

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTEL CORPORATION,
Petitioner,

v.

TELEFONAKTIEBOLAGET LM ERICSSON,
Patent Owner.

IPR2024-01008
Patent 9,641,841 B2

Before PATRICK R. SCANLON, NATHAN A. ENGELS, and
STEVEN M. AMUNDSON, *Administrative Patent Judges*.

SCANLON, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Intel Corporation (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting an *inter partes* review of claims 1–3, 5–7, and 9–16 of U.S. Patent No. 9,641,841 B2 (Ex. 1001, “the ’841 patent”). Telefonaktiebolaget LM Ericsson (“Patent Owner”) filed a Preliminary Response (Paper 6, “Prelim. Resp.”). With our authorization, Petitioner filed a Reply (Paper 7) to the Preliminary Response, and Patent Owner filed a Sur-reply (Paper 8).

We have authority to determine whether to institute an *inter partes* review. *See* 35 U.S.C. § 314 (2018); 37 C.F.R. § 42.4(a) (2023). To institute an *inter partes* review, we must determine that the information presented in the Petition shows “a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). For the reasons set forth below, we determine that Petitioner has not demonstrated a reasonable likelihood that it would prevail with respect to at least one challenged claim. Accordingly, we do not institute an *inter partes* review of the challenged claims on the grounds set forth in the Petition.

II. BACKGROUND

A. *Real Parties in Interest*

Petitioner identifies itself, Lenovo (United States), Inc., Lenovo (Shanghai) Electronics Technology Co. Ltd., Lenovo Beijing, Ltd., Lenovo PC HK Limited, Lenovo Group, Ltd., and Lenovo Information Products (Shenzhen) Co., Ltd. as real parties in interest. Pet. 86. Patent Owner identifies itself as the real party in interest. Paper 5, 1.

B. *Related Matters*

The parties indicate that the ’841 patent was at issue in the following matters:

Telefonaktiebolaget LM Ericsson v. Lenovo (United States), Inc., No. 5:23-CV-00714 (EDNC); and

Certain Electronic Computing Devices, and Components and Modules Thereof, Inv. No. 337-TA-1387 (ITC).
Pet. 86; Paper 5, 1.

C. The '841 Patent

The '841 patent, titled “Deblocking Filtering Control,” issued May 2, 2017, with claims 1–16. Ex. 1001, codes (54), (45), 26:34–32:59. The '841 patent relates to controlling deblocking filtering over block boundaries in video frames. *Id.* at 1:5–7. Deblocking filters are used in video coding standards to combat blocking artifacts that arise because the original video frames are split into blocks which are processed relatively independently. *Id.* at 1:11–14.

Figure 2A of the '841 patent is reproduced below.

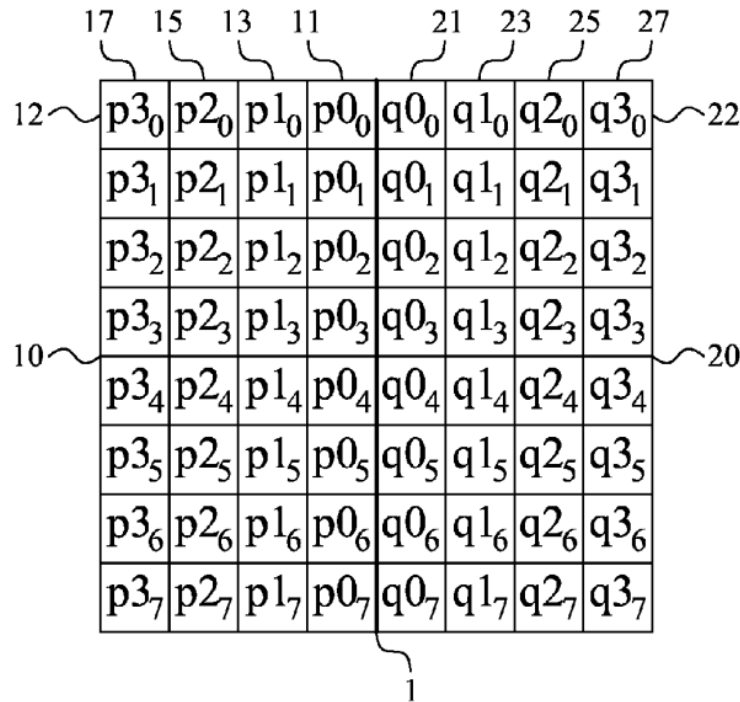


Fig. 2A

Figure 2A shows an embodiment of neighboring blocks and a block boundary over which deblocking filtering can be applied. Ex. 1001, 5:12–14. Neighboring blocks 10, 20 are arranged side by side at boundary 1. *Id.* at 6:45–48. Block 10 includes first line 12 of pixels 11, 13, 15, 17 in which pixel 11 is the closest to block boundary 1, pixel 13 is the next closet to boundary 1, and pixel 15 is the second next closet to boundary 1. *Id.* at 7:1–8. Neighboring block 20 includes a corresponding line of pixels 21, 23, 25, 27. *Id.*

Figure 1 of the '841 patent is reproduced below.

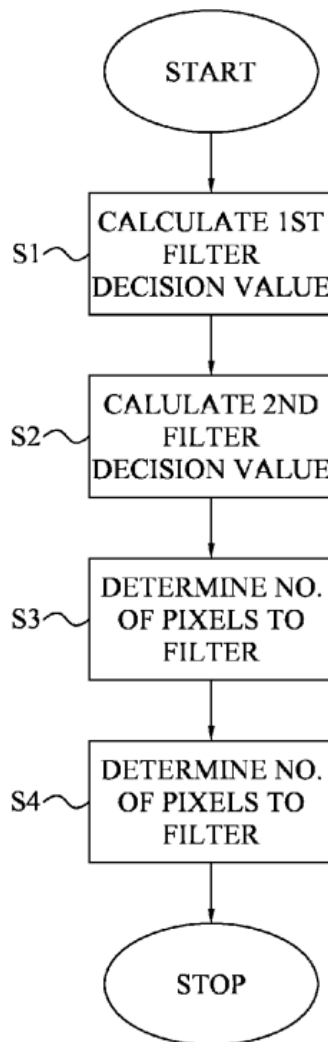


Fig. 1

Figure 1 is a flow diagram depicting a method of filtering control. Ex. 1001, 5:10–11. The method starts at step S1 where a first filter decision value is calculated based on $|p_2 - 2p_1 + p_0|$, where p_0 denotes a pixel value of pixel 11, p_1 denotes a pixel value of pixel 13, and p_2 denotes a pixel value of pixel 15. *Id.* at 6:65–7:8. Step S2 correspondingly calculates a second filter decision value based on $|q_2 - 2q_1 + q_0|$ where q_0 denotes a pixel value of pixel 21, q_1 denotes a pixel value of pixel 23, and q_2 denotes a pixel value of pixel 25. *Id.* at 7:9–19.

