

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UNIFIED PATENTS, LLC,
Petitioner,

v.

IDEAHUB INC.,
Patent Owner.

PGR2022-00044
Patent 11,122,274 B2

Before STACEY G. WHITE, KEVIN W. CHERRY, and
MONICA S. ULLAGADDI, *Administrative Patent Judges*.

ULLAGADDI, *Administrative Patent Judge*.

DECISION
Granting Institution of Post-Grant Review
35 U.S.C. § 324

I. INTRODUCTION

Unified Patents, LLC (“Petitioner”) filed a Petition (Paper 2, “Petition” or “Pet.”) requesting post-grant review of claims 1–13 of U.S. Patent No. 11,122,274 B2 (Ex. 1001, “the ’274 patent”), accompanied by the supporting Declaration of Dr. Immanuel Freedman (Ex. 1005). IDEAHUB INC. (“Patent Owner”) filed a Preliminary Response (Paper 6, “Preliminary Response” or “Prelim. Resp.”), accompanied by the supporting Declaration of Dr. Clifford Reader (Ex. 2001). Pursuant to Board authorization, Petitioner filed a Reply to the Patent Owner Preliminary Response (Paper 8, “Prelim. Reply”) and Patent Owner filed a Sur-reply to Petitioner’s Reply (Paper 9, “Prelim. Sur-reply”).

We have authority to determine whether to institute a post-grant review. 35 U.S.C. § 324(c); 37 C.F.R. § 42.4(a) (2021). Under 35 U.S.C. § 324(a), a post-grant review may not be instituted “unless . . . the information presented in the petition . . . , if such information is not rebutted, would demonstrate that it is more likely than not that at least 1 of the claims challenged in the petition is unpatentable.” After considering the Petition, Patent Owner’s Preliminary Response, Petitioner’s Preliminary Reply, Patent Owner’s Preliminary Sur-reply, as well as all supporting evidence, we determine that Petitioner satisfies its burden under 35 U.S.C. § 324(a) to show that it is more likely than not that at least one of the challenged claims of the ’274 patent is unpatentable. Therefore, we authorize a post-grant review to be instituted as to all grounds and all challenged claims. 37 C.F.R. § 42.208(a) (“When instituting post-grant review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.”).

Our determinations at this stage of the proceeding are based on the evidentiary record developed thus far. This decision to institute trial is not a final decision as to patentability of claims for which post-grant review is instituted. Our final decision will be based on the full record developed during trial.

II. BACKGROUND

A. *Real Parties in Interest*

Petitioner (i) identifies Unified Patents, LLC as a real party-in-interest. Pet. 1. Patent Owner provides that “[t]he real parties-in-interest are Ideahub Inc. and Access Advance LLC (f/k/a HEVC Advance LLC).” Paper 3, 1.

B. *Related Matters*

The parties submit that the ’274 patent is related to U.S. Patent No. 9,641,849, which was the subject of the IPR2020-00702 proceeding (“the ’702IPR), in which the final written decision was appealed to the Federal Circuit by Patent Owner and remains pending as of the filing of the present Petition. Pet. 1 (citing *IdeaHub Inc. v. Unified Patents, LLC*, Appeal No. 22-1160); Paper 3, 1.

The parties also identify U.S. Patent Application No. 17/407,865, which is pending and is a continuation of the application that led to the ’274 patent. Pet. 1; Paper 3, 1.

C. *The ’274 Patent*

The ’274 patent is titled “Video Encoding Apparatus, Video Decoding Apparatus, and Video Decoding Method for Performing Intra-Prediction Based on Directionality of Neighboring Block,” and concerns “a video compression method and, more particularly, to a method and apparatus for

improving compression efficiency in directional intra-prediction.” Ex. 1001, code (54) (Title), 1:27–31.

The ’274 patent addresses the problem of “overhead increasing the size of a coded bitstream” in the intra-prediction technique of the H.264 standard. *See id.* at 2:8–20, 2:21–25, 3:15–25, 3:26–33. The ’274 patent explains that

the intra-prediction according to an example embodiment of the present invention selects the intra mode of the current block on the basis of the directionality of the neighboring blocks that have already been reconstructed. By contrast, the existing H.264 is different from example embodiments of the present invention in that it employs a method of performing the intra-prediction on the current block using the nine intra modes and selecting the intra mode having a minimum cost, rather than the method of selecting the intra mode of the current block on the basis of the directionality of the neighboring blocks that have already been reconstructed as in example embodiments of the present invention.

