLC (“Patent Owner”) filed a Response. Paper 54 (“PO Resp.”). Petitioner filed a Corrected Reply. Paper 67³ (“Pet. Reply”). Patent Owner filed a Sur-reply. Paper 71 (“PO Sur-reply”). On February 1, 2021, we held an oral hearing, the transcript of which is in the record. Paper 81 (“Tr.”).

Following consideration of the fully developed record, we issued a Final Written Decision (“Decision”) in which we concluded that Petitioner had not shown that claims 1, 2, 4, and 17–19 of the ’651 patent are

² On the parties’ joint motion following the remand, we terminated Petitioner Hulu, LLC from this proceeding. *See* Paper 95.

³ Petitioner’s original Reply (Paper 64) was expunged on request of the parties.

unpatentable. Paper 82 (“Dec.”). Petitioner appealed our Decision to the Federal Circuit. *Netflix*, 2022 WL 2298983 at *1. The Federal Circuit vacated our Decision as to claims 1 and 17–19 and remanded for further consideration of whether claims 1 and 17–19 are unpatentable in light of the court’s construction of a disputed limitation recited in claim 1. *Id.* at *7. The Federal Circuit affirmed our Decision as to claims 2 and 4, and thus, those claims are not before us on remand. *Id.*

The parties proposed filing a joint brief, with six pages per side, limited to identifying the issues that remain on remand and identifying relevant portions of the existing record, without submitting any new evidence or arguments, and we authorized the joint brief. Paper 87; Ex. 1028. Accordingly, the parties filed a joint brief. Paper 88 (“Joint Brief”).

For the reasons discussed below, we conclude, in view of the Federal Circuit’s claim construction and the complete record before us, that Petitioner has shown, by a preponderance of the evidence, that claims 1 and 17–19 are unpatentable.

B. Related Proceedings

The ’651 patent is asserted in *DivX, LLC v. Netflix, Inc.*, No. 2:19-cv-01602 (C.D. Cal.). Pet. 87; Paper 5, 1. The ’651 patent was also asserted *DivX, LLC v. Hulu, LLC*, No. 2:19-cv-01606 (C.D. Cal.), which has now been dismissed. Paper 94, 2–3. Unified Patents Inc. filed an *inter partes* review petition relating to the ’651 patent on which the Board entered judgment on February 8, 2021. IPR2019-01379 (“Unified IPR”), Paper 52.

C. The '651 Patent

The '651 patent, titled “Video Deblocking Filter,” was filed on May 26, 2010, and claims priority to a provisional application filed on September 20, 2004. Ex. 1001, codes (54), (22), (60).

The '651 patent concerns a method for “deblocking” a reconstructed video frame. *Id.* at code (57). “Digital video sequences are composed of frames of pixels, where the characteristics of the pixels are represented using digital information.” *Id.* at 1:17–19. “Encoding schemes, such as the scheme described in the MPEG-4 standard, can include video compression algorithms that divide frames into blocks of pixels and use the characteristics of the pixels within the blocks to encode the blocks of the video frame,”⁴ resulting in “artifacts at block boundaries when an encoded video frame is reconstructed.” *Id.* at 1:25–31. Those artifacts can be removed from a reconstructed image by “applying a deblocking filter to pixels adjacent block boundaries.” *Id.* at 1:32–34.

⁴ The MPEG-4 standard was developed by the Motion Picture Experts Group. *Id.* at 1:35–36.

Figure 1 of the '651 patent is reproduced below.

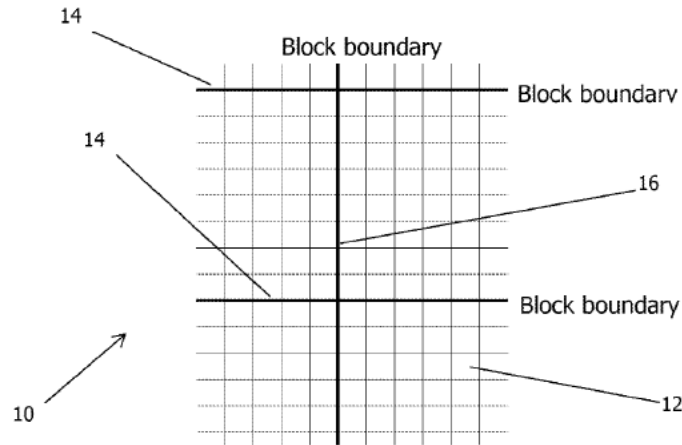


FIG. 1

Figure 1, above, illustrates a portion of reconstructed video frame 10, made up of a number of pixels 12. *Id.* at 8:6–8. Each block is made up of an 8 x 8 area of pixels, and the deblocking filter can be applied to the pixels both along horizontal boundaries 14 and vertical boundaries 16 between the reconstructed blocks. *Id.*

Figure 2 of the '651 patent is reproduced below.

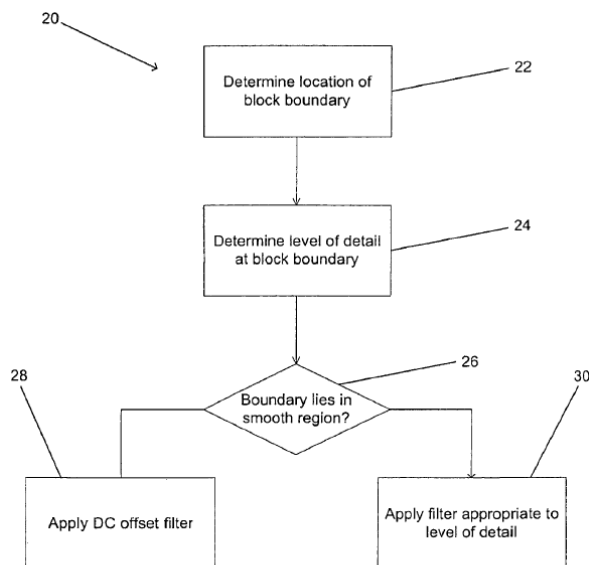


FIG. 2

Figure 2, above, illustrates the steps for applying a deblocking filter by “identifying (22) the location[s] of horizontal and vertical block boundaries,” determining (24) “[t]he level of detail of the region of the video frame in which the block boundary is located,” and applying either dc offset filter (28) or another filter appropriate to level of detail (30) to pixels adjacent the boundary depending on a determination (26) of whether the boundary lies in a smooth region or in a region with a higher level of detail. *Id.* at 8:20–31. A deblocking filter can be applied to pixel chrominance and/or to pixel luminance. *Id.* at 8:34–37.

D. Challenged Claims

The Petition challenged claims 1, 2, 4, and 17–19. Claim 1 is the only independent claim and is reproduced below.

1. A method of deblocking a reconstructed video frame, comprising:
 - identifying a boundary between two blocks of the reconstructed video frame;
 - determining the level of detail of the reconstructed video frame across a region in which the block boundary is located, wherein the region includes pixels from multiple rows and multiple columns of the reconstructed video frame that encompass pixels immediately adjacent to at least two sides of the block boundary and includes at least one pixel that is not immediately adjacent to the block boundary;
 - selecting a filter to apply to predetermined pixels on either side of the block boundary based upon the determined level of detail.

Ex. 1001, 13:7–22.

E. Prior Art and Instituted Grounds of Patentability

We instituted review on the following grounds of unpatentability:

Claim(s) Challenged	35 U.S.C. § ⁵	Reference(s)/Basis
1, 17, 18	102(b)	Vehviläinen ⁶
1, 17–19	103(a)	Vehviläinen
1, 2, 4, 17–19	103(a)	Vehviläinen, Kadono ⁷

Inst. Dec. 57–58; Pet. 9, 19–52. On remand, however, only the two grounds based on Vehviläinen alone are at issue. In support of its patentability challenges, Petitioner relies on the declaration testimony of Dr. Victor Michael Bove, Jr. *See* Ex. 1003. Patent Owner relies on the declaration testimony of Dr. Chandrajit Bajaj. *See* Ex. 2050.

III. ANALYSIS

A. Principles of Law

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*,

⁵ Because the application leading to the ’651 patent was filed before March 16, 2013, patentability is governed by the versions of 35 U.S.C. §§ 102 and 103 preceding the Leahy-Smith America Invents Act (“AIA”), Pub L. No. 112–29, 125 Stat. 284 (2011).

⁶ U.S. Patent No. 6,504,873 B1, issued Jan. 7, 2003 (Ex. 1004, “Vehviläinen”).

⁷ U.S. Patent Appl. Pub. No. 2004/0076237 A1, published Apr. 22, 2004 (Ex. 1005, “Kadono”).

800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

To establish anticipation, each and every element in a claim, arranged as recited in the claim, must be found in a single prior art reference. *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008); *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383 (Fed. Cir. 2001). Although the elements must be arranged or combined in the *same way* as in the claim, “the reference need not satisfy an *ipsissimis verbis* test,” i.e., identity of terminology is not required. *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009); *accord In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990). Further, to be anticipating, a prior art reference must be enabling and must describe the claimed invention sufficiently to have placed it in possession of a person of ordinary skill in the field of the invention. *Helifix Ltd. v. Blok-Lok, Ltd.*, 208 F.3d 1339, 1346 (Fed. Cir. 2000); *In re Paulsen*, 30 F.3d 1475, 1479 (Fed. Cir. 1994).

As set forth in 35 U.S.C. § 103(a),

[a] patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

An obviousness determination requires finding “a motivation to combine accompanied by a reasonable expectation of achieving what is

claimed in the patent-at-issue.” *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367 (Fed. Cir. 2016). Petitioner cannot satisfy its burden of proving obviousness by employing “mere conclusory statements.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). Instead, Petitioner must articulate a reason why a person of ordinary skill in the art would have combined the prior art references. *In re NuVasive*, 842 F.3d 1376, 1382 (Fed. Cir. 2016).

To prevail in its challenges to Patent Owner’s claims, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d) (2019).

Petitioner asserts that Vehviläinen anticipates certain claims of the ’651 patent, and that Vehviläinen would have rendered the subject matter of certain claims of the ’651 patent obvious to one of ordinary skill in the art at the time of the invention. Pet. 19–52. We analyze the asserted grounds of unpatentability that are at issue on remand in accordance with these principles to determine whether Petitioner has met its burden in establishing unpatentability of these claims.

B. Level of Ordinary Skill in the Art

We review Petitioner’s asserted obviousness grounds in view of the understanding of a person of ordinary skill in the art at the time of the invention. *Graham*, 383 U.S. at 17. In our Decision, we found the level of ordinary skill in the art of the ’651 patent is that of “a person having a bachelor’s degree in electrical engineering, computer engineering, computer science, or a related subject, and two to three years of work experience in image and/or video processing, including previous work on the development

and application of video compression and decompression methods.”

Dec. 8–11. We adopt that finding on remand as well.

C. Claim Construction

We apply the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b), following the standard articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b) (2019). In applying this standard, we generally give claim terms their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art, at the time of the invention and in the context of the entire patent disclosure. *Phillips*, 415 F.3d at 1312–13.