Next, at step S3, the first filter decision value is used to determine how many pixels of pixels 11, 13, 15, 17 in line 12 of block 10 to filter relative to boundary 1, and, at step S4, the second filter decision value is used to determine how many pixels of pixels 21, 23, 25, 27 in line 22 of neighboring block 20 to filter relative to boundary 1. *Id.* at 8:11–18. With this approach, “separate filter decision values are calculated for each side or part of a row or column of pixels extending over the block boundary 1 and a respective filter decision is taken for each side or part based on the particular filter decision value calculated for that side or part.” *Id.* at 8:18–22. In one embodiment, the number of pixels to filter is based on a comparison of the first and second filter decision values to threshold. *Id.* at 9:35–59. Specifically, if the filter decision value is less than its corresponding threshold, then two pixels in the block are filtered, but if the filter decision value is greater than or equal to its threshold, then one or zero pixels in the block are filtered. *Id.*

D. Challenged Claims

As noted above, Petitioner challenges claims 1–3, 5–7, and 9–16 of the '841 patent. Claims 1, 5, and 16 are independent. Claim 1, reproduced below with Petitioner's bracketed annotations inserted, is illustrative.

1. 1[pre] A method for filtering control applicable to a block of multiple pixels in a video frame, each pixel having a respective pixel value, said method comprising:

- 1[a] calculating a first filter decision value for said block, by only using pixels p_{2i} , p_{1i} and p_{0i} , based on:

$$|p_{2i} - 2p_{1i} + p_{0i}|$$

wherein p_{0i} denotes a pixel value of a pixel closest to, in a first line of pixels in said block, a block boundary to a neighboring block of multiple pixels in said video frame, p_{1i} denotes a pixel value of a pixel next closest to, in said first line of pixels, said block boundary and p_{2i} denotes a pixel value of a pixel second next closest to, in said first line of pixels, said block boundary;

- 1[b] calculating a second filter decision value for said neighboring block, by only using pixels q_{2i} , q_{1i} and q_{0i} , based on:

$$|q_{2i} - 2q_{1i} + q_{0i}|$$

wherein q_{0i} denotes a pixel value of a pixel in said neighboring block closest to, in a corresponding first line of pixels in said neighboring block, said block boundary, q_{1i} denotes a pixel value of a pixel of said neighboring block next closest to, in said corresponding first line of pixels, said block boundary and q_{2i} denotes a pixel value of a pixel in said neighboring block second next closest to, in said corresponding first line of pixels, said block boundary;

- 1[c] determining how many pixels in said first line of pixels in said block to filter relative to said block boundary based on a comparison of said first filter decision value to a first threshold value; and

- 1[d] determining how many pixels in said corresponding first line of pixels in said neighboring block to filter relative to said block boundary based on a comparison of said second filter decision value to a second threshold value.

Ex. 1001, 26:34–27:2; Pet. xx (showing Petitioner’s bracketed annotations).

E. Asserted Grounds of Unpatentability

Petitioner contends that the challenged claims are unpatentable based on the following grounds:

Claim(s) Challenged	35 U.S.C. §¹	References/Basis
1, 3, 5, 7, 9, 10, 12–16	103(a)	Bjontegaard, ² Bjontegaard’s Code ³
2, 6, 11	103(a)	Bjontegaard, Bjontegaard’s Code, H.241, ⁴ B205/AAPA ⁵
1, 3, 5, 7, 9, 12–16	103(a)	Aksu, ⁶ Gonzalez ⁷
2, 6, 11	103(a)	Aksu, Gonzalez, H.241, B205/AAPA
10	103(a)	Aksu, Gonzalez, Fu, ⁸ B118 ⁹

¹ For purposes of this Decision, we assume the challenged claims have an effective filing date prior to March 16, 2013, the effective date of the relevant aspects of the Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), and we apply the pre-AIA version of 35 U.S.C. § 103.

² Gisle Bjontegaard et al., *Definition of the new coding elements from Telenor*, Q15-J-28, published May 9, 2000 (Ex. 1009).

³ Gisle Bjontegaard et al., *Software Including Proposed New H.26L Coding Elements from Telenor*, Q15-J-29, published May 9, 2000 (Exs. 1010–1015).

⁴ ITU-T, *H.241: Extended video procedures and control signals for H.300-series terminals*, published December 2006 (Ex. 1017).

⁵ JCT-VC, *Test Model under Consideration*, JCTVC-B205 v.7, published October 9, 2010; and Applicant Admitted Prior Art (“AAPA”), ’841 patent, 2:5–3:5 (Ex. 1018).

⁶ WO 01/54415 A1, published July 26, 2001 (Ex. 1019).

⁷ Rafael Gonzalez, *Digital Image Processing* (3d ed.), published 2008 (Ex. 1020).

⁸ WO 2009/033390 A1, published Mar. 19, 2009 (Ex. 1021; Ex. 1022 (certified English translation)).

⁹ JVT, *Working Draft Number 2, Revision 2 (WD-2)*, JVT-B118r2, published Mar. 15, 2002 (Ex. 1023).

Pet. 3. Petitioner relies on the Declaration of Dan Schonfeld, Ph.D. (Ex. 1003) in support of its arguments. Patent Owner relies on the Declaration of Dr. Iain Richardson (Ex. 2001) in support of its arguments.

III. ANALYSIS

A. Level of Ordinary Skill in the Art

In determining whether an invention would have been obvious at the time it was made, 35 U.S.C. § 103(a) requires us to resolve the level of ordinary skill in the pertinent art at the time of the invention. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). The person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the time of the invention. *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). Factors that may be considered in determining the level of ordinary skill in the art include, but are not limited to, the types of problems encountered in the art, the sophistication of the technology, and educational level of active workers in the field. *Id.* In a given case, one or more factors may predominate. *Id.*

Petitioner contends that a person having ordinary skill in the art (“POSITA”) “would have had a bachelor’s degree in electrical engineering, computer science, or a similar field and two to three years of experience in the design and development of relevant multimedia processing, such as video and/or image coding or compression.” Pet. 13 (citing Ex. 1003 ¶ 165). Petitioner adds that “[a]dvanced graduate studies with coursework and/or research focusing on topics of video encoding/decoding and processing could substitute for working experience in the field.” *Id.* (citing Ex. 1003 ¶ 165).