Id. at 6:1–42; *see id.* at 5:48–52.¹

Figure 5, reproduced below, illustrates a video encoder. *Id.* at 5:37–39.

¹ The claims recite “intra prediction mode” and the Specification primarily uses the term “intra mode.” The current record does not indicate that these terms have different meanings. At this stage of the proceeding, we use “intra prediction mode” and “intra mode” interchangeably as appropriate.

FIG. 5

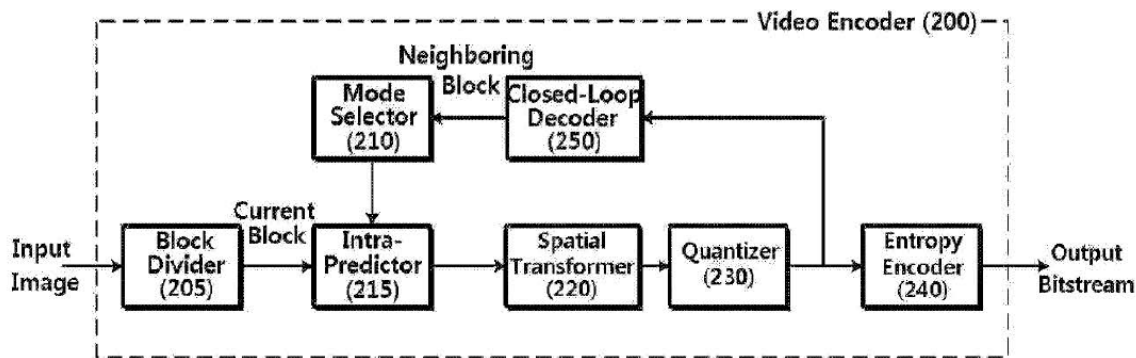


Figure 5 is a block diagram of a video encoder 200. *Id.* at 5:37–39.

In Figure 5, video encoder 200 is depicted as including block divider 205, mode selector 210, intra-predictor 215, spatial transformer 220, quantizer 230, entropy encoder 240, and closed-loop decoder 250. *Id.* at 5:37–43.

Block divider 205 divides an input image into blocks of a predetermined size according to whether the input image is a chrominance signal or a luminance signal, or according to some other condition. *Id.* at 5:44–57.

Mode selector 210 selects a mode suitable for the current block from among a plurality of intra modes using “directionality” of neighboring blocks of the current block, the neighboring blocks already having been reconstructed before the current block is reconstructed. *Id.* at 5:57–67. The ’274 patent discloses, in its exemplary embodiments, that “the description will be made on the assumption that a current block to be encoded is a block having a 4×4 size and has a total of nine intra modes (mode 0 through mode 8).” *Id.* at 5:48–52. In the encoder in Figure 5, the neighboring blocks may be obtained from an image reconstructed by closed-loop decoder 250, i.e., by encoding and decoding, rather than being obtained from the original input, and provided to mode selector 210. *Id.* at 6:43–63. Intra-predictor 215 obtains a prediction block of the current block according to the intra mode

selected by mode selector 210 and subtracts the obtained prediction block from the current block, thereby obtaining a residual block. *Id.* at 6:64–7:15.

Figure 6, reproduced below, depicts video decoder 500 including entropy decoder 510, dequantizer 520, inverse spatial transformer 530, mode selector 540, intra reconstructor 550, and inter reconstructor 560. *Id.* at 8:15–19.