1. “level of detail”

a) The Final Written Decision

Claim 1 recites “determining the level of detail of the reconstructed video frame across a region in which the block boundary is located.” See Ex. 1001, 13:11–19. We determined in the Institution Decision that “level of detail” means “level of variation in visual elements *across adjacent pixels*.” Inst. Dec. 22 (emphasis added). In the Final Decision, we found our preliminary construction to be supported by each of the disclosed embodiments as well as the definition of the term “detail” in the ’651 patent specification, and thus, we maintained our construction of the term. Dec. 12.

b) The Federal Circuit’s Decision on Appeal

In its decision on appeal, the Federal Circuit disagreed with us and construed “level of detail” as “level of variation in visual elements *across a region* of pixels.” *Netflix*, 2022 WL 2298983 at *5 (emphasis added). The court explained that “[claim 1] is not specific as to the methodology to be used in the level-of-detail calculation, nor does it specify what type of filter

should be applied based upon the determined level of detail,” but instead, “simply provides that the level of detail is calculated ‘across a region in which the block boundary is located.’” *Id.* at *4. The court found “[n]othing in the specification [that] indicates that the term ‘detail’ was intended to require that the level-of-detail calculation involve a direct comparison between the values of immediate adjacent pixels.” *Id.* at *4–5. According to the Federal Circuit:

In light of the reference in claim 1 to determining the level of detail “across a region,” the use of the phrase “across adjacent pixels” in the specification is best understood to refer to the degree of variation in pixel values across a region of contiguous pixels (i.e., a region in which each pixel is adjacent to at least one other pixel in the region), rather than being limited to a determination of variation based on direct comparisons of value between adjacent pairs of pixels.

Id. at *5. In view of this construction, the Federal Circuit directed us “to consider whether Vehviläinen discloses the ‘determining the level of detail’ step of claim 1 under the proper construction of that step.” *Id.* We apply the court’s construction in our obviousness analysis below.

2. “*selecting a filter*”

Our prior patentability determination turned on other findings and did not require us to address the parties’ dispute regarding the construction of this term. *See* Dec. On remand, we find it necessary to determine the proper meaning of this term.

a) Patent Owner’s Response

Patent Owner argues the term “selecting a filter” requires more than merely determining whether or not to apply a filter—it requires selection of a filter *from among multiple filters*. PO Resp. 32–36. Patent Owner

contends that this interpretation is consistent with the ordinary meaning of the claim language. *Id.* at 33 (citing Ex. 2001 ¶¶ 90–91). Patent Owner further contends that this understanding comports with the language of claim 19 and the embodiments described in the specification. *Id.* at 34 (citing Ex. 1001, 6:47–49, 6:53–54, 6:60, 10:45–67; Ex. 2001 ¶¶ 92, 93; Ex. 2004, 3).

Patent Owner contends that the '651 patent's prosecution history also supports its position. PO Resp. 35–36 (Ex. 1002, 107; Ex. 2001 ¶ 94; Ex. 2049 81:10–82:15). Patent Owner asserts that “in response to a rejection, the ['651 patent] applicant distinguished the invention of claim 1 from the prior art raised in the rejection expressly on the basis that the claims select a filter to apply rather than merely decide whether to apply a filter.” *Id.* at 35.

Patent Owner further contends that an embodiment disclosed in the '651 patent's provisional application shows that the level of detail across a two-dimensional region can be used to select *one of two* filters to be applied to the region. PO Resp. 41–42 (citing Ex. 2048, 3; Ex. 1001, 11:54–59). Patent Owner also points us to a different embodiment, where “after a first determination that the two-dimensional region is detailed, an additional level of detail calculation is performed for each row/column within that region, and that second calculation is used to ‘select’ a filter ‘appropriate to the level of detail’ for that row/column.” *Id.* at 42 (citing Ex. 1001, 5:34–35, 10:27–67). Patent Owner argues that in that embodiment, the step of “selecting a filter” to apply is *delayed* to include further analysis on each row/column. *Id.* at 42–43 (citing Ex. 1001, 5:29–35; 8:22–31, 10:43–67; Ex. 2001 ¶¶ 109–112). Patent Owner contends that these embodiments support its proposed construction. *Id.*

Patent Owner also points to a dictionary that defines “select” as “to choose from a number of options or alternatives.” PO Resp. 33 (citing Ex. 2082, 3).

b) Petitioner’s Reply

Petitioner responds that Patent Owner’s construction of “selecting a filter” to require selection of a filter to apply from among multiple filters “contradicts the primary embodiments” of the ’651 patent which use “the same conditional (if-else) progression that [Patent Owner] seeks to exclude.” Pet. Reply 12–13 (citing Ex. 1001, 10:19–26, 10:34–44). Petitioner argues that “[t]he claims do not preclude selecting a smooth filter, if the region is smooth, or otherwise selecting other filters based on additional comparisons—that is how the embodiments work.” *Id.* According to Petitioner, Patent Owner’s construction is based on contorting the disclosed embodiments to exclude the selection of the smooth filter. *Id.* at 13. However, Petitioner contends, claim 1 requires “selecting a filter” based on a determined level of detail across a region with “multiple rows and multiple columns,” and that the two-dimensional level of detail “is only used to select the smooth filter” and “is not used in any way to select a filter among the medium, high, or no filter options.” *Id.* (citing Ex. 1001, 10:34–63). Thus, Petitioner contends, Patent Owner’s argument excluding the selection of a single filter contradicts claim 1. *Id.* Petitioner further argues that the construction also contradicts claim 17, which compares the two-dimensional level of detail to a threshold. *Id.* Petitioner contends that if the selecting does not occur until the later one-dimensional analysis, Patent Owner’s interpretation of the term would exclude the embodiment of claim 17. *Id.*

Petitioner also argues that the prosecution history does not support Patent Owner's position. *Id.* at 11.

c) Patent Owner's Sur-reply

In its Sur-reply, Patent Owner reiterates its contention that the step of “selecting a filter” requires an actual step of selecting from amongst a plurality of filters, and not merely determining “whether or not to apply” a filter. PO Sur-reply 10; *see also id.* at 11–13

d) Our Analysis

Under the claim construction standard applied in this proceeding, “[t]he words of a claim are generally given their ordinary and customary meaning as understood by a person of ordinary skill in the art when read in the context of the specification and prosecution history.” *Thorner v. Sony Comput. Entm’t Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012) (citing *Phillips*, 415 F.3d at 1313). “There are only two exceptions to this general rule: 1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of a claim term either in the specification or during prosecution.” *Id.* (citing *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1580 (Fed. Cir. 1996)). Neither of those exceptions apply here, and for the reasons below, we disagree with Patent Owner that the plain and ordinary meaning of “selecting a filter to apply” excludes determining whether or not to apply a given filter.

We begin with the claim language at issue. *TQ Delta, LLC v. DISH Network LLC*, 929 F.3d 1350, 1357 (Fed. Cir. 2019). When considering the language of the claim overall, the usage of “selecting a filter” in the claims does not in any way indicate whether the filter has to be selected from among multiple filters. Claim 1 recites “*selecting a filter to apply to*

predetermined pixels on either side of the block boundary based upon the determined level of detail.” Ex. 1001, 13:20–22 (emphasis added). Patent Owner argues that “the claim language confirms that ‘selecting a filter’ means choosing from a number of alternative filters, not merely deciding whether or not to apply a filter,” (PO Resp. 34), but we see nothing in the claim language that suggests such a requirement. Patent Owner also points us to claim 19, arguing that selecting is not merely deciding whether to apply a filter, “since that determination is already made in [c]laim 19 by virtue of the initial sub-step of ‘exceed[ing] the threshold.’” *Id.* Again, we see nothing in claim 19 that suggests the determination of the threshold being exceeded requires a specific manner of filter selection. Instead, similar to claim 1, claim 19 recites: “when the level of detail exceeds the threshold, selecting a filter to apply to predetermined pixels.” Ex. 1001, 16:8–9. Thus, we are not persuaded that the claim language necessarily requires selecting a filter from among multiple filters.

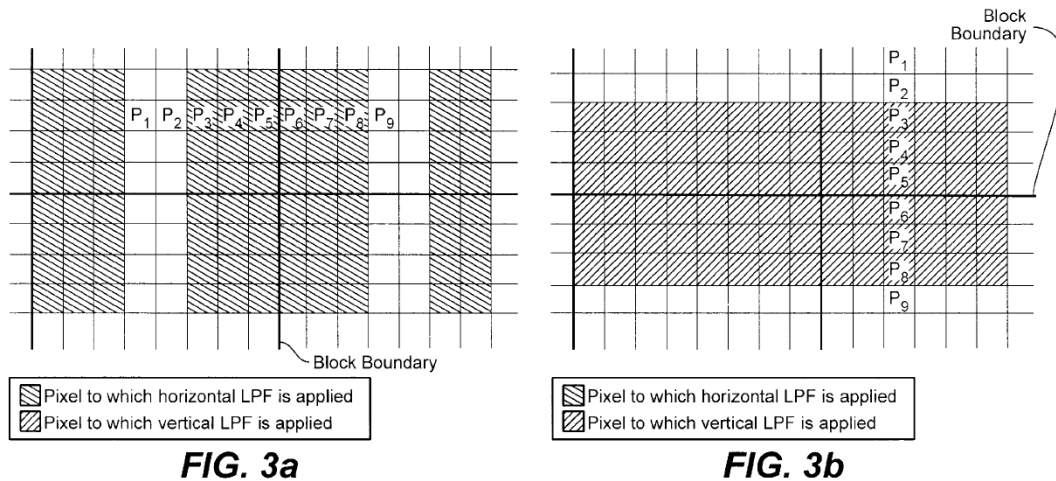
Turning to the specification, Patent Owner contends that “[e]very single embodiment of the claimed invention is described as selecting a filter from a number of alternatives rather than merely determining whether or not to apply a filter.” PO Resp. 34 (citing Ex. 2048, 3; Ex. 1001, 6:47–49, 6:53–54, 10:45–67; Ex. 2050 ¶ 93). But as Petitioner points out, at least one of the disclosed embodiments discloses one level of detail determination to select *only* the smooth filter (e.g., DC Offset), and a second determination for selecting among other filters. *See* Pet. Reply 13 (citing Ex. 1001, 10:34–63); *see also id.* (explaining how Patent Owner’s interpretation reads out the embodiment of claim 17). Patent Owner argues that, here, “the step of ‘selecting’ a filter is postponed until additional analysis is performed for each row/column, and a filter is ‘selected’ for each row/column based on all

the preceding analysis.” PO Sur-reply 12. That argument, however, ignores that, at the first step of this embodiment, the selection of a smooth filter is merely the determination of whether or not to apply a smooth filter. At bottom, the conditional if-else-if-else progression simply decides, at each stage, whether or not to apply a specific filter—i.e., the if condition checks whether or not to apply a specific filter. *See* Ex. 1001, 10:34–63. Patent Owner’s proposal to require selecting from among multiple filters reads out at least one disclosed embodiment, and we agree with Petitioner that a construction that excludes a disclosed embodiment “is rarely, if ever correct.” *See CUPP Computing AS v. Trend Micro Inc.*, 53 F.4th 1376, 1381 (Fed. Cir. 2022) (citing *Accent Packaging, Inc. v. Leggett & Platt, Inc.*, 707 F.3d 1318, 1326 (Fed. Cir. 2013)).

We are also not persuaded that the cited prosecution history supports Patent Owner’s proposed construction. Patent Owner argues that “in response to a rejection, the applicant distinguished the invention of [c]laim 1 from the prior art raised in the rejection expressly on the basis that the claims select a filter to apply rather than merely decide whether to apply a filter.” PO Resp. 35 (citing Ex. 1002, 107; Ex. 2050 ¶ 94). According to Patent Owner, the “prior art reference on which the rejection of the pending claims was based, the applicant explained, differed from the claims because it did not ‘select a filter’ to apply, as claimed, but instead ‘selectively applie[d]’ a filter, *i.e.*, merely either applied a filter or did not apply a filter.” *Id.* We do not agree with Patent Owner’s characterization of the applicant’s statements.

As the applicant explained during prosecution, the prior art at issue, U.S. Patent 6,983,079 (Ex. 1010, “Kim”), teaches “*selectively applying* the filters where ‘filtering is not performed when the difference between the

maximum pixel value and the minimum pixel value among *nine pixels centered on the current pixel* is greater than QP.” Ex. 1002, 105 (citing Ex. 1010, 8:52–54, Figs. 3a, 3b) (emphasis in original). Figures 3a and 3b of Kim, which applicant included in its response, are reproduced below.