Patent Owner contends that a POSITA “would have had a bachelor’s degree in electrical engineering, computer engineering, or a related field,

with about two years of experience in video decoding or encoding technologies.” Prelim. Resp. 26 (citing Ex. 2001 ¶¶ 36–37).

Although not identical, the parties’ definitions are substantially similar. Accordingly, for purposes of this Decision, we determine that no express finding is necessary, and that the level of ordinary skill in the art is reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). We note, however, that our obviousness analysis in this Decision would not differ if we adopted either Petitioner’s or Patent Owner’s definition.

B. Claim Construction

In *inter partes* reviews, the Board interprets claim language using the district-court-type standard, as described in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b). Under that 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, in light of the language of the claims, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1313–14. Although extrinsic evidence, when available, may also be useful when construing claim terms under this standard, extrinsic evidence should be considered in the context of the intrinsic evidence. *See id.* at 1317–19.

Petitioner contends that the challenged claims do not need construction to demonstrate unpatentability. Pet. 14. Petitioner, however, notes that the parties in the ITC proceeding identified above dispute the meaning of several claim terms. *Id.* (citing Ex. 1026). Petitioner specifically notes that “the parties dispute what is required of independent claims 1, 5, and 16 to ‘determin[e] how many pixels’ to filter in each block.” *Id.* (citing Ex. 1026, 6–7). Petitioner argues that “ITC Respondent Lenovo

contends that ‘determining’ how many pixels to filter in one block ‘has no mathematical basis (no relationship) with the pixel values of the pixels in said neighboring block’” (*id.* (citing Ex. 1026, 6–7)), but Patent Owner “contends that no construction is necessary,” “and the ‘plain meaning’ does not foreclose some ‘mathematical basis’ existing as long as separate decision values are calculated for each block” (*id.* (citing Ex. 1027, 14–19)).

Petitioner indicates that Ground 1 adopts Patent Owner’s broader construction from the ITC proceeding and Ground 2 adopts Lenovo’s narrower construction. *Id.* at 14–15.

Patent Owner argues that “none of the asserted grounds disclose or render obvious the Challenged Claims under the plain meaning of the claims (which is [Patent Owner’s] proposed construction) or under Lenovo’s narrower proposed construction.” Prelim. Resp. 29.

On the present record, we do not discern a need to construe explicitly any claim language because doing so would have no effect on our analyses below of Petitioner’s asserted grounds and will not assist in resolving the present controversy between the parties. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

C. Ground 1A: Asserted Obviousness Based on Bjontegaard and Bjontegaard’s Code

Petitioner challenges claims 1, 3, 5, 7, 9, 10, and 12–16 as unpatentable under 35 U.S.C. § 103(a) based on the combination of Bjontegaard and Bjontegaard’s Code. Pet. 15–44. Patent Owner provides

arguments addressing this asserted ground of unpatentability. Prelim. Resp. 30–51.

1. Bjontegaard (Ex. 1009)

Bjontegaard is a coding model proposal submitted by Telenor Broadband Services to the ITU Video Coding Experts Group. Pet. 15 (citing Ex. 1003 ¶¶109, 111); Prelim. Resp. 13 (citing Ex. 2001 ¶ 134); Ex. 1009, 1. Bjontegaard describes a deblocking filter (§ 4.5) that filters pixels a, b, c, d, e, f, g, h belonging to two neighboring blocks 1, 2, with a block boundary between pixels d and e. *Id.* at 19. Bjontegaard includes a filtering process in which pixels c, d, e, f may be modified. *Id.* The following parameters are calculated as part of the filtering process:

$$S0 = \mathbf{abs}(4(c-f)+12(e-d)) + \mathbf{abs}(9(c-d-e+f))$$

$$S0_1 = 12\mathbf{abs}(a-2b+c)$$

$$S1_1 = \mathbf{abs}(4(a-d)+12(c-b)) + \mathbf{abs}(9(a-b-c+d))$$

$$S0_2 = 12\mathbf{abs}(e-2f+g)$$

$$S1_2 = \mathbf{abs}(4(e-h)+12(g-f)) + \mathbf{abs}(9(e-f-g+h))$$

Id. Bjontegaard also describes determining overall activity, Act_{overall} , as being equal to $(3-i)$, where i is the smallest number such that $S0 < \text{Lim}(qp) \times 2^i$. *Id.* $\text{Lim}(qp)$ is obtained from a table defining threshold values for the filtering process depending on qp , the quantization parameter. *Id.* Bjontegaard also determines activity on each side of the block boundary, Act_1 and Act_2 . *Id.* Act_1 is determined by the following steps:

Act_1 is initially set to 1

If $S0_1 < \text{Lim}(qp)$, Act_1 is incremented by 1

If $S1_1 < \text{Lim}(qp)$, Act_1 is incremented by 1

Id. Bjontegaard indicates that “[t]he same procedure is made for Act_2 .” *Id.* Finally, Bjontegaard calculates two more values: $Act_{11} = \min(Act_{overall}, Act_1)$ and $Act_{22} = \min(Act_{overall}, Act_2)$. *Id.*

Next, Bjontegaard describes the following process for modification of edge pixels d, e:

$$Act_{edge} = (Act_{11} + Act_{22})/2$$

$$Clip_{edge} = (Clip(qp, Strength_1) + Clip(qp, Strength_2) + Act_1 + Act_2 - 2)/2$$

Initially set $Diff = 0$

$$\text{If } Act_{edge} \text{ equals 1 or 2: } Diff = (3(c - f) - 8(d - e))/16$$

$$\text{If } Act_{edge} \text{ equals 3: } Diff = (b + c - 8(d - e) - f - g)/16$$

$$Diff = \max(-Clip_{edge}, \min(Clip_{edge}, Diff))$$

$$d_{modified} = d + Diff \text{ (clipped to stay in the range 0-255)}$$

$$e_{modified} = e - Diff \text{ (clipped to stay in the range 0-255)}$$

Id. at 20. Bjontegaard describes the following process for modification of pixel c:

Initially set $Diff = 0$

$$\text{If } Act_{11} \text{ equals 2: } Diff = 5(b - 2c + d)/16$$

$$\text{If } Act_{11} \text{ equals 3: } Diff = 3(a + b - 4c + d + e)/16$$

$$Diff = \max(-Clip(qp, Strength_1), \min(Clip(qp, Strength_1), Diff))$$

$$c_{modified} = c + Diff \text{ (clipped to stay in the range 0-255)}$$

Id. Bjontegaard describes a similar process for modification of pixel f. *Id.*

2. Bjontegaard's Code (Exs. 1010–1015)

Petitioner asserts that Bjontegaard's Code is computer-executable code incorporating Bjontegaard's deblocking filter into an encoder and decoder. Pet. 18; *see* Exs. 1010–1015.