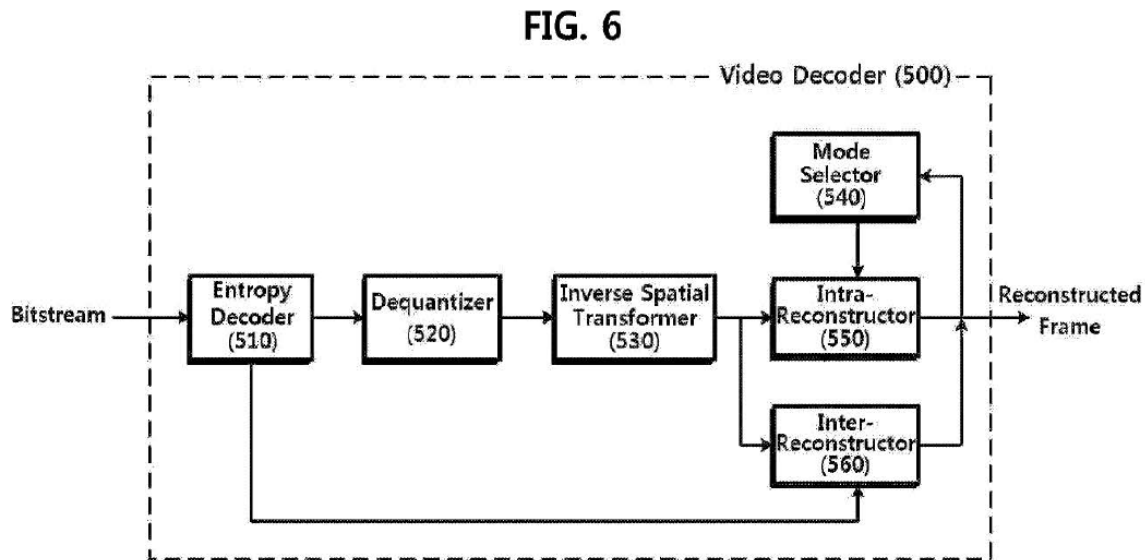


Figure 6 is a block diagram of a video decoder 500 that performs operations reciprocal to those of a video encoder. *Id.* at 8:12–49.

Mode selector 540 selects an intra mode suitable for a current block from among a plurality of intra modes (e.g., intra modes 0 through 8) using directionality of neighboring blocks of the current block. *Id.* at 9:39–44.

Neighboring blocks may include, for example, an upper block, a left block, an upper left block, and an upper right block, all of which have already been reconstructed with respect to the current block. *Id.* at 9:44–50. The '274 patent discloses that video decoder 500 need not receive information about the intra mode from video encoder 200. *Id.* Intra reconstructor 550 then obtains a prediction block of the current block according to the intra mode

selected by mode selector 540, adds the prediction block and the residual signal of the current block provided from inverse spatial transformer 530, and reconstructs the current block. *Id.* at 8:63–9:5.

In Figure 4, reproduced below, the directionalities of the nine intra modes are depicted.