The applicant explained that Figures 3a and 3b “show the pixel locations to which the horizontal and vertical [low pass filters (“LPFs”)] are respectively applied in low-activity blocks.” Ex. 1002, 104 (quoting Ex. 1010, 8:43–56). Applicant further pointed to Kim’s example, that “pixel P5 shown in FIG. 3(a) is not low-pass filtered if $\max(P) - \min(P) > QP$, where $P = \{P_1, P_2, \dots, P_8, P_9\}$.”⁸ *Id.* It is this aspect of “selectively applying” a filter to *each* pixel based on the values of *nine other pixels* that applicant characterized as different from the claimed invention, which instead requires “selecting a filter to apply to *predetermined pixels* on either side of the block boundary based upon the determined level of detail.” *See id.* at 107; *see also id.* at 104 (applicant’s added emphasis with underlining on this aspect of Kim’s

⁸ Kim explains that it uses this approach to “prevent real edges in the low-activity-classified block from being smoothed,” and describes it as an *additional* condition to its “low-activity-block filtering scheme.” *See* Ex. 1002, 104 (quoting Ex. 1010, 8:43–56).

teachings). We are therefore not persuaded that the applicant broadly distinguished *whether or not* to apply a given filter, as argued by Patent Owner.

In summary, based on the specification and prosecution history of the '651 patent, including the plain language of the challenged claims, we construe the claim term “selecting a filter to apply” as including determining whether or not to apply a given filter—selecting one from among one is still “selecting” a filter to apply. As a result, we need not resort to the extrinsic evidence, which, under these particular circumstances, includes a dictionary that provides multiple definitions for the word “select,”⁹ or the expert testimony that Patent Owner relies upon. *See Phillips*, 415 F.3d at 1317 (“[W]hile extrinsic evidence can shed useful light on the relevant art, we have explained that it is less significant than the intrinsic record in determining the legally operative meaning of claim language.”) (quoting *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 862 (Fed. Cir. 2004)); *id.* at 1322–23 (stating that a tribunal may “rely on dictionary definitions when construing claim terms, so long as the dictionary definition does not contradict any definition found in or ascertained by a reading of the patent documents” (quoting *Vitronics*, 90 F.3d at 1584 n.6)); *Seabed Geosolutions (US) Inc. v. Magseis FF LLC*, 8 F.4th 1285, 1290 (Fed. Cir. 2021) (“Given the clarity of the intrinsic evidence, resort to extrinsic evidence is

⁹ Notably, the definition that Patent Owner points us to relates to “information processing,” e.g., to choosing “subroutines or input/output channels,” and not specifically to image processing. *See* Ex. 2082, 3. Further, an alternate definition of the word “select,” in general computer use, is “to specify a block of data or text,” which also does not require selection of one from among many. *Id.*

unnecessary.”). The record therefore does not support Patent Owner’s position.

D. Overview of the Asserted Prior Art

1. Vehviläinen (Ex. 1004)

Vehviläinen relates to a method of filtering compressed video “based on the amount of activity inside the adjacent video blocks and the activity at the boundary between the adjacent video blocks.” Ex. 1004, codes (54), (57). Vehviläinen discloses that

If there is [a] lot of activity inside two adjacent video blocks, and at the boundary between them, that part of video frame most probably includes important information, and filtering at that area should be outlined to the minimum or completely omitted. On the other hand, if there is no or very little (probably just noise) activity in that area, the area is supposed to be “smooth” (e.g., a wall of one color), and an efficient filter can be used for a relatively large area to minimize the visible blocking effect, which is as its worst just at the “smooth” areas.

Id. at 2:46–55.

Figure 5A of Vehviläinen is reproduced below.

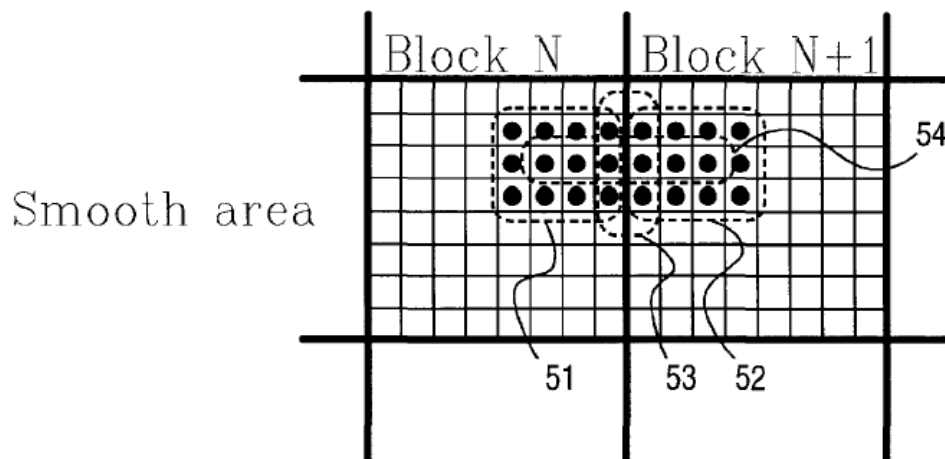


Figure 5A

Figure 5A, above, illustrates a pixel area that is used for calculation of picture activity within an area of the video frame. *Id.* at 4:11–14.

Vehviläinen discloses that calculation of variance inside the block N is done using the 12 video pixels (51) marked with black circles, using equation (4), which follows:

$$S_{IN} = x_{max} - x_{min}$$

Equation (4) uses the difference between the largest and smallest pixel value within a given set of pixels. *Id.* at 10:44–55. It is an estimation of Vehviläinen's variance calculation method provided in equation (3), which follows:

$$S = \frac{1}{(N - 1)} \sum_{i=1}^N (x_i - \bar{x})^2$$

Vehviläinen also discloses a selection process for the filtering method to be used based on whether a given area is smooth, moderate, or high activity.

Figure 6 of Vehviläinen is reproduced below.

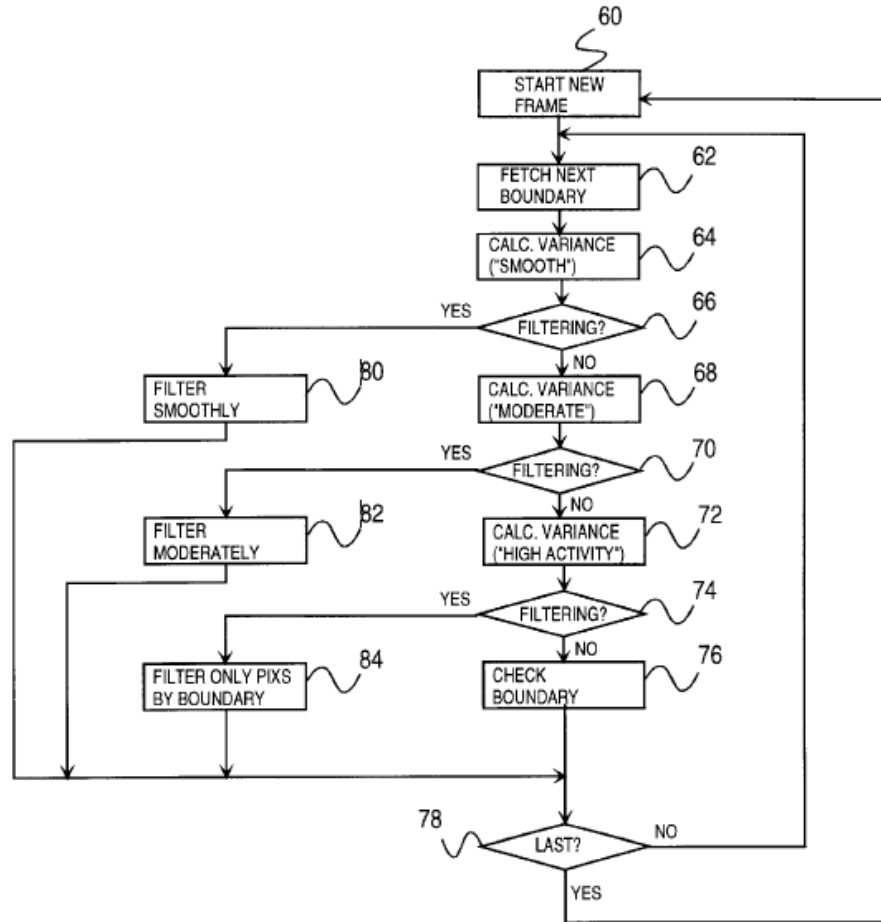


Figure 6

Figure 6, above, illustrates a flowchart for the filter selection process of Vehviläinen, including conditional steps 66, 70, and 74 that determine the filter to be applied in steps 80, 82, and 84. *Id.* at 11:4–12:6. Vehviläinen uses the same conditional equation for each of conditional steps 66, 70, and 74 to determine whether filtering is required at the boundary between adjacent video blocks. *Id.* at 9:51–53, 10:5–9. This conditional equation, labeled “equation (2),” is reproduced below:

$$IF \left[\begin{array}{c} activity_{IN} < activity_{EDGE} + MQUANT \\ AND \\ activity_{IN} < THRESHOLD_{IN} \end{array} \right] = TRUE$$

In equation (2) above, “activity_{IN} is a variance inside the block, activity_{EDGE} is a variance over the edge between adjacent blocks, THRESHOLD_{IN} is a threshold value, [and] MQUANT is a quantization value for the block under processing.” *Id.* at 9:51–66, 10:6–9.

E. Obviousness based on Vehviläinen

Petitioner contends that claims 1, 17, and 18 are unpatentable as anticipated by or obvious over Vehviläinen.¹⁰ Pet. 19–49. Petitioner also contends that claim 19 is unpatentable as obvious over Vehviläinen. Pet. 49–52. For the reasons that follow, we are persuaded that Petitioner has established by a preponderance of the evidence that claims 1 and 17–19 would have been obvious in view of Vehviläinen.

1. Independent Claim 1

a) “A method of deblocking a reconstructed video frame, comprising:”

Petitioner contends Vehviläinen teaches a method for deblocking a video frame to reduce the “blocking effect” in decoded video. Pet. 29 (citing Ex. 1004, code (57), 5:27–30; Ex. 1003 ¶ 109). According to Petitioner, Vehviläinen’s deblocking method is applied to reconstructed (decoded) video frames. *Id.* (citing Ex. 1004, 1:36–44; 4:33–55, Fig. 1; Ex. 1003 ¶ 110).

¹⁰ Petitioner presents generally the same contentions with respect to these claims under both its anticipation and obviousness grounds based on Vehviläinen. *See* Pet. 19.

Patent Owner does not present arguments as to the preamble of claim 1. *See* PO Resp. Based on the entirety of the record and for the reasons explained by Petitioner, we determine that Petitioner has proved by a preponderance of the evidence that, to the extent the preamble is limiting, Vehviläinen teaches the preamble of claim 1.

b) *“identifying a boundary between two blocks of the reconstructed video frame;”*

Petitioner contends Vehviläinen teaches identifying a boundary between two blocks of a reconstructed (decoded) video frame. Pet. 30–32 (citing Ex. 1004, 2:63–3:6, 3:28–36, Figs. 3A–3F, 4, 5A; Ex. 1003 ¶ 111). Petitioner contends that Vehviläinen’s deblocking process operates on “reconstructed” video frames (*i.e.*, after they are decoded). *Id.* at 33 (citing Ex. 1004, 1:36–44, 2:63–3:6, 4:33–36; Ex. 1003 ¶ 112). According to Petitioner, Vehviläinen addresses artifacts where “the boundaries between the different video blocks after decoding appear visible impairing the quality of the video signal presented.” *Id.* (citing Ex. 1004, 1:36–44).