3. Independent Claim 1

Petitioner contends that the proposed combination of Bjontegaard and Bjontegaard's Code discloses the limitations of independent claim 1.

Pet. 18–24. Limitations 1[a] and 1[c] pertain to the recited “block” of claim 1, while corresponding limitations 1[b] and 1[d] pertain to the “neighboring block” of claim 1. Because the parties' arguments for these two groupings of limitations are similar, we focus our analysis on limitations 1[a] and 1[c].

Petitioner maps the claimed first filter decision value of limitation 1[a] to Bjontegaard's parameter “ $S0_1$.” *Id.* at 19 (citing Ex. 1009, 19; Pet. § VIII.A.1; Ex. 1003 ¶¶ 174–176). Regarding limitation 1[c], Petitioner argues that Bjontegaard discloses filtering pixel d (i.e., the block 1 pixel closest to the boundary), and then makes a decision whether to also filter pixel c (i.e., the block 1 pixel second-closest to the boundary). *Id.* at 21 (citing Ex. 1009, 20 (§§ 4.5.5, 4.5.6.1); Ex. 1003 ¶¶ 186–187). Petitioner asserts that Bjontegaard discloses filtering pixel c *only if* Act_{11} is equal to 2 or 3. *Id.* at 21–22 (citing Ex. 1009, 20; Ex. 1003 ¶ 188). Specifically, modification of pixel c is based on the equation $c_{\text{modified}} = c + \text{Diff}$, where Diff is initially set to zero and then recalculated if Act_{11} equals 2 or 3. Ex. 1009, 20. Thus, according to Petitioner, if Act_{11} is not greater than 1, then Diff remains zero and pixel c is not modified. Pet. 22 (citing Ex. 1009, 20; Ex. 1003 ¶ 188).

Next, Petitioner argues that the value of Act_{11} depends on Act_1 , which is dependent on a comparison of $S0_1$, the first filter decision value, to a first threshold, $\text{Lim}(\text{qp})$. *Id.* (citing Ex. 1009, 19; Ex. 1003 ¶ 189). Specifically, Petitioner asserts that Act_1 initially is set to 1 and incremented by 1 if $S0_1 < \text{Lim}(\text{qp})$ and incremented by 1 if $S1_1 < \text{Lim}(\text{qp})$. *Id.* (citing Ex. 1009,

19; Ex. 1003 ¶ 189). In view of this disclosure, Petitioner asserts that Act_1 will always be greater than 1 if first filter decision value $S0_1$ is less than first threshold $Lim(qp)$. *Id.* (citing Ex. 1003 ¶ 189). Petitioner then argues that Bjontegaard discloses setting Act_{11} equal to the smaller of Act_1 and another value, $Act_{overall}$, such that Act_{11} equals Act_1 when Act_1 is less than or equal to $Act_{overall}$. *Id.* (citing Ex. 1009, 19; Ex. 1003 ¶¶ 190–191).

In that circumstance, Petitioner contends that

Act_1 determines whether second-pixel c is filtered because, if $S0_1 < Lim(qp)$, Act_1 will always be greater than 1, and pixel c will be filtered. But if $S0_1 \geq Lim(qp)$ —and the second condition does not increment Act_1 either—then Act_1 will equal 1, Act_{11} will not be greater than 1, and second-pixel c will not be filtered.

Id. at 22–23 (citing Ex. 1009, 19; Ex. 1003 ¶ 191) (internal citation omitted).

Petitioner then concludes that “[b]ecause Act_{11} equals Act_1 whenever $Act_1 \leq Act_{overall}$, and the value of Act_1 depends on comparing first filter-decision value $S0_1$ to threshold $Lim(qp)$, Bjontegaard discloses determining how many pixels to filter (one or two pixels) in block 1 by comparing first-filter decision value $S0_1$ to first-threshold $Lim(qp)$.” *Id.* at 23 (citing Ex. 1009, 19–20; Ex. 1003 ¶ 192; *Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1002 (Fed. Cir. 2016) (“*Unwired Planet*”)).

Petitioner’s analysis (and Dr. Schonfeld’s testimony) depends on modification in Bjontegaard being the same as filtering—that is, if a pixel is not “modified,” then it is not “filtered.” Patent Owner, however, disputes this position. Specifically, Patent Owner argues that “Bjontegaard and Bjontegaard’s Code teach calculating offsets for four pixels (c , d , e , and f) and *always* applying those offsets.” *Id.* at 31 (citing Ex. 2001 ¶¶ 260–264, 280–281) (emphasis added). Referring to Bjontegaard’s process for modifying pixel c , Patent Owner also argues that “Bjontegaard discloses that

the pixel c is *always filtered* using Diff, and thus the Petition has not shown that S0₁ is a filter decision value or that a determination of how many pixels to filter is made based on that value.” *Id.* at 31–32 (citing Ex. 1009, 20; Ex.2001 ¶¶ 141, 260–264) (emphasis added).

In addition, Patent Owner asserts that “a filter offset of 0 is not a determination not to filter a pixel.” *Id.* at 32 (citing Ex.1001, Figs. 3, 6; Ex. 1003 ¶¶ 259–261). Dr. Richardson’s testimony supports this assertion. *See* Ex. 2001 ¶ 260 (“A filter offset of 0 is not a determination not to filter the pixel.”), ¶ 261(“[A] filter offset of 0 is not a decision not to filter the pixel.”). Moreover, Patent Owner contends that Petitioner “tacitly acknowledges this point” by arguing that Bjontegaard discloses *always filtering* pixel d even though Bjontegaard’s process for modifying pixel d, like the process for pixel c, allows for a filter offset (i.e., “Diff”) of zero. Prelim. Resp. 33 (citing Ex.1009, 20; Ex. 1003 ¶ 260).¹⁰

We agree that Petitioner has not shown sufficiently that Bjontegaard discloses limitation 1[c]. With respect to filtering pixels, Bjontegaard discloses that “[f]iltering takes place *only if* [Strength₁ and Strength₂] are both different from 0. In that case pixels c,d,e,f may be modified in the filtering process.”¹¹ Ex. 1009, 19 (emphasis added). As such, the only determination in Bjontegaard as to whether to filter pixels depends on the strengths of blocks 1 and 2 being different from zero, and if a determination to filter is made, then pixels c, d, e, and f are all included in “the filtering process.” Furthermore, even if pixel c ultimately is not modified because

¹⁰ Although the Preliminary Response actually cites Exhibit 1019 rather than Exhibit 1009, this appears to be a typographical error.

¹¹ Strength₁ and Strength₂ refer to “strength” values assigned to block 1 and block 2, respectively. Ex. 1009, 18–19.