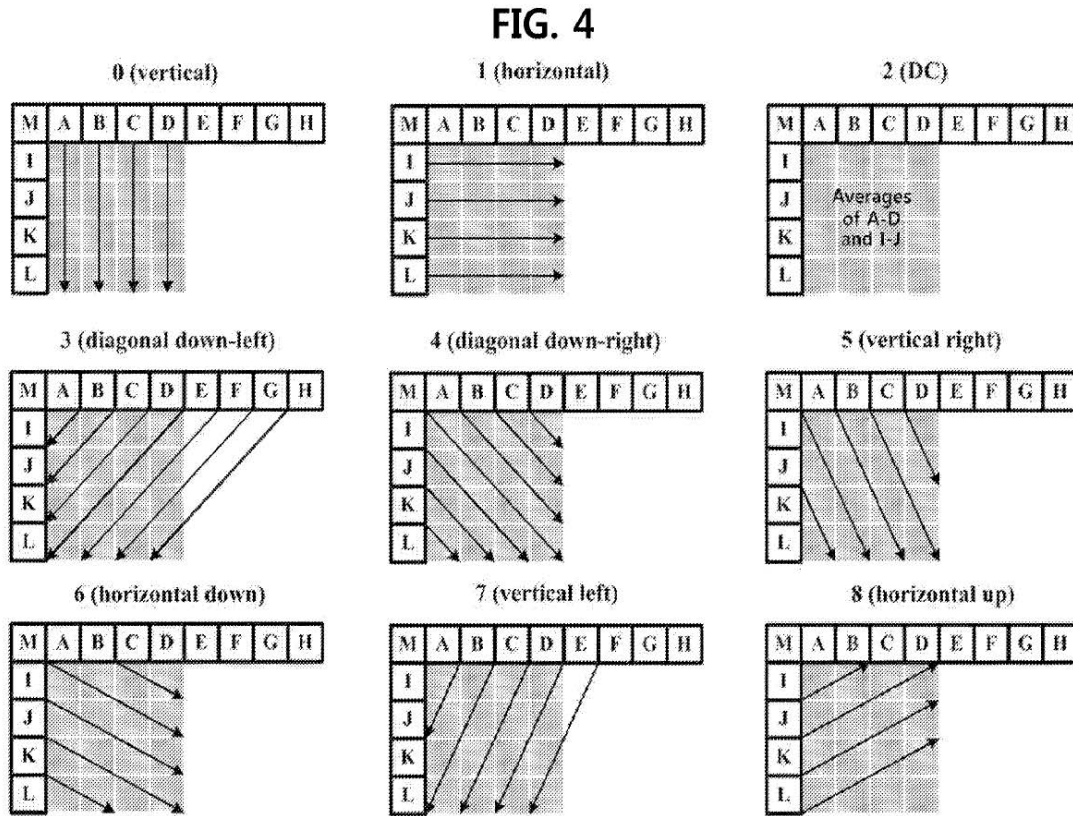


Figure 4 depicts 8 directionalities of intra modes and one non-directional intra mode, intra mode 2.

Mode selector 540 calculates a cost C_i with respect to a specific directionality i by means of a sum (or an average) of deviations according to the directionalities, using the following equation (Equation 2):

$$C_i = \sum_{k=0}^{n-1} D_{ik}.$$

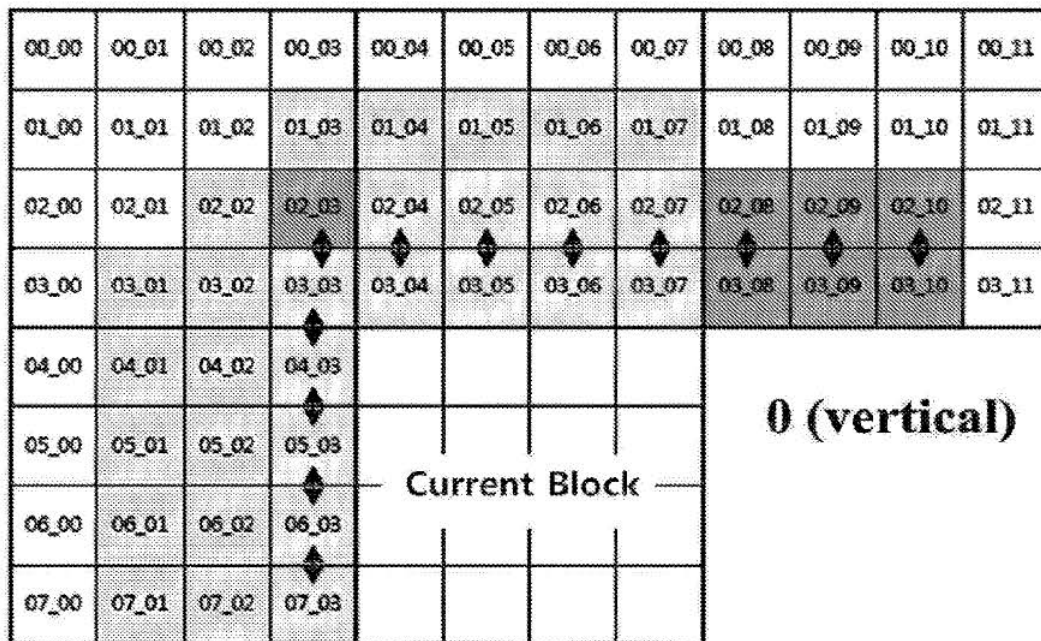
Id. at 9:50–60. In Equation 2, n is the number of pixel pairs k for calculating the deviation, i is the intra mode number, and D_{ik} is the deviation between the pixel pairs k corresponding to the specific directionality i . *Id.* at 9:61–64. The '274 patent also explains that “since the cost C_2 of mode 2 of the intra modes is calculated by an average without directionality, D_{ik} ($i=2$) of Equation 2 can be obtained from Equation 3:

$$D_{2k} = |\mu - p_k|.$$

Id. at 10:27–32.

According to the '274 patent, “[t]he symbol n may be selected by another number depending on an embodiment,” and “[i]n example embodiments of the present invention, the description will be made on the assumption that n is set to 12.” *Id.* at 9:64–67. Figure 7A, reproduced below, depicts pixel pairs selected from neighboring blocks in the vertical direction.

FIG. 7A



In Figure 7A, 12 pixel pairs are selected from neighboring blocks of the current block for calculating a cost of vertical intra mode 0. Figure 7B depicts the pixel pairs that are selected from neighboring blocks for non-directional intra mode 2. Figures 7C through 7H depict the pixel pairs that are selected for each directionality of intra mode 1 and 3–8.