Patent Owner does not present arguments as to this limitation. *See* PO Resp. Based on the entirety of the record and for the reasons explained by Petitioner, we determine that Petitioner has proved by a preponderance of the evidence that Vehviläinen teaches this limitation.

c) *“determining the level of detail of the reconstructed video frame across a region in which the block boundary is located, wherein the region includes pixels from multiple rows and multiple columns of the reconstructed video frame that encompass pixels immediately adjacent to at least two sides of the block boundary and includes at least one pixel that is not immediately adjacent to the block boundary;”*

Petitioner contends that Vehviläinen’s calculation of activity_{IN} as a measure of variance for the pixels marked by dots in Figure 5A teaches

determining the level of detail in a region of the reconstructed video frame where the block boundary is located. Pet. 33 (citing Ex. 1004, 9:50–67, 11:30–41, Fig. 5A; Ex. 1003 ¶ 113). Petitioner reproduces an annotated version of Vehviläinen’s Figure 5A (*id.* at 34), as shown below.

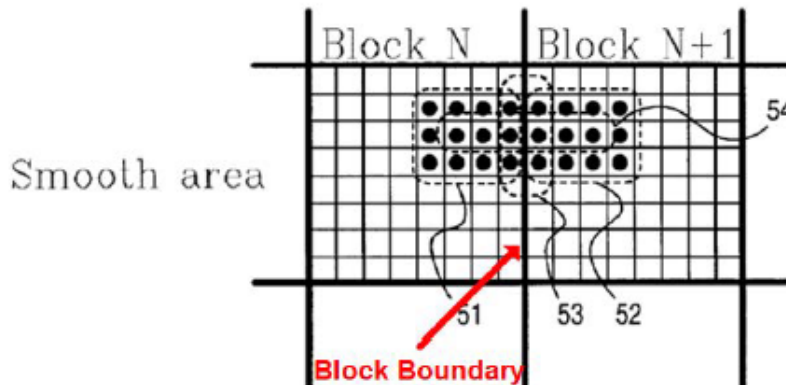


Figure 5A
(Annotations added)

Petitioner’s annotated Figure 5A of Vehviläinen, above, shows an 8 x 3 pixel area 54, comprising two regions 51 and 52 on either side of a vertical block boundary, annotated in red, and a third 2 x 3 region 53 comprising pixels immediately adjacent to the block boundary. Pet. 33–34 (citing Ex. 1004, 10:1–15, 11:29–41, Fig. 5A; Ex. 1003 ¶ 114). Referring to Figure 5A, Petitioner argues that Vehviläinen analyzes the pixels marked by dots to determine if the block boundary lies in a “smooth area.” *Id.* at 34. According to Petitioner, Vehviläinen’s teaching “is mirrored by embodiments of the ’651 patent, which similarly analyze whether the block boundary is ‘located within very *smooth* regions of a video frame’ or whether it ‘lies in a region possessing a *high level of detail*,’” and “calculates the level of detail based on the level of variation across pixels in the region.” *Id.* (citing Ex. 1001, 1:45–63).

Petitioner contends that Vehviläinen’s “min-max approximation” of pixel variance “takes the difference between the largest and smallest pixel values in an area.” Pet. 35 (citing Ex. 1004, 9:51–67, 10:44–55; Ex. 1003 ¶ 115). Petitioner further contends that Vehviläinen teaches

calculating the variance of pixels on the left side of the block boundary, shown in Figure 5A as marked pixels (dots) in block N, labelled 51, then calculating the variance of pixels on the right side of the block boundary, shown as marked pixels in block N+1, labelled 52, and then averaging the two variance calculations into a single variance value (‘activity_{IN}’) for the area.

Id. (citing Ex. 1004, 11:29–46, 11:56–12:10, Fig. 5A; Ex. 1003 ¶ 115); *see also id.* (discussing the numerical examples provided by Vehviläinen for each of those calculations). Petitioner further asserts that “[t]he variance at the boundary is called ‘activity_{EDGE}’ and ‘is calculated using formula (5)’ with the 6 pixels labelled (53).” *Id.* at 35–36. According to Petitioner, Vehviläinen teaches equation (2), which uses those variance parameters, activity_{IN} and activity_{EDGE}, together with THRESHOLD_{IN} and MQUANT values, to determine whether to apply a smooth filter. *Id.* at 36. Petitioner asserts that calculations for the moderate and high activity areas are performed “in a similar manner.” *Id.* (citing Ex. 1004, 11:56–12:10, Figs. 5B–5C; Ex. 1003 ¶ 115). Petitioner thus argues that Vehviläinen teaches determining a level of detail (activity_{IN}) across a region (the dotted area in Figure 5A) that includes a block boundary (the center line in Figure 5A) by taking an average of the variance calculations in the region. *Id.* (citing Ex. 1004, 11:29–46; Ex. 1003 ¶ 116).

Petitioner further argues that a person of ordinary skill in the art would have found it obvious to apply Vehviläinen’s teaching of taking the average of the variance calculations for determining the level of detail of the

region containing all marked pixels in Figure 5A. Pet. 36 (citing Ex. 1003 ¶ 116). Petitioner contends that doing so would have provided “a simple, efficient, and accurate method for determining the level of detail of the region.” *Id.* Petitioner contends that it would have also been obvious for one of ordinary skill in the art to determine the level of detail for just the “smooth” area (the one shown in Figure 5A) and then select the smooth filter, if the area is smooth, or the high/moderate activity filter otherwise. *Id.* at 38–39 (citing Ex. 1003 ¶¶ 120–121).

In response, Patent Owner argues that the Petition relies on an incorrect understanding of the claimed “level of detail,” and that “Vehviläinen’s variance calculation (or its approximation proxy) does not determine the level of change across adjacent pixels, as required under the proper construction of ‘level of detail.’” PO Resp. 16. Patent Owner’s remaining arguments as to this limitation are based on the construction of “level of detail” as requiring determination of the level of change *across adjacent pixels*. *Id.* at 15–22 (citing Ex. 2050 ¶¶ 53–68).

The Federal Circuit has, however, construed the “level of detail” as “level of variation in visual elements *across a region of pixels*.” *Netflix*, 2022 WL 2298983 at *5 (emphasis added). The court explained that

the use of the phrase “across adjacent pixels” in the specification is best understood to refer to the degree of variation in pixel values across a region of contiguous pixels (i.e., a region in which each pixel is adjacent to at least one other pixel in the region), rather than being limited to a determination of variation based on direct comparisons of value between adjacent pairs of pixels.

Id. Patent Owner does not dispute Vehviläinen teaches determining the level of variation in visual elements across a region of pixels. For example, Patent Owner agrees that “Vehviläinen explains, and . . . [a person of

ordinary skill in the art would have understood that] Vehviläinen’s ‘variance’ is a known statistical calculation measuring the difference between the value of each pixel in the region and *the average value of all pixels in the region.*” PO Resp. 18 (citing Ex. 1004, 2:41–45, 10:32–43); *see also* PO Sur-reply 2–4 (stating that Vehviläinen “assesses the level of change of pixels relative to the average of all pixels in the region”); Pet. Reply 5–6. Determining level of change of pixel values relative to the average value of all pixels in a region is in fact a determination of the degree of variation in pixel values across the region of pixels. Petitioner’s contentions that *Vehviläinen* variance calculation teaches determining the level of detail as claimed are thus persuasive. *See* Ex. 1004, 10:1–11:41, Fig. 5A. Based on the entirety of the record and for the reasons explained by Petitioner, we determine that Petitioner has proved by a preponderance of the evidence that Vehviläinen teaches this limitation.

d) “*selecting a filter to apply to predetermined pixels on either side of the block boundary based upon the determined level of detail*”

(1) Petitioner’s Contentions

Petitioner contends Vehviläinen teaches selecting a filter (*i.e.*, the smooth filter) to apply to predetermined pixels on either side of the block boundary based on the level of detail (activity_{IN}). Pet. 43–44 (citing Ex. 1004, Fig. 6; Ex. 1003 ¶ 126). Referring to Figure 6 of Vehviläinen, Petitioner contends that steps 66 and 80 select the smooth filter based on the determined level of detail by comparing activity_{IN} to thresholds in Equation (2), and if the comparison is true, the smooth filter is selected (Step 80). *Id.* at 44 (citing Ex. 1004, 9:51–10:9, 11:29–12:10; Ex. 1003 ¶ 127). According to Petitioner, Vehviläinen teaches analyzing only the

smooth area and then selecting between the smooth or high activity filter, based on the level of detail determined for the smooth area. *Id.* at 44–45 (citing Ex. 1003 ¶ 127). Petitioner contends that the smooth filter is applied to predetermined pixels on both sides of the block boundary—the predetermined set of six pixels (pixel area 54 in Figure 5A). *Id.* at 45 (citing Ex. 1004, 11:46–50, Fig. 4; Ex. 1003 ¶ 128). Petitioner further contends that the moderate filter is applied to a predetermined set of four pixels (pixel area 56 in Figure 5B) and the high-activity filter is applied to a predetermined set of two pixels (pixel area 58 in Figure 5C), where each set of pixels 54, 56, and 58 is bifurcated by the block boundary and therefore includes pixels on either side of the block boundary. *Id.* at 46 (citing Ex. 1004, 7:14–16, 11:63–12:3, Figs. 5B, 5C; Ex. 1003 ¶ 129). According to Petitioner, this is no different than the embodiments disclosed in the ’651 patent. *Id.* (citing Ex. 1001, 9:16–35, 10:13–67, 2:19–40, Fig. 2; Ex. 1003 ¶ 129).

Petitioner also argues that a person of ordinary skill in the art would have found it obvious, based on Vehviläinen’s teachings, to use an embodiment with a single area and decision branch, for example based on the “smooth area” of Figure 5A, determining the level of detail for just the “smooth” area and then selecting the smooth filter if the area is smooth, or the high-activity filter otherwise. Pet. 37–38 (citing Ex. 1004, 8:15–22; Ex. 1003 ¶¶ 119–120). According to Petitioner, Vehviläinen states that its invention can, of course, “be utilized with less than three branches,” and “[d]oing so would reduce complexity and the required ‘control logic,’” “particularly for applications running on performance-constrained platforms such as low-end computer processors or mobile platforms, which often had constraints on thermal dissipation, power consumption, and cost.” *Id.* at 38. Petitioner further contends that both alternatives would have been obvious

and well within an ordinarily skilled artisan's level of skill, and such a person would have had a reasonable expectation of success given that either modification involves a simple reordering of elements taught by Vehviläinen, the fact that Vehviläinen expressly teaches the modification, and the deep familiarity such a person would have had with these basic filtering and thresholding technique. *Id.*

(2) Patent Owner's Response

Patent Owner contends, based on its claim construction position, that Vehviläinen fails to teach this limitation because it uses three distinct regions and separately determines whether or not to apply each of three filters, one filter and one region at a time—never “selecting” a filter among a plurality of filters. PO Resp. 37 (citing Ex. 1004, 2:17–45; 6:40–45, 7:20–37, Fig. 3; Ex. 2050 ¶¶ 95–98). Patent Owner specifically contends that, in Vehviläinen's filtering method, each of the three filters (smooth, moderate activity or high activity) uses a different reference line and modifies a different set of pixels. *Id.* (citing Ex. 1004, 7:2–5). According to Patent Owner, Vehviläinen matches (i) the area that it analyzes to determine whether or not to apply each particular filter to (ii) the area where that filter would actually be applied, which is a different region for each of the different filters. *Id.* at 38. Patent Owner's annotated versions of Figures 5 and 3B of Vehviläinen are reproduced below.