Diff equals zero, pixel c is still evaluated or considered as part of Bjontegaard's filtering process. Accordingly, we are not persuaded on the record before us that a zero filter offset (i.e., "Diff") for pixel c in Bjontegaard equates to a determination not to filter pixel c.

Furthermore, even if assuming for the sake of argument that pixel c is not filtered when Diff equals zero, we are not persuaded that Petitioner adequately establishes that Bjontegaard discloses determining how many pixels to filter *based on a comparison of a first filter decision value to a first threshold value*. As discussed above, Petitioner links Bjontegaard's determination to modify pixel c to the comparison of $S0_1$ (alleged to be the first filter decision value) to $\text{Lim}(\text{qp})$ (alleged to be the first threshold value) by asserting that (1) the value of Diff depends on Act_{11} , (2) the value of Act_{11} depends on Act_1 , and (3) the value of Act_1 depends on the comparison of $S0_1$ to $\text{Lim}(\text{qp})$. Pet. 21–23.

All three conditions, however, create flaws in Petitioner's argument. Regarding the first condition, for instance, Bjontegaard provides the following disclosure for determining Diff and modifying pixel c:

Initially set Diff = 0

If Act_{11} equals 2: $\text{Diff} = 5(b - 2c + d)/16$

If Act_{11} equals 3: $\text{Diff} = 3(a + b - 4c + d + e)/16$

$\text{Diff} = \max(-\text{Clip}(\text{qp}, \text{Strength}_1), \min(\text{Clip}(\text{qp}, \text{Strength}_1), \text{Diff}))$

$c_{\text{modified}} = c + \text{Diff}$ (clipped to stay in the range 0-255)

Ex. 1009, 20. Thus, Petitioner's assertion that Diff is not zero if Act_{11} equals 2 or 3 but remains zero if Act_{11} is not greater than 1 (*see* Pet. 21–22 (citing Ex. 1009, 20; Ex. 1003 ¶ 188)) is not always correct. Petitioner overlooks the possibility that Diff could be zero even when Act_{11} equals 2

or 3. Namely, when Act_{11} equals 2, Diff would equal zero if $b-2c+d$ equals zero, and when Act_{11} equals 3, Diff would equal zero if $a+b-4c+d+e$ equals zero. Petitioner also overlooks that the value of Diff can be reset based on Bjontegaard's clipping function,¹² which means it is possible that Diff could be a non-zero number even when Act_{11} is not 2 or 3. *See* Ex. 1009, 20.

Regarding the second condition, Bjontegaard discloses that Act_{11} is equal to the smaller of Act_1 and $Act_{overall}$. *See id.* at 19 (stating that " $Act_{11} = \min(Act_{overall}, Act_1)$ ").¹³ Thus, Act_{11} equals Act_1 only when Act_1 is less than or equal to $Act_{overall}$. When $Act_{overall}$ is less than Act_1 , however, Act_{11} is equal to $Act_{overall}$, which does not depend on the comparison of $S0_1$ to $Lim(qp)$.

Regarding the third condition, Bjontegaard provides the following disclosure for determining the value of Act_1 :

Act_1 is initially set to 1
If $S0_1 < Lim(qp)$, Act_1 is incremented by 1
If $S1_1 < Lim(qp)$, Act_1 is incremented by 1

Ex. 1009, 19. Accordingly, if $S0_1$ is less than $Lim(qp)$, Act_1 will be 2 or 3, and when Act_{11} *happens* to equal Act_1 , the value of Diff will be determined by either equation $Diff=5(b-2c+d)/16$ or equation $Diff=3(a+b-4c+d+e)/16$. But, as noted above, Diff will be a non-zero value only *if* the applicable term $b-2c+d$ or $a+b-4c+d+e$ does not equal zero.

On the other hand, if $S0_1$ is not less than $Lim(qp)$, Act_1 will be 1 or 2. In this case, when Act_{11} *happens* to equal Act_1 , the value of Diff will remain

¹² "Diff = max(-Clip(qp,Strength1),min(Clip(qp,Strength1),Diff))."
Ex. 1009, 20.

¹³ Bjontegaard discloses that " $Act_{overall} = (3-i)$ where i is the smallest number such that $S0 < Lim(qp) \times 2^i$." Ex. 1009, 19.

zero if Act_1 is 1 but will be determined by the equation $Diff = 5(b - 2c + d)/16$ if Act_1 is 2. Thus, different values of $Diff$ can occur because of Bjontegaard's second comparison, $S1_1 < Lim(qp)$. Regarding the second comparison, Petitioner asserts only that "if $S0_1 \geq Lim(qp)$ —*and the second condition does not increment Act_1 either*—then Act_1 will equal 1, Act_{11} will not be greater than 1, and second-pixel c will not be filtered." Pet. 22–23 (emphasis added). This assertion, however, does not adequately account for the impact of the second comparison on Bjontegaard's filtering process.

In view of the above, Petitioner's asserted connection between Bjontegaard's modification of pixel c and the comparison of $S0_1$ to $Lim(qp)$ is too tenuous to support the contention that the value of $Diff$, and thus whether pixel c is modified, is based on the comparison. The fact that the comparison *may impact* the value of $Diff$ in some circumstances does not mean the value of $Diff$ (and whether pixel c is modified) is *based on* the comparison. We are not persuaded on the record before us that modification of pixel c is *based on* the comparison when different modification determinations can result from the same outcome of the comparison—that is, $Diff$ is not necessarily equal to zero if $S0_1$ is greater than or equal $Lim(qp)$ and is not necessarily greater than zero if $S0_1$ is less than $Lim(qp)$.

Furthermore, Petitioner's reliance on *Unwired Planet* for the holding that prior art that sometimes meets a claim limitation is sufficient to show obviousness is not persuasive here. The patent at issue in *Unwired Planet* describes providing wireless network subscribers with prioritized search results based on the location of their mobile device. *Unwired Planet*, 841 F.3d at 997–98. This prioritization "can lead to service providers that are actually farther away from the subscriber being given priority over service providers that are nearer," which is referred to as "farther-over-nearer

ordering.” *Id.* at 998. The Court rejected the argument that “prioritization schemes that ‘*sometimes* return a farther result’” should not be equated “with ‘farther-over-nearer ordering’ . . . because combinations of prior art that sometimes meet the claim elements are sufficient to show obviousness.” *Id.* at 1002 (citing *Hewlett-Packard Co. v. Mustek Sys., Inc.*, 340 F.3d 1314, 1326 (Fed. Cir. 2003)).