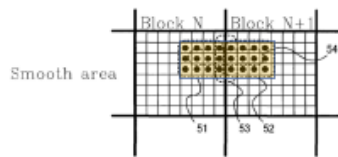


Figure 5A

Area used to determine whether or not to apply smooth filter (left) and smooth filter (right), each extending four pixels on each side of block boundary

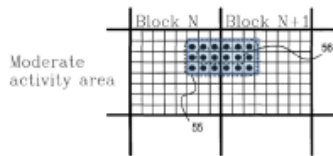


Figure 5B

Area used to determine whether or not to apply moderate activity filter (left) and moderate activity filter (right), each extending three pixels on each side of block boundary

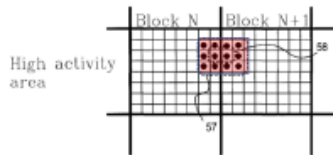
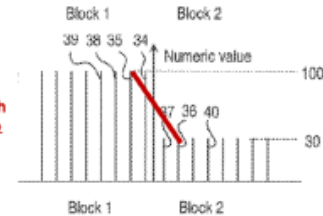
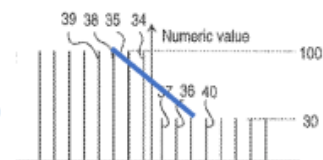
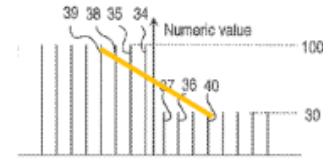


Figure 5C

Area used to determine whether or not to apply high activity filter (left) and high activity filter (right), each extending two pixels on each side of block boundary



Ex. 1004 [Vehviläinen] Fig. 5 (annotated)

Ex. 1004 [Vehviläinen] Fig. 3B (annotated)

Figures 5A–5C and 3B of Vehviläinen, above, include Patent Owner’s annotations showing the regions that Patent Owner contends are analyzed with respect to different filters. PO Resp. 39 (citing Ex. 2050 ¶ 100). According to Patent Owner, the area in Vehviläinen’s region 5A that is analyzed to determine whether or not to apply Vehviläinen’s smooth area filter is coextensive (extending four pixels on each side of the block boundary) with the reference line that would be used for Vehviläinen’s smooth filter if that filter is applied. *Id.* Similarly, the areas analyzed for determining whether to apply the moderate activity filter (Fig. 5B) and high activity filter (Fig. 5C) are coextensive with their respective filtering reference lines—one region and one line for each individual filter. *Id.* Patent Owner therefore contends that although Vehviläinen applies different filters for smooth, moderate, and high activity regions, the application of Vehviläinen’s filters to its regions is not achieved through any step of “selecting a filter.” *Id.* at 40 (citing Ex. 2050 ¶¶ 105–106).

Patent Owner contends a person of ordinary skill in the art would have had no motivation to reduce the regions of Vehviläinen from three to just one because, while Vehviläinen states in passing that it “can be utilized with less than three branches,” it never even suggests to a person of ordinary skill in the art that the branches should be reduced to just a single region. PO Resp. 44–45 (citing Ex. 1004, 8:20). Patent Owner further contends that there is no motivation to modify Vehviläinen’s algorithm from determining whether or not to apply the smooth region filter based on analyzing its corresponding region to instead selecting between two filters based on that region because Vehviläinen teaches that the choice for each region is always between applying a filter or applying no filter, not applying one of a set of possible filters. PO Resp. 47–48 (citing Ex. 1004, 11:64–12:5).

(3) Petitioner’s Reply

Petitioner argues Vehviläinen expressly teaches “selecting a filter” under the plain and ordinary meaning of the term. Pet. Reply 11 (citing Ex. 1004, 2:62, 7:9, 8:16, 8:18, 8:41, 9:8, 10:5, 10:9, 10:26; Ex. 1003 ¶¶ 100–101, 126–127).

Even under Patent Owner’s proposed construction, Petitioner contends, Vehviläinen teaches the limitation because it provides express motivation to utilize less than three branches by stating that using fewer branches reduces control logic. Pet. Reply 14–15 (citing Ex. 1004, 8:15–22; Ex. 1003 ¶¶ 119–120). Petitioner argues that Vehviläinen teaches different tradeoffs for different applications. *Id.* at 14, n.5. Petitioner points out that Vehviläinen explains that if there is a lot of activity in a region, filtering should be kept at a minimum or completely omitted, suggesting a one-

branch implementation where the high-activity filter is applied. *Id.* at 14–15.

(4) Patent Owner’s Sur-reply

In its Sur-reply, Patent Owner reiterates its contention that the step of “selecting a filter” requires an actual step of selecting from among a plurality of filters, and not merely determining “whether or not to apply” a filter. PO Sur-reply 10; *see also id.* at 11–13. Patent Owner further reiterates its contention that Petitioner’s proposed modifications to Vehviläinen (*i.e.*, (1) instead of analyzing three regions for three filters, it would only analyze one region; and (2) instead of analyzing regions matching a particular filter to determine whether or not to apply the region’s corresponding filter, it would choose among two filters based on the analysis of a single region) are contrary to Vehviläinen’s teachings, and “even if a [person of ordinary skill in the art] did desire less filtering choices, she would achieve this objective through Vehviläinen’s own method, not through a divergent modification supported by no apparent rationale.” *Id.* at 14.

(5) Analysis

On consideration of the full record, we determine that Petitioner has proved by a preponderance of the evidence that Vehviläinen teaches this limitation.

To the extent Patent Owner’s arguments are based on its proposed construction of “selecting a filter” as excluding a determination of whether or not to apply a filter, we do not adopt Patent Owner’s construction, and therefore, find those arguments inapposite.

Vehviläinen teaches selecting a filter under the plain and ordinary meaning of the term, using the exact *same* word as the claim. *See, e.g.,* Ex. 1004, 2:62 (“*select* the used filtering method”), 7:9 (“the *selection* of the filtering mode”), 9:8 (“The *selection* of which branch (‘smooth,’ ‘moderate’ or ‘high activity’) should be used”). For example, Vehviläinen teaches that if the variance in a region is less than a given threshold, a “smooth” filter is selected. *See* Ex. 1004, 8:37–42, 9:51–60, 11:29–55, Fig. 6 (steps 64, 66, 80). Vehviläinen similarly teaches selection of a “moderate” or “high activity” filter once again based on variance of a given region. *See* Ex. 1004, 11:56–12:10, Fig. 6. As Petitioner points out, this approach is identical to the one disclosed in the ’651 patent for selecting a filter. *Compare* Ex. 1001, 10:13–67, *with* Ex. 1004, Figs. 5A, 6. Vehviläinen therefore teaches selecting a filter to apply. Vehviläinen further teaches applying the smooth filter to predetermined pixels on both sides of the block boundary as required by this claim limitation, and thus, teaches this limitation. *See* Ex. 1004, 11:46–50, Fig. 6.

Patent Owner’s argument, based on its claim interpretation, is that because Vehviläinen performs additional analysis before selecting a moderate or high activity filter, it does not teach selecting from among multiple filters. As discussed above, we do not agree with Patent Owner’s claim interpretation, and even if we did, we are persuaded that a person of ordinary skill in the art would have easily modified Vehviläinen’s filter selection to use a single area, e.g., the smooth area of Figure 5A, and a decision branch based on the level of detail for that single area. Vehviläinen discloses that “increasing the amount of selection branches makes the system more adaptive to the nature of the blocking effect but also increases control logic.” Ex. 1004, 8:15–27. Vehviläinen states that “[a] good

compromise is three selection branches as described in [its] exemplary embodiment,” but of course, “the invention can be utilized with *less than three branches*.” *Id.* at 8:18–21. Dr. Bove testifies that a person of ordinary skill in the art “would have been motivated to reduce complexity and the required control logic by using fewer branches, as taught by Vehviläinen, including for example just one branch, particularly for applications running on performance-constrained platforms such as low-end computer processors or mobile platforms, which often had constraints on thermal dissipation, power consumption, and cost.” Ex. 1003 ¶ 120 (citing Ex. 1004, 11:7–22). He further testifies that a person of ordinary skill in the art “would have been motivated to determine the level of detail for just the ‘smooth’ area and then select the smooth filter, if the area is smooth, or the high-activity filter otherwise.” *Id.* Dr. Bove illustrates that modification with the following pseudocode:

```
if ( IsSmooth (Figure_5A) == TRUE) {  
    Select (SmoothFilter);  
} else {  
    Select (HighActivityFilter);  
}
```

Id. He further testifies that such a modification

would have been obvious and well within [a person of ordinary skill in the art’s] level of skill, and [such a person] would have had a reasonable expectation of success given that [the] modification involves a simple reordering of elements taught by Vehviläinen, the fact that Vehviläinen expressly teaches the

modification, and the deep familiarity [such a person] would have had with these basic filtering and thresholding techniques.

Id. On this aspect, we credit Dr. Bove’s testimony because it is based on the express teachings of Vehviläinen and addresses a straightforward modification in view of those teachings.

Patent Owner’s argument that a person of ordinary skill in the art would have had no motivation to reduce the regions of Vehviläinen from three to just one because more powerful devices, such as the Nokia 9500, were available at the time of the invention (PO Resp. 44–45), misunderstands Petitioner’s proposed motivation. Nothing in Vehviläinen suggests that its teachings are limited to a specific type of hardware. On the contrary, Vehviläinen teachings highlight the cost-benefit balance that comes with the number of selection branches and the resulting control logic, thereby allowing implementation across a variety of hardware. *See, e.g.*, Ex. 1004, 8:15–22, 11:12–22 (“The terminal device 90, which can be *for example* a mobile terminal 100 according to the FIG. 8,” which “presents a Nokia 9000 Communicator type of a mobile terminal.” (Emphasis added)).

Patent Owner’s argument that Vehviläinen never even suggests that the branches should be reduced to just *a single region* (PO Resp. 45–46) also ignores Vehviläinen’s teaching that not only can the invention “be utilized with less than three branches, . . . the filtering can be totally omitted,” as needed.¹¹ Ex. 1004, 8:15–22. Thus, Vehviläinen teaches flexibility in the number of selection branches. Similarly, the fact that Vehviläinen teaches

¹¹ We see no disclosure in Vehviläinen that suggests exclusion of a *single* region/branch, as argued by Patent Owner; instead, “less than three branches” suggests at least the use of one and two branches, *i.e.*, the only two positive numbers that are less than three.

how different regions can be analyzed to apply different filters does not undermine that its system can also be implemented in a simpler manner.

Patent Owner also argues that Petitioner’s proposal requires motivation to “still further modify Vehviläinen’s algorithm from determining whether or not to apply the smooth region filter based on analyzing its corresponding region to instead selecting between two filters based on that region.” PO Resp. 47. As discussed above, Dr. Bove testifies that the proposed modification “would have determined the level of detail of the reconstructed video frame across a single region (the marked pixels of Figure 5A) in which the block boundary is located,” and selected the smooth filter or the high-activity filter for that region. Ex. 1003 ¶ 120. His testimony is consistent with Vehviläinen’s disclosure that “[i]f there is lot of activity inside two adjacent video blocks, and at the boundary between them, that part of video frame most probably includes important information, and filtering at that area should be *outlined to the minimum* or completely omitted.” Ex. 1004, 2:46–50 (emphasis added). We also agree with Dr. Bove that such a modification would have been within the skill level of a person of ordinary skill in the art, and thus, such a person could have implemented filtering of a corresponding region based on fewer selection branches. See Ex. 1003 ¶ 120.

Patent Owner’s argument that Vehviläinen’s no filter option teaches away from Petitioner’s proposed modification (PO Resp. 47–50) once again confuses Vehviläinen’s flexibility for a requirement—that Vehviläinen allows no filtering for regions with extremely high activity does not suggest that it bars a simpler implementation or prohibits the use of one of the filters as a default option.

For all of these reasons, we determine that Petitioner has proved by a preponderance of the evidence that Vehviläinen teaches or suggests this limitation to a person of ordinary skill in the art as proposed by Petitioner.

e) Conclusion as to Claim 1

We have reviewed the parties' evidence and argument, and based on the complete record, we find that Petitioner has shown by a preponderance of the evidence that Vehviläinen teaches or suggests each of the limitations of claim 1.

2. Dependent Claims 17 and 18

Claim 17 depends on claim 1 and recites “wherein selecting a filter to apply to predetermined pixels on either side of the block boundary based upon the determination of the level of detail comprises comparing the determined level of detail to a threshold.” Ex. 1001, 15:21–25. Petitioner contends Vehviläinen teaches comparing a determined level of detail ($\text{activity}_{\text{IN}}$) to one of two thresholds: $\text{activity}_{\text{EDGE}} + \text{MQQUANT}$; and $\text{THRESHOLD}_{\text{IN}}$. Pet. 47–48 (citing Ex. 1004, 9:54–67; Ex. 1003 ¶ 132). Petitioner contends that either of these threshold comparisons satisfies claim 17. *Id.* at 48.

Claim 18 depends on claim 17 and recites “wherein the threshold varies depending upon the quantizer used in the encoding of the blocks at the block boundary.” Ex. 1001, 16:1–3. Petitioner contends Vehviläinen teaches the threshold $\text{activity}_{\text{EDGE}} + \text{MQQUANT}$ varies depending upon a quantization factor MQQUANT , where MQQUANT is the “quantizer value” that is “adjusted at the encoder” to encode blocks, and where quantization factors are commonly used in video standards and a person of ordinary skill in the art would have been familiar and knowledgeable about their use.

Pet. 48 (citing Ex. 1004, 5:56–6:23; Ex. 1003 ¶ 134). According to
Petitioner:

when analyzing an area that straddles a block boundary, a [person of ordinary skill in the art] would have found it obvious and been motivated to use the average MQUANT values of the blocks on both sides of the boundary, as one option for implementing these teachings, particularly because Vehviläinen teaches, for the smooth area in Figure 5A, calculating variance for the area in each block and then averaging the calculated variance values together.

Id. at 48–49 (citing Ex. 1004, 11:29–41; Ex. 1003 ¶ 134). Petitioner further contends that Vehviläinen’s threshold “activity_{EDGE} + MQUANT” varies directly and linearly with MQUANT, and therefore varies depending on the quantizer used to encode the blocks at the block boundary. *See id.* at 49 (citing Ex. 1004, 9:30–32; Ex. 1003 ¶ 134).

Patent Owner does not raise any arguments directed specifically to dependent claims 17 and 18. *See* PO Resp. Based on the entirety of the record and for the reasons explained by Petitioner, we determine that Petitioner has proved by a preponderance of the evidence that Vehviläinen teaches the limitations of claims 17 and 18.

3. *Dependent Claim 19*

Claim 19 depends on claim 17 and recites:

wherein selecting a filter to apply to predetermined pixels on either side of the block boundary based upon the determination of the level of detail further comprises:

when the level of detail exceeds the threshold, selecting a filter to apply to predetermined pixels;

wherein selection of a filter comprises determining the detail of the image in the region of the pixels being filtered.

Ex. 1001, 16:4–12.

a) Petitioner's Contentions

Petitioner contends Vehviläinen teaches the method of claim 17 and further teaches that when the level of detail ($\text{activity}_{\text{IN}}$) exceeds the threshold (“ $\text{activity}_{\text{EDGE}} + \text{MQUANT}$ ”), a filter is selected to apply to predetermined pixels. Pet. 49 (citing Pet. §§ VI.A.3.1.e, VI.A.4; Ex. 1003 ¶¶ 136–137). Petitioner first contends that Vehviläinen teaches evaluating whether “ $\text{activity}_{\text{IN}} < \text{activity}_{\text{EDGE}} + \text{MQUANT}$,” to determine whether the area is smooth. *Id.* at 50 (citing Ex. 1004, 9:54–67). Petitioner then contends that “[i]t would also have been obvious to instead check whether the area is detailed, by asking whether the level of detail exceeds the threshold, e.g., ‘ $\text{activity}_{\text{IN}} > \text{activity}_{\text{EDGE}} + \text{MQUANT}$,’ where the high-activity filter would be selected if the level of detail exceeds the threshold, and the smooth filter would be selected otherwise. *Id.* (citing Ex. 1003 ¶ 137). Depending on that evaluation, Petitioner contends, “the high-activity filter would be selected; otherwise, the smooth filter would be selected.” *Id.* (also providing exemplary pseudocode that shows the evaluation and the filter selection). Petitioner contends that a person of ordinary skill in the art would have been motivated to make these changes because the choice was a matter of programmer preference. *Id.* at 50–51 (citing Ex. 1003 ¶ 138).

Petitioner next contends that Vehviläinen teaches the selection of a filter comprises determining the detail ($\text{activity}_{\text{IN}}$) of the image in the region of the pixels being filtered. Pet. 51–52 (citing Pet. §§ VI.A.3.1c, 1e; Ex. 1003 ¶ 139). According to Petitioner, the antecedent basis for “the region” is in limitation 1[c], and Vehviläinen teaches determining the level of detail in this region and selecting a filter based on the determined level of detail. *Id.* at 52 (citing Ex. 1004, Figs. 5A–5C; Pet. §§ VI.A.3.1c, 1e; Ex. 1003 ¶ 139).

b) Patent Owner's Response

Patent Owner responds that claim 19 requires a distinct “determining” step which occurs as part of the claimed “selecting” step recited in claim 1, and, thus, the “determining” step recited in claim 19 is necessarily separate from the “determining” step recited in claim 1. PO Resp. 56–57. Patent Owner argues that Petitioner incorrectly maps claim 19’s second “determining” step to the same feature that Petitioner alleges discloses the first “determining” step of claim 1. *Id.* at 56. Patent Owner argues that claim 19 corresponds to an embodiment “which first determines the level of detail for a 2-dimensional region, and then, if that first determining step exceeds a threshold of detail, determines the detail of the image in a 1-dimensional region that includes the pixels to be filtered.” *Id.* at 57 (citing Ex. 1001, 10:13–67; Ex. 2050 ¶ 140). But, Patent Owner argues, Petitioner relies on the same region for both determinations of level of detail. *Id.* (citing Ex. 2050 ¶ 141). Patent Owner further argues “determining the variance for Fig. 5A is the first variance determination that is made in Vehviläinen,” and Petitioner cannot rely on it once again for the determining step of claim 19. *Id.* at 57–58 (citing Ex. 1004, 11:23–12:10, Fig. 6).

c) Petitioner's Reply

In its Reply, Petitioner reiterates that claims 1 and 19 do not require their claimed “region[s]” to be different, as the antecedent basis for “the region” in claim 19 is the region of claim 1, and, therefore, the same teaching may satisfy both limitations. Pet. Reply 25 (citing *Google LLC v. Pers. Audio, LLC*, 743 F. App’x 978, 985 (Fed. Cir. 2018)). Petitioner contends that even if the “determining” steps in claims 1 and 19 require different regions, Vehviläinen teaches this similar to the ’651 patent

embodiments. *Id.* For example, Petitioner contends, Vehviläinen variance determination for moderate or high activity teaches the determining step of claim 19 given that Figures 5B and 5C of Vehviläinen disclose regions of sizes different than in Figure 5A. *Id.* at 25–26 (citing Pet. 23–28, 36–37, 52; Ex. 1004, Figs. 5A–5C).

d) Patent Owner’s Sur-reply

In its Sur-reply, Patent Owner responds that Petitioner’s contention that claims 1 and 19 do not require their claimed regions to be different is “both irrelevant and incorrect.” PO Sur-reply 17–18. According to Patent Owner, Petitioner’s contention “is irrelevant because the issue is not whether the ‘regions’ are the same, but that there has to be two distinct ‘determining’ steps—even if for overlapping regions.” *Id.* at 18 (citing PO Resp. 56–58). Patent Owner contends “because Vehviläinen discloses a single determining step corresponding to each region, Petitioner’s reliance on a single region in Vehviläinen’s [Figure 5A] means that the Petition maps both claimed determining steps to a single determining step in Vehviläinen.” *Id.* Further, Patent Owner argues that Petitioner “is also incorrect in its interpretation of Claim 19, [as] the plain language clearly recites that the claimed region relates to the pixels being filtered, and not to an earlier region in claim 1.” *Id.* Patent Owner contends Petitioner’s mapping of claim 19 to Figures 5B and 5C of Vehviläinen is untimely and should be rejected. *Id.* at 18–19 (citing Pet. 51–52; Pet. Reply 25–26; PO Resp. 58 n.7).

e) Our Analysis

On consideration of the full record, we determine that Petitioner has proved by a preponderance of the evidence that Vehviläinen teaches the additional limitations of claim 19. Patent Owner’s primary objection is that

Petitioner cannot rely on the same determining step in *Vehviläinen* as teaching both the limitation of claim 1 and of claim 19. Federal Circuit law, however, permits such reliance. *See Google*, 743 F. App'x at 985.

In *Google*, the court reaffirmed “the principle that in infringement or obviousness analysis, a single element, feature, or mechanism can ordinarily satisfy multiple claim limitations, including by performing multiple claimed functions.” *Id.* (citing *Powell v. Home Depot U.S.A., Inc.*, 663 F.3d 1221, 1231–32 (Fed. Cir. 2011)); *see also Linear Tech. Corp. v. Intl. Trade Commn.*, 566 F.3d 1049, 1055 (Fed. Cir. 2009) (agreeing with a “construction of ‘second circuit’ and ‘third circuit’ . . . to not require entirely separate and distinct circuits”). Here, the claim language does not require that the two determining steps be implemented in entirely distinct ways.

Claim 19 recites additional limitations to the “selecting” step of claim 1. As Petitioner points out, claim 19 recites determining the detail in “*the region* of the pixels being filtered,” and the only antecedent basis for this region is the region of claim 1. Pet. Reply 25. Patent Owner contends that “[t]he plain language clearly recites that the claimed region relates to the pixels being filtered, and not to an earlier region in claim 1.” PO

Sur-reply 18. But the claims do not recite *a region that is filtered*, they repeatedly recite a filter to apply to “predetermined pixels on either side of the block boundary.” *See, e.g.*, Ex. 1001, 13:20–21, 15:22–23, 16:5–6. The only *region* previously recited in the claims is the region of claim 1, thus, claim 19 must refer to determining the level of detail of the image in the *region of claim 1*. What else could that region be? Given that the level of detail for the *same* region is determined in both claims, we are not persuaded that a single determining step of *Vehviläinen* cannot teach both steps to an ordinarily skilled artisan. Nothing in the specification mandates a different

type of “determining” of the level of detail for claim 19 than for that in claim 1, and Patent Owner does not argue as such. *See* PO Resp. 57; PO Sur-reply 17–18 (arguing that these are distinct steps). We are therefore persuaded that Vehviläinen’s variance determination for the region shown in Figure 5A sufficiently teaches the additional limitation of claim 19. *See Google*, 743 F. App’x. at 985; *Powell*, 663 F.3d at 1231–32.

Even if we agree with Patent Owner that Petitioner was required to show teaching of separate steps for the two determining limitations, we are persuaded that Vehviläinen’s variance determination for its moderate and high activity areas, as shown in Figures 5B and 5C, sufficiently teaches the separate step. In fact, Patent Owner argues claim 19 corresponds to the embodiment discussed in column 10 of the ’651 patent. PO Resp. 57. As discussed above, we determine that Vehviläinen’s teachings align closely with that embodiment of the ’651 patent. *See supra* § III.E.d.5.; *compare* Ex. 1001, 10:13–67, *with* Ex. 1004, Fig. 6. Patent Owner argues that Petitioner’s reliance on Vehviläinen’s Figures 5B and 5C as teaching the determining step of claim 19 is untimely and should be rejected. PO Sur-reply 19. We disagree. Although the Petitioner’s contentions for claim 19 specifically discussed Vehviläinen’s variance determination for the pixels “marked by dots in Figure 5A,” the Petition also cited to Figures 5B and 5C of Vehviläinen and repeatedly cited to sections of the Petition relating to the determining and selecting limitations of claim 1. *See* Pet. 51–52 (citing Pet. §§ VI.A.3.1c, VI.A.3.1e). Those sections detail Vehviläinen’s teachings regarding the variance calculation for its moderate and high activity areas, as shown in Figures 5B and 5C, and explain how those teachings align with the embodiments disclosed in the ’651 patent.