That Bjontegaard’s determination of value of Diff is *sometimes* impacted by the comparison of $S0_1$ to $\text{Lim}(\text{qp})$, however, is much different than a prioritization scheme meeting the claim language in *Unwired Planet* by *sometimes* returning a farther result. As discussed above, Bjontegaard’s comparison is just one of several factors that impact the value of Diff. And the comparison impacts the value of Diff only in the event of several otherwise unrelated conditions (i.e., (1) Act_{11} equals Act_1 , (2) either $b-2c+d$ or $a+b-4c+d+e$ does not equal zero, (3) Bjontegaard’s clipping function does not change Diff to a non-zero number, and (4) Bjontegaard’s second comparison ($S1_1 < \text{Lim}(\text{qp})$) not being satisfied) randomly occurring at the same time.

Lastly, we are not persuaded on this record that Bjontegaard discloses determining *how many pixels to filter* based on the comparison of $S0_1$ to $\text{Lim}(\text{qp})$, as opposed to simply impacting the determination of whether modify pixel c. In particular, Petitioner appears to argue that Bjontegaard discloses *always* modifying pixel d and then making a decision whether to also modify pixel c (*See* Pet. 21 (citing Ex. 1009, 20 (§§ 4.5.5, 4.5.6.1); Ex. 1003 ¶¶ 186–187)), in which case, the decision of whether to modify pixel c would dictate how many pixels to modify: 1 (just pixel d) or 2 (both

pixel c and pixel d).¹⁴ But we note that the testimony of Petitioner's expert contradicts this position. Specifically, Dr. Schonfeld testifies that

Bjontegaard discloses that if $Act_{overall}=0$, *no pixels will be filtered*. Bjontegaard further discloses that if $Act_{overall}=1, 2$, or 3 (true at least for all blocks whose strength is 3), at least pixel d in block 1—the pixel closest to the block boundary in block 1—is filtered. Bjontegaard, 20 (§4.5.5). Afterwards, *a separate decision is made whether to also filter an additional pixel c located one pixel away from the block boundary in block 1*. Bjontegaard, 20 (§4.5.6.1).

Ex. 1003 ¶ 187 (emphases added). We agree with Dr. Schonfeld's assessment that Bjontegaard discloses different and separate decisions regarding whether to modify pixels c and d, although Dr. Schonfeld appears to mistakenly refer to $Act_{overall}$ instead of Act_{edge} . See Ex. 1009, 20; Ex. 1003 ¶ 187. Accordingly, Petitioner has not shown sufficiently that Bjontegaard discloses either always modifying pixel d or that the determination to modify pixel d is based on the comparison of $S0_1$ to $Lim(qp)$. As such, even if assuming for the sake of argument that Bjontegaard discloses modifying pixel c based on the comparison of $S0_1$ to $Lim(qp)$, that determination would affect pixel c only and would not be a determination of how many pixels to filter.

For the above reasons, Petitioner fails to persuade us that the combination of Bjontegaard and Bjontegaard's Code discloses limitation 1[c]. Therefore, we determine Petitioner has not met its burden to show a reasonable likelihood it would prevail with respect to the contention that claim 1 is unpatentable over the combination of Bjontegaard and Bjontegaard's Code.

¹⁴ As discussed above, Petitioner and Dr. Schonfeld equate modifying pixels in Bjontegaard with filtering pixels.

4. Independent Claims 5 and 16

Similarly to limitation 1[c] of claim 1, claim 5 recites “a first pixel determiner configured to determine how many pixels in a first line of pixels in said block to filter relative to said block boundary based on said first filter decision value calculated by said first decision value calculator,” and “a first comparator configured to compare said first filter decision value calculated by said first decision value calculator to a first threshold value,” and claim 16 recites “determine how many pixels in a first line of pixels in said block to filter relative to said block boundary based on said first filter decision value,” which “comprises determining how many pixels in said first line of pixels in said block to filter relative to said block boundary based on a comparison of said first filter decision value to a first threshold value.” Ex. 1001, 28:57–61, 29:1–3, 32:40–42, 32:48–52.

For these limitations of claims 5 and 16, Petitioner relies on essentially the same arguments made in connection with limitation 1[c]. Pet. 26–28, 43–44. Thus, Petitioner’s challenge to claims 5 and 16 is based on the same deficient assertions regarding Bjontegaard as discussed above in the analysis of the challenge to independent claim 1. For these same reasons, we find that Petitioner has not met its burden to show a reasonable likelihood that claims 5 and 16 are unpatentable over the combination of Bjontegaard and Bjontegaard’s Code.

5. Dependent Claims 3, 7, 9, 10, and 12–15

Claim 3 depends from claim 1 and, thus, contains all the limitations of claim 1, and claims 7, 9, 10, and 12–15 depend from claim 5 and, thus, contain all the limitations of claim 5. Petitioner’s challenges to dependent claims 3, 7, 9, 10, and 12–15 do not overcome the deficiencies discussed above with respect to the challenge to independent claims 1 and 5. *See*

Pet. 24–26, 28–43. Accordingly, for the same reasons discussed above in connection with claims 1 and 5, we find Petitioner has not met its burden to show a reasonable likelihood that claims 3, 7, 9, 10, and 12–15 are unpatentable over the combination of Bjontegaard and Bjontegaard’s Code.

D. Ground 1B: Asserted Obviousness Based on Bjontegaard, Bjontegaard’s Code, H.241, and B205/AAPA

Petitioner challenges claims 2, 6, and 11 as unpatentable under 35 U.S.C. § 103(a) based on the combination of Bjontegaard, Bjontegaard’s Code, H.241, and B205/AAPA. Pet. 45–51. Each of these claims depends from either independent claim 1 or independent claim 5 and, therefore, contains all the limitations thereof. Thus, Petitioner relies in part on the same assertions presented in the challenge of independent claims 1 and 5 based on the combination of Bjontegaard and Bjontegaard’s Code, discussed above, in support of its contentions that claims 2, 6, and 11 would have been obvious over the combination of Bjontegaard, Bjontegaard’s Code, H.241, and B205/AAPA. *See id.*

Accordingly, Ground 1B suffers from the same deficiencies noted above (*see supra* § III.C) in connection with Ground 1A. Therefore, for the same reasons discussed above, we determine that the information presented in the Petition fails to establish a reasonable likelihood that Petitioner would prevail in showing that claims 2, 6, and 11 are unpatentable.

E. Ground 2A: Asserted Obviousness Based on Aksu and Gonzalez

Petitioner challenges claims 1, 3, 5, 7, 9, and 12–16 as unpatentable under 35 U.S.C. § 103(a) based on the combination of Aksu and Gonzalez. Pet. 51–72. Patent Owner provides arguments addressing this asserted ground of unpatentability. Prelim. Resp. 51–57.