See Pet. 33–39, 43–46. We are not persuaded that Petitioner was required to repeat those details in its contentions for claim 19.

Moreover, we find Petitioner’s arguments relating to Vehviläinen’s Figures 5B and 5C (Pet. Reply 25–26) to be squarely in response to arguments raised in the Patent Owner Response, and not in support of contentions different from those in the Petition. *See Apple Inc. v. Andrea Elecs. Corp.*, 949 F.3d 697, 707 (Fed. Cir. 2020) (finding that the Board abused its discretion in ignoring petitioner’s responsive arguments to issues raised by patent owner during trial). As discussed above, the Petition included the contention that “[t]he antecedent basis for ‘the region’ is in limitation 1[c]” and that “Vehviläinen teaches determining the level of detail in *this* region.” Pet. 52 (emphasis added). In response, Patent Owner argued, based on a claim interpretation that claim 19 was directed to a region different than the only one providing antecedent basis, that determining the variance for Figure 5A in Vehviläinen cannot teach the additional limitation of claim 19. PO Resp. 56–58. Petitioner’s argument that “[e]ven if the ‘determining’ steps in claims 1 and 19 require different regions, Vehviläinen teaches this in the same manner as the ’651 patent embodiments,” is indeed responsive to Patent Owner’s arguments.

Based on the entirety of the record and for the reasons explained by Petitioner, we determine that Petitioner has proved by a preponderance of the evidence that Vehviläinen teaches the limitations of claim 19.

4. Objective Indicia of Nonobviousness

Objective indicia of nonobviousness (also referred to as secondary considerations) may include long-felt but unsolved need, failure of others, unexpected results, commercial success, copying, licensing, industry praise,

and expert skepticism. *Mintz v. Dietz & Watson, Inc.*, 679 F.3d 1372, 1379 (Fed. Cir. 2012). Objective indicia are “only relevant to the obviousness inquiry ‘if there is a nexus between the claimed invention and the [objective indicia of nonobviousness].’” *In re Affinity Labs of Tex., LLC*, 856 F.3d 883, 901 (Fed. Cir. 2017) (quoting *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1312 (Fed. Cir. 2006)); *see also ClassCo, Inc. v. Apple, Inc.*, 838 F.3d 1214, 1220 (Fed. Cir. 2016). As the Federal Circuit recently explained, “a patentee is entitled to a rebuttable presumption of nexus between the asserted evidence of secondary considerations and a patent claim if the patentee shows that the asserted evidence is tied to a specific product and that the product ‘is the invention disclosed and claimed.’” *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019) (quoting *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988)). That is, presuming nexus is appropriate “when the patentee shows that the asserted objective evidence is tied to a specific product and that product ‘embodies the claimed features, and is coextensive with them.’” *Id.* (quoting *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1072 (Fed. Cir. 2018)). On the other hand, the patentee is not entitled to a presumption of nexus if the patented invention is only a component of a commercially successful machine or process. *Id.* (reaffirming the importance of the “coextensiveness” requirement).

Applying *Fox Factory*, the Board uses a two-step analysis in evaluating nexus between the claimed invention and the evidence of secondary considerations. *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 33 at 33 (PTAB Jan. 24, 2020) (precedential). We first consider whether the patent owner has demonstrated “that its products are coextensive (or nearly coextensive) with the challenged claims,” resulting in

a rebuttable presumption of nexus. *Id.* at 33. If not, that “does not end the inquiry into secondary considerations”; “the patent owner is still afforded an opportunity to prove nexus by showing that the evidence of secondary considerations is the ‘direct result of the unique characteristics of the claimed invention.’” *Id.* (quoting *Fox Factory*, 944 F.3d at 1373–75).

Once a patent owner has presented a *prima facie* case of nexus, the burden of coming forward with evidence in rebuttal shifts to the challenger to adduce evidence showing that the objective indicia was due to extraneous factors other than the patented invention. *Demaco*, 851 F.2d at 1392–93.

Patent Owner argues there is evidence of a long standing need as well as industry praise for the claimed invention. PO Resp. 59–63. We determine that Patent Owner has failed to establish a nexus between the claimed invention and the submitted evidence.

Patent Owner contends that the claimed invention “satisfied a longstanding need for better, more efficient deblocking in Internet-shared video,” and “its deblocking scheme was praised at the time as superior to prior schemes, including that of MPEG-4, [] *e.g.*, the invention’s improved ability to reduce blocking artifacts without losing video frame details.” PO Resp. 59. Patent Owner argues that the provisional application incorporated by reference into the ’651 patent describes the deblocking scheme implemented in the DivX6 release’s codec, and the DivX6 codec’s deblocking scheme practices claims 1 and 17. *Id.* at 59–60 (citing Ex. 2022; Ex. 2048). Patent Owner contends that a member of the team that developed that DivX6 commercial implementation, Mr. Seth Hanson, testifies that interested users had, for years, criticized available deblocking in Internet-shared and other low-bitrate, high compression video, and sought better deblocking. *Id.* at 60–61 (citing Ex. 2051 (Hanson Declaration) ¶¶ 4–15,

17–30). Patent Owner further argues that “DivX6 ‘was very popular with the public, receiving a very large number of downloads and making a big splash on the message boards,’ and many users specifically ‘praised the deblocking as superior to other deblocking filtering schemes available in other codecs.’” *Id.* at 61 (quoting Ex. 2051 ¶¶ 44–46). Patent Owner also argues that “users conducting ‘thorough’ tests of the DivX6’s capabilities praised the new deblocker as objectively and subjectively better, and ‘manag[ing] to postprocess the video without losing too much details’ and ‘to actually reduce blocks while keeping the details and colors.’” *Id.* (quoting Ex. 2051 ¶¶ 46–48). According to Patent Owner, that praise and recognition is directed precisely at the deblocking scheme introduced in DivX 6.0, which directly corresponds to the claims. *Id.* at 62 (citing Ex. 2050 ¶ 47). Patent Owner, therefore, argues “[t]here is a strong nexus between the objective indicia of nonobviousness and [claims 1 and 17–19] of the ’651 patent.” *Id.* (quoting Ex. 2051 ¶ 145).

Petitioner responds that Patent Owner has failed to establish a nexus between the evidence and the challenged claims. Pet. Reply 31–32. Petitioner contends Patent Owner “does not even try to connect its evidence to the allegedly novel elements of the challenged claims—multidimensional deblocking, according to [Patent Owner] in district court, or [the sum of absolute differences] according to [Patent Owner] now.” *Id.* at 31. According to Petitioner, Patent Owner is not entitled to a presumption of nexus when the claimed invention is not coextensive with the product. *Id.* (citing *Fox Factory*, 944 F.3d at 1373; *Therasense, Inc. v. Becton, Dickinson and Co.*, 593 F.3d 1289, 1299 (Fed. Cir. 2010)). Petitioner contends “[t]he claimed features constitute only a small part of the claimed product and is far from being coextensive,” where “[e]ven the product’s deblocking scheme

is claimed in at least one other patent in the same family, U.S.

Patent 7,729,426, which is directed to the default mode filter.” *Id.* (citing Ex. 1017, 133:10–24; Ex. 1018, 34:4–35:1; Ex. 1024). Petitioner further contends “any alleged nexus is undermined by [Patent Owner’s] characterization of deblocking as an unpredictable art.” *Id.* According to Petitioner, Patent Owner characterized filtering as requiring “significant inventive input and careful experimental testing” in “*the particular weights and thresholds* used in the process,” and Petitioner contends Patent Owner “cannot show that the alleged improvements of DivX 6 were tied to the steps of the challenged claims, as opposed to particular *filter weights and thresholds* in its software or other patents.” *Id.* at 31–32 (citing Ex. 2050 ¶ 40; Ex. 2051 ¶ 34; Ex. 1017, 49:7–25, 105:5–17).

a) Patent Owner Has Not Established that It is Entitled to a Presumption of Nexus

We determine that Patent Owner has not demonstrated a nexus between the evidence presented and claims 1 and 17–19. Patent Owner’s arguments and evidence are directed broadly to the DivX6 codec’s deblocking scheme and not specifically to the deblocking aspects covered by the challenged claims. We agree with Petitioner that the claimed features constitute only a small part of the commercial product and the two are far from being coextensive. *See* Pet. Reply 31 (citing Ex. 1017, 133:10–24; Ex. 1018, 34:4–35:1). As Dr. Bajaj explained, the “DivX [codec] included a lot of things” *other than deblocking*, and the DivX documentation details “only a fraction of the things that were there in the codec.” Ex. 1017, 133:10–24.

Patent Owner contends that the updated deblocking scheme described in DivX’s June 2005 Functional Specification corresponds to the claimed

invention (*see* PO Resp. 59), but that Functional Specification makes clear that even the improvements to deblocking in that version relate to two distinct aspects:

The new DivX codec deblocking scheme is derived from the MPEG-4 deblocking scheme with some enhancements for better video quality (objective and subjective) and better run-time performance. The differences focus in two parts:

1. A new filter mode decision (i.e., the block-based filter mode decision.
2. A new default mode filter. The DC offset mode filter remains the same.

Ex. 2022, 30. The Functional Specification explains that the second-listed enhancement comprises “a simple 3-tap low pass filter,” applied to pixels adjacent to the block boundary. *Id.* at 32–33 (explaining that that is an improvement over the prior algorithm requiring complex calculations such as 4-tap filtering, clipping, etc.). That 3-tap filter is claimed in the related ’426 patent;¹² for example, claim 1 of the ’426 patent recites a deblocking filter, comprising a 3-tap filter. Ex. 1024, 13:5–16; Pet. Reply 31.

Patent Owner is not entitled to a presumption of nexus where the relevant product embodies at least two patented inventions, and the burden remains on Patent Owner to show that the claimed secondary considerations were due to the invention claimed in the patent at issue here. *See Therasense, Inc.*, 593 F.3d at 1299. Applying *Therasense*, the Federal Circuit recently explained that allowing a presumption in such a situation would not be “consistent with *Demaco*’s explanation that nexus cannot be presumed where, for example, ‘the patented invention is only a component

¹² The ’426 patent is a parent of the ’651 patent and was filed on September 20, 2005. Ex. 1001, code (63).

of a commercially successful machine or process.” *See Fox Factory*, 944 F.3d at 1377 (citing *Demaco*, 851 F.2d at 1392) (rejecting a patent owner’s “attempt to reduce the coextensiveness requirement to an inquiry into whether the patent claims broadly cover the product that is the subject of the evidence of secondary considerations”).

As in *Fox Factory*, the ’651 patent is a continuation of the ’426 patent, but the two patents do not cover the same invention. *See id.* (rejecting the argument that a presumption should exist where the two patents at issue are related). In particular, these patents cover different aspects of the DivX codec deblocking scheme described in the Functional Specification, and as noted above, the deblocking scheme is just one of the many features of the codec. Nor are the enhancements to the default mode filter, claimed in the ’426 patent, an insignificant additional feature given that the patentee sought to protect those aspects in the ’426 patent almost five years *before* filing the ’651 patent. In fact, Dr. Bajaj testifies, as to selection and filtering methods, that “the particular weights and thresholds used in the process generally required significant inventive input and careful experimental testing and validation with controls.” Ex. 2050 ¶ 40 (citing Ex. 2080, 45–49, 70–80). The evidence thus supports that enhancements to the default mode filter claimed in the ’426 patent are at least as significant if not more significant than the claimed invention here.