1. Aksu (Ex. 1019)

Aksu relates to filtering digital video images, particularly reducing visual artifacts caused by a block boundary. Ex. 1019, 1:1–7. Figure 2 of Aksu is reproduced below.

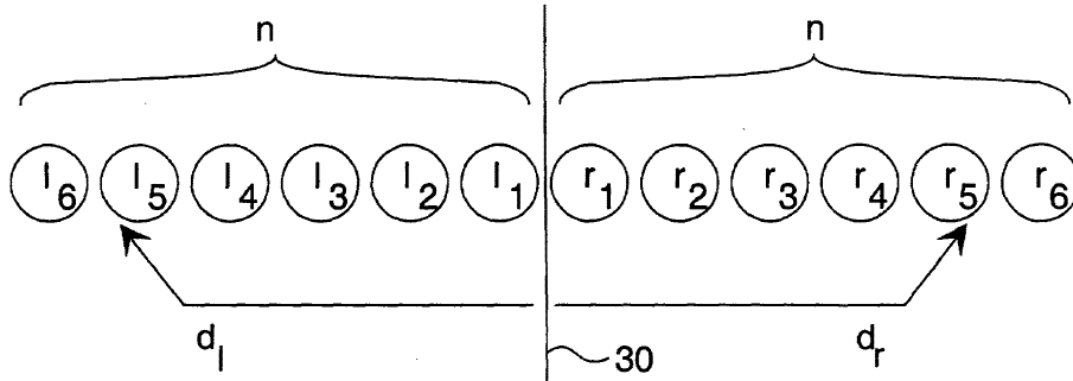


Figure 2 shows the location of pixels $r_1 - r_6$ and $l_1 - l_6$ in relation to vertical block boundary 30. Ex. 1019, 9:27–28. Aksu discloses specifying certain parameters to implement the method, including the largest number of pixels to be examined from the block boundary in one direction. *Id.* at 9:28–31.

Next, Aksu discloses determining parameters d_l and d_r , which represent activity. *Id.* at 13:10–14. Aksu discloses the following definition for d_r :

$$\begin{aligned}
 & d_r = 6, \text{ if } |r_1 - r_j| \leq \beta/j \text{ with all } j \in [1, 6], \\
 & \text{otherwise: } d_r = i, \text{ where } i \text{ fulfils the conditions} \\
 & \quad i \in [1, n_{tr}], \quad (4) \\
 & \quad |r_1 - r_{i+1}| > \beta/i, \text{ and} \\
 & \quad |r_1 - r_j| \leq \beta/j \text{ with all } j \in [1, i].
 \end{aligned}$$

Id. at 13:15–19. Once the parameters have been determined, filtering is carried out using a suitable filter. *Id.* at 15:1–2. Aksu’s Table 2, reproduced below, “shows the determination of the width of the filtering window for the pixels r_1 , r_2 and r_3 according to the value of parameter d_r in a preferred embodiment of the invention.” *Id.* at 15:17–19.

d_r ($d_l > 1$)	r_1	r_2	r_3
1	X	X	X
2	1	X	X
3	1	1*	X
4	2	2	X
5	2	2	2**
6	3 or 2***	3	3

“In the table, ‘X’ means that the pixel in question is not filtered at all, and the number means that the filtering window includes a number of pixels shown by the number from each side of the pixel being examined.” *Id.* at 15:21–24.

2. *Gonzalez (Ex. 1020)*

Gonzalez is a textbook titled “Digital Image Processing.” Ex. 1020, 1. In § 3.6.2, Gonzalez describes using the second-order Laplacian operator for image sharpening. *Id.* at 160. Chapter 10 of Gonzalez pertains to image segmentation. *Id.* at 689. In §§ 10.2, 10.2.1, Gonzalez describes using first- and second-order derivatives for point, line, and edge detection. *Id.* at 692–95.

3. *Independent Claim 1*

Petitioner contends that the proposed combination of Aksu and Gonzalez discloses the limitations of independent claim 1. Pet. 54–62. Petitioner also articulates reasons to combine the relied-upon aspects of Aksu and Gonzalez. *Id.* at 56–58.

Regarding limitation 1[a], Petitioner argues that Aksu discloses calculating a first filter decision value, d_r , by performing multiple first-order pixel difference calculations and comparing the absolute value of each difference to a threshold based on β , but does not disclose that the

calculation is based on $|p_{2i}-2p_{1i}+p_{0i}|$. *Id.* at 55 (citing Ex. 1019, 13:10–19, Fig. 2; Ex. 1003 ¶¶ 379–381). To address this, Petitioner argues that “Gonzalez teaches that a ‘second-order’ Laplacian—which applies coefficients [1, -2, 1] to three pixel values—is superior to first-order difference calculations for detecting noise and fine details in an image.” *Id.* (citing Ex. 1020, 160, 693–96; Ex. 1003 ¶¶ 382–388). Petitioner then argues that one of ordinary skill in the art “would have been motivated to replace Aksu’s multiple difference calculations with a single Laplacian, as taught by Gonzalez.” *Id.* at 56 (citing Ex. 1003 ¶¶ 384–396). Petitioner provides several reasons for making the proposed combination, including the assertion that Gonzalez teaches that the Laplacian is superior to Aksu’s first-order difference calculations. *Id.* at 56–58.

Turning to limitation 1[c], Petitioner argues that “Aksu determines how many pixels in a line in block r to filter by making comparisons to a threshold. Specifically, Aksu discloses that d_r is determined by comparing each of Aksu’s first-order difference calculations to a threshold based on β .” *Id.* at 59–60 (citing Ex. 1019, 13:15–19). Petitioner also argues that Aksu discloses that d_r controls how many pixels are filtered. *Id.* at 60 (citing Ex. 1019, 15:1–36). Next, Petitioner contends that, when using Gonzalez’s second-order Laplacian, one of ordinary skill in the art “would have understood that the Laplacian’s output would be compared directly to a threshold based on β —just like Aksu’s difference calculations—to determine how many pixels to filter.” *Id.* (citing Ex. 1019, 13:15–19; Ex. 1003 ¶¶ 406–410).

In response, Patent Owner argues that,

[c]ontrary to the Petition, the determination of how many pixels to modify in Aksu is not based on the comparison of the alleged

first filter decision value, d_r , to the thresholds based on β . Instead, d_r is assigned an integer value, i , and the decision of the number of pixels to modify is based on the value of that integer without comparing d_r to any threshold, such as β .”

Prelim. Resp. 56 (citing Ex.2001 ¶ 345).