Because the same evidence of secondary considerations cannot be presumed to be attributable to two different features, Patent Owner retains the burden of proving the degree to which the evidence tied to “the deblocking scheme” is attributable to the invention recited in the challenged claims. *Fox Factory*, 944 F.3d at 1378 (citing *Therasense*, 593 F.3d at 1299; *WMS Gaming, Inc. v. Int’l. Game Tech.*, 184 F.3d 1339, 1359 (Fed. Cir.

1999)); *see also Lectrosonics*, Paper 33 at 34–35. We are not persuaded that Patent Owner has met its burden here.

Patent Owner’s argument that it was Petitioner’s burden to show “either that the filter was the basis of the praise or that the claimed deblocking method was not” (PO Sur-reply 24) is misplaced. *See Fox Factory*, 944 F.3d at 1377 (explaining that a presumption may be appropriate where “the claims of each of the patents covered essentially the same invention” (citing *PPC Broadband, Inc. v. Corning Optical Commc ’ns RF, LLC*, 815 F.3d 734, 747 (Fed. Cir. 2016))); PO Sur-reply 22–24. Here, claims 1 and 17–19 do not cover essentially the same invention as that claimed in the ’426 patent, but instead cover different aspects of the deblocking scheme. *See Demaco*, 851 F.2d at 1392–93 (explaining that Petitioner bears the burden of showing that the objective indicia was due to factors other than the patented invention only after a patent owner has presented a *prima facie* case of nexus).

b) Patent Owner Has Failed to Establish Nexus Separate from the Presumption

In its Sur-reply,¹³ Patent Owner argues that the asserted objective evidence is directed solely at the determining step (as recited in the

¹³ In its Response, Patent Owner makes no meaningful attempt to show that the submitted evidence is related to the unique characteristics of the claimed invention (*see* PO Resp. 59–63), arguing merely that a presumption of nexus exists because “[t]his praise and recognition is directed precisely at the deblocking scheme introduced in DivX 6.0 which directly corresponds to the claims.” *Id.* at 62 (citing Ex. 2050 ¶ 47). Patent Owner also makes no attempt to link the purported evidence of long felt need to the claimed invention, arguing only that the evidence more generally shows that “[u]sers complained that available *deblocking* . . . was both insufficient and inefficient.” *Id.* at 61 (emphasis added).

challenged claims), not the actual filter (as claimed in the '462 patent), because, according to Patent Owner, that evidence is connected to the codec's deblocking performance for low bitrate video, not high bitrate video. PO Sur-reply 24 (Ex. 2051 ¶¶ 16–20, 27–28, 37). Patent Owner contends that improvements in quality and performance “at relatively *low* bitrate” are attributable to the challenged claims while the new filter mode yielded improvements “at relatively *high* bitrates.” *Id.* (citing Ex. 2048, 3–4). We find that argument flawed because there is no basis in the record to separate low bitrate video from high bitrate video such that evidence of objective indicia may be tied to one and not the other. Moreover, we are not persuaded that any alleged performance improvements can be separated on the basis of bitrate alone. *See, e.g.*, Ex. 2048, 4 (stating that both aspects of the new codec resulted in “better run-time performance”); Ex. 2016, 32, 34 (noting that both parts of the codec provide improvements to luminance). We, therefore, do not agree with Patent Owner that it has met its burden to establish a nexus between the merits of the claimed invention and the submitted evidence relating to long-felt need and industry praise. Absent a nexus, we determine that Patent Owner's evidence of objective indicia does not weigh in favor of nonobviousness.

5. *Conclusion on Obviousness of Claims 1, 17, 18, and 19 based on Vehviläinen*

“Once all relevant facts are found, the ultimate legal determination [of obviousness] involves the weighing of the fact findings to conclude whether the claimed combination would have been obvious to an ordinary artisan.” *Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.*, 876 F.3d 1350, 1361 (Fed. Cir. 2017). On balance, considering the full record before us, we determine that Petitioner has established, by a preponderance of the

evidence, that Vehviläinen would have rendered the subject matter of claims 1 and 17–19 obvious to one of ordinary skill in the art at the time of the invention. In light of this determination, we do not address whether Petitioner has established, by a preponderance of the evidence, that Vehviläinen anticipates claims 1, 17, and 18.

F. Obviousness over Vehviläinen and Kadono

Petitioner contends that claims 1, 2, 4, and 17–19 are unpatentable under 35 U.S.C. § 103 as obvious over Vehviläinen and Kadono. Pet. 52–86. In our Decision, we concluded that Petitioner had not articulated an adequate motivation to combine Vehviläinen and Kadono to arrive at the claimed invention, and thus, found this ground deficient. Dec. 42–43. The Federal Circuit affirmed. *Netflix*, 2022 WL 2298983 at *7.

Patent Owner argues that that determination may not be revisited on remand and that our review is now limited to grounds 1 and 2—grounds that do not rely on a combination with Kadono. Joint Brief 9–10 (citing *Retractable Techs. v. Becton Dickinson & Co.*, 757 F.3d 1366, 1370 (Fed. Cir. 2014); *Engel Indus. v. Lockformer Co.*, 166 F.3d 1379, 1383 (Fed. Cir. 1999); *Amado v. Microsoft Corp.*, 517 F.3d 1353, 1364 (Fed. Cir. 2008)). We agree with Patent Owner that, unless remanded, “all issues within the scope of the appealed judgment are deemed incorporated with the mandate and thus are precluded from further adjudication.” *Engel Indus.*, 166 F.3d at 1383. We, therefore, do not revisit Petitioner’s obviousness ground based on Vehviläinen and Kadono.

IV. PATENT OWNER’S MOTION TO EXCLUDE

Patent Owner filed a Motion to Exclude seeking to exclude Exhibits 1019–1023, and 1026. Paper 72 (“PO Mot.”). Petitioner filed an opposition (Paper 74 (“Pet. Opp.”)) and Patent Owner filed a reply (Paper 78).

In our Decision, we dismissed Patent Owner’s objections to Exhibits 1021–1023 as moot because we did not assess Patent Owner’s objective evidence of non-obviousness and thus did not consider Petitioner’s rebuttal evidence. Dec. 45. However, in light of our determination, on remand, that Petitioner has demonstrated by a preponderance of the evidence that claims 1 and 17–19 are unpatentable, we revisit these objections.¹⁴

Patent Owner’s objections to Exhibits 1021–1023 are based on FRE 801 and 802 (hearsay), 403 (relevance), and 901 (authentication). PO Mot. 5–6. Petitioner relies on these exhibits in support of its rebuttal to Mr. Hanson’s declaration submitted by Patent Owner to establish secondary considerations. Pet. Opp. 7; Pet. Reply 29.

Under the particular circumstances in this case, we need not assess the merits of Patent Owner’s objections. As discussed above, we determine that Patent Owner has not met its burden to establish a nexus between the merits of the claimed invention and the submitted evidence. We therefore do not rely on the objected-to exhibits in this Remand Decision. Accordingly, Patent Owner’s objections to these exhibits, which Petitioner relies on as rebuttal evidence, are *dismissed* as moot.

¹⁴ Our findings regarding Patent Owner’s objections to Exhibits 1019, 1020, and 1026 remain undisturbed. See Dec. 46–47.

V. PETITIONER’S MOTION TO EXCLUDE

Petitioner filed a Motion to Exclude seeking to exclude Patent Owner’s Exhibits 2051, 2054–2069, and 2073–2080. Paper 73 (“Pet. Mot.”). Patent Owner filed an opposition (Paper 76) and Petitioner filed a reply (Paper 77).

In our Decision, we dismissed Petitioner’s objections to Exhibits 2051 and 2054–2069 as moot because we did not consider Patent Owner’s evidence of secondary considerations. Dec. 47. However, in light of our analysis, on remand, of Patent Owner’s secondary considerations evidence, we revisit these objections.¹⁵

Petitioner’s objections to Exhibits 2054–2068 are based on FRE 901(a) (authentication), 801(c) and 802 (hearsay), 701 (improper opinions), and 402 (relevance). Pet. Mot. 2–8. Petitioner objects to portions of Exhibit 2051, which is the declaration of Seth Hanson, based on FRE 701 (improper opinions), 602 (lack of personal knowledge), and because those portions rely on Exhibits 2054–2068. *Id.* at 12–14. Petitioner objects to Exhibit 2069, which Mr. Hanson relies on in his declaration, based on FRE 901(a) (authentication), 801(c) and 802 (hearsay), and 701 (improper opinions). *Id.* at 14–15. Patent Owner relies on these exhibits to establish secondary considerations of nonobviousness. *See* PO Resp. 60–62.

Under the particular circumstances in this case, we need not assess the merits of Petitioner’s objections because, even considering Patent Owner’s evidence, we have determined that Patent Owner has not met its burden to establish a nexus between the merits of the claimed invention and the

¹⁵ Our findings regarding Petitioner’s objections to Exhibits 2073–2080 remain undisturbed. *See* Dec. 50.

submitted evidence. Accordingly, Petitioner's objections to these exhibits are *dismissed* as moot.

VI. PATENT OWNER'S OBJECTION TO JOINT BRIEF ON REMAND

On remand, we authorized the parties to file a joint brief limited to identifying the issues that remain on remand and identifying relevant portions of the existing record. Paper 87. Patent Owner objects to Petitioner's portion of the joint brief "on the basis that it does not merely state a roadmap of Petitioner's 'understanding on how the panel should proceed' on remand, but is instead a substantive advocacy brief that essentially gives Petitioner an unfair second bite at oral arguments."

Ex. 3006, 1. Specifically, Patent Owner identifies the following as new substantive arguments from Petitioner, which Patent Owner contends should be stricken or not considered: "[i]t is undisputed that Vehviläinen determines the level of variation in visual elements across a region of pixels"; and "[o]n Sur-Reply, DivX did not dispute that its construction would exclude the primary embodiment (in col. 10:13–67), relying instead on the provisional application." *Id.* at 2 (citing Joint Brief 1, 3). We have reviewed the parties' joint brief and are not persuaded that Petitioner's portion of the Joint Brief includes new substantive arguments. We determine that Petitioner's portion of the brief merely reiterates Petitioner's arguments previously presented to us, along with citations to the previously existing record. We therefore overrule Patent Owner's objection.

We note, however, that our authorization for the post-remand briefing intended to allow the parties "to streamline for [] us the issues that remain and to point us to the record that already exists, without submitting any new evidence or arguments." Paper 87, 3. In this Remand Decision, we rely

solely on the arguments properly presented in the parties' briefs and the evidence of record, not on any substantive arguments solely presented in the post-remand brief.

VII. CONCLUSION¹⁶

For the foregoing reasons, we conclude that Petitioner has established by a preponderance of the evidence that claims 1 and 17–19 of the '651 patent are unpatentable.

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1, 17, 18	102(b) ¹⁷	Vehviläinen		
1, 17–19	103(a)	Vehviläinen	1, 17–19	
1, 2, 4, 17–19	103(a) ¹⁸	Vehviläinen, Kadono		2, 4
Overall Outcome			1, 17–19	2, 4

¹⁶ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

¹⁷ As explained above, we do not address this ground in light of our determination that Petitioner has established, by a preponderance of the evidence, that claims 1 and 17–19 would have been obvious under 35 U.S.C. § 103(a).

¹⁸ Because this ground was not subject to the remand, we do not address it in this Remand Decision.

VIII. ORDER

It is, therefore,

ORDERED that claims 1 and 17–19 of the '651 patent have been shown to be unpatentable; and

FURTHER ORDERED that Petitioner's Motion to Exclude is *dismissed* as moot with regard to Exhibits 2051 and 2054–2069;

FURTHER ORDERED that Patent Owner's Motion to Exclude is *dismissed* as moot with regard to Exhibits 1021–1023;

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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