We agree with Patent Owner. Aksu discloses the following definition for d_r :

$$\begin{aligned} d_r &= 6, \text{ if } |r_1 - r_j| \leq \beta/j \text{ with all } j \in [1, 6], \\ \text{otherwise: } d_r &= i, \text{ where } i \text{ fulfils the conditions} \\ &\quad i \in [1, n_{tr}], \quad (4) \\ &\quad |r_1 - r_{i+1}| > \beta/i, \text{ and} \\ &\quad |r_1 - r_j| \leq \beta/j \text{ with all } j \in [1, i]. \end{aligned}$$

Ex. 1019, 13:15–19. Thus, Aksu compares the values $|r_1 - r_j|$ and $|r_1 - r_{i+1}|$ to the threshold β . This definition does not suggest comparing d_r , which Petitioner identifies as the first filter decision value, to β , and we are not directed to any other disclosure in Aksu of comparing d_r to β . And although Petitioner argues that Aksu discloses that d_r controls how many pixels are filtered (Pet. 60 (citing Ex. 1019, 15:1–36)), Petitioner does not explain adequately how Aksu discloses determining how many pixels to filter based on a *comparison* of d_r to β , as required by limitation 1[c].

Furthermore, we are not persuaded that modifying Aksu in view of Gonzalez in the manner proposed by Petitioner overcomes this problem. As noted above, Petitioner asserts that, in the proposed combination, one of ordinary skill in the art “would have understood that the Laplacian’s output would be compared directly to a threshold based on β —just like Aksu’s difference calculations—to determine how many pixels to filter.” Pet. 60 (citing Ex. 1019, 13:15–19; Ex. 1003 ¶¶ 406–410). We disagree with this assertion, however, because it relies on erroneously equating the output of

Gonzalez's Laplacian (which Petitioner contends is d_r) to Aksu's difference calculations (i.e., $|r_1 - r_j|$ and $|r_1 - r_i + 1|$). In other words, Aksu's difference calculations, although used in setting d_r , are not the same as d_r ; and we are not persuaded that one of ordinary skill in the art would have considered comparing Gonzalez's Laplacian output to threshold β because Aksu discloses comparing its difference calculations to β . As noted above, we are not directed to any disclosure in Aksu of comparing d_r to β .

In addition, Dr. Schonfeld's testimony on this point is not persuasive. Specifically, Dr. Schonfeld testifies that " d_r can simply be defined as the output of the Laplacian ($d_r = |r_3 - 2r_2 + r_1|$), and d_r could be directly compared to a threshold based on β ." Ex. 1003 ¶ 408 (underline emphasis added). This testimony, however, is entitled to little weight because Dr. Schonfeld fails to provide a sufficient underlying basis for his opinion. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight."); *see also Nobel Biocare Services AG v. Intradent USA, Inc.*, 903 F.3d 1365, 1382 (Fed. Cir. 2018) (explaining that the Board can reject arguments based on expert testimony that lacks specificity or detail). Moreover, opining that output of the Laplacian, d_r , *could be* directly compared to β does not establish sufficiently that one of ordinary skill in the art *would* have been motivated to do so. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) ("[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.").

For the above reasons, Petitioner fails to persuade us that the combination of Aksu and Gonzalez discloses limitation 1[c]. Therefore, we determine Petitioner has not met its burden to show a reasonable likelihood

it would prevail with respect to the contention that claim 1 is unpatentable over the combination of Aksu and Gonzalez.

4. Independent Claims 5 and 16

As noted above, claims 5 and 16 recite limitations that are similar to limitation 1[c] of claim 1. *See supra* § III.C.4.

For these limitations of claims 5 and 16, Petitioner relies on essentially the same arguments made in connection with limitation 1[c]. Pet. 65–67, 71–72. Thus, Petitioner’s challenge to claims 5 and 16 is based on the same deficient assertions regarding the combination of Aksu and Gonzalez as discussed above in the analysis of the challenge to independent claim 1. For these same reasons, we find that Petitioner has not met its burden to show a reasonable likelihood that claims 5 and 16 are unpatentable over the combination of Aksu and Gonzalez.

5. Dependent Claims 3, 7, 9, and 12–15

Claim 3 depends from claim 1 and, thus, contains all the limitations of claim 1, and claims 7, 9, and 12–15 depend from claim 5 and, thus, contain all the limitations of claim 5. Petitioner’s challenges to dependent claims 3, 7, 9, and 12–15 do not overcome the deficiencies discussed above with respect to the challenge to independent claims 1 and 5. *See* Pet. 62–65, 67–71. Accordingly, for the same reasons discussed above in connection with claims 1 and 5, we find Petitioner has not met its burden to show a reasonable likelihood that claims 3, 7, 9, and 12–15 are unpatentable over the combination of Aksu and Gonzalez.

F. Grounds 2B and 2C: Asserted Obviousness Based on Aksu, Gonzalez, H.241, and B205/AAPA and Aksu, Gonzalez, Fu, and B118

Petitioner challenges claims 2, 6, and 11 as unpatentable under 35 U.S.C. § 103(a) based on the combination of Aksu, Gonzalez, H.241, and

B205/AAPA, and claim 10 as unpatentable based on the combination of Aksu, Gonzalez, Fu, and B118. Pet. 72–84. Each of these claims depends from either independent claim 1 or independent claim 5 and, therefore, contains all the limitations thereof. Thus, Petitioner relies in part on the same assertions presented in the challenge of independent claims 1 and 5 based on the combination of Aksu and Gonzalez, discussed above, in support of its contentions that claims 2, 6, and 11 would have been obvious over the combination of Aksu, Gonzalez, H.241, and B205/AAPA, and claim 10 would have been obvious over the combination of Aksu, Gonzalez, Fu, and B118. *See id.*

Accordingly, Grounds 2B and 2C suffer from the same deficiencies noted above (*see supra* § III.E) in connection with Ground 2A. Therefore, for the same reasons discussed above, we determine that the information presented in the Petition fails to establish a reasonable likelihood that Petitioner would prevail in showing that claims 2, 6, 10, and 11 are unpatentable.

G. Discretion Under 35 U.S.C. § 325(d)

Patent Owner argues that we should exercise our discretion to deny institution under § 325(d). Prelim. Resp. 64–66; Paper 8. Petitioner argues that discretionary denial is not appropriate in this case. Pet. 85–86; Paper 7. Because we are not persuaded the Petition demonstrates sufficiently a reasonable likelihood that Petitioner will prevail with respect to at least one challenged claim as discussed above, we need not reach Patent Owner’s arguments regarding discretionary denial under § 325(d).

IV. CONCLUSION

For the foregoing reasons, we do not institute *inter partes* review.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is *denied* as to all challenged claims of the '841 patent; and

FURTHER ORDERED that no *inter partes* review is instituted.

IPR2024-01008
Patent 9,641,841 B2

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