D. Illustrative Claims

Petitioner challenges claims 1–13 of the '274 patent. Pet. 3. Claims 1, 7, and 13 are independent. Claims 1 and 7 are illustrative and reproduced below.

1. [1.0] A video decoding method performed by a video decoding apparatus, the method comprising:

[1.1] determining a neighboring intra prediction mode associated with a neighboring block, the neighboring block being adjacent to a current block;

[1.2] determining a current intra prediction mode associated with the current block based on whether the neighboring intra prediction mode associated with the neighboring block has directionality or not;

[1.3] performing intra-prediction based on the current intra prediction mode associated with the current block to generate a prediction block associated with the current block;

[1.4] obtaining transform coefficients;

[1.5] dequantizing the transform coefficients to generate dequantized transform coefficients;

[1.6] transforming the dequantized transform coefficients to generate a residual block associated with the current block; and

[1.7] reconstructing the current block based on the prediction block and the residual block,

[1.8.0] wherein determining the current intra prediction mode associated with the current block comprises:

[1.8.1] determining candidate intra prediction modes associated with the current block according to a first set of two or more mathematical expressions, when the neighboring intra

prediction mode associated with the neighboring block has no directionality,

[1.8.2] determining candidate intra prediction modes associated with the current block according to a second set of two or more mathematical expressions, when the neighboring intra prediction mode associated with the neighboring block has directionality,

[1.8.3] selecting the current intra prediction mode associated with the current block among the candidate intra prediction modes,

[1.8.4] wherein the second set of two or more mathematical expressions is different from the first set of two or more mathematical expressions,

[1.8.5] wherein the second set of two or more mathematical expressions use the neighboring intra prediction mode associated with the neighboring block, and

[1.8.6] the neighboring block includes an upper block adjacent to the current block.

7. A video encoding method performed by a video encoding apparatus, the method comprising:

determining a current intra prediction mode associated with a current block;

performing intra-prediction according to the current intra prediction mode associated with the current block to generate a prediction block associated with the current block;

determining a neighboring intra prediction mode associated with a neighboring block, the neighboring block being adjacent to the current block;

encoding the current intra prediction mode associated with the current block based on whether the neighboring intra prediction mode associated with the neighboring block has directionality or not;

obtaining a residual block associated with the current block by using the prediction block and the current block;

transforming the residual block to generate transform coefficients;

quantizing the transform coefficients to generate quantized transform coefficients;

encoding the quantized transform coefficients, wherein the encoding the current intra prediction mode associated with the current block comprises:

determining candidate intra prediction modes associated with the current block according to a first set of two or more mathematical expressions, when the neighboring intra prediction mode associated with the neighboring block has no directionality,

determining candidate intra prediction modes associated with the current block according to a second set of two or more mathematical expressions, when the neighboring intra prediction mode associated with the neighboring block has directionality,

encoding the current intra prediction mode associated with the current block based on the candidate intra prediction modes,

wherein the second set of two or more mathematical expressions is different from the first set of two or more mathematical expressions,

wherein the second set of two or more mathematical expressions use the neighboring intra prediction mode associated with the neighboring block, and

the neighboring block includes an upper block adjacent to the current block.

Ex. 1001, 11:51–12:29, 12:55–13:33 (bracketed identifying labels added in accordance with Petitioner’s labeling, *see* Pet. 49–75).

E. Asserted Grounds

Petitioner presents the following challenges as summarized in the chart below. Pet. 4–5, 44, 82.

Ground	Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1A	1–4, 6	102 ²	HEVC265 ³
1B	1–4, 6	103 ³	HEVC265
2	1–13	112(a)	Lack of Written Description

III. ANALYSIS

A. *Eligibility for Post-Grant Review*

As a threshold matter, we must determine whether the ’274 patent is eligible for post-grant review. The post-grant review provisions set forth in section 6(d) of the Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (September 16, 2011) (“AIA”), apply only to patents subject to the first-inventor-to-file provisions of the AIA. *See* AIA § 6(f)(2)(A) (stating

² Per the Manual of Patent Examining Procedure (MPEP) § 2159.02, America Invents Act (“AIA”) 35 U.S.C. §§ 102, 103 took effect on March 16, 2013. AIA 35 U.S.C. §§ 102, 103 apply to any patent application that contains or contained at any time a claim to a claimed invention that has an effective filing date that is on or after March 16, 2013. If a patent application (1) contains or contained at any time a claim to a claimed invention having an effective filing date as defined in 35 U.S.C. § 100(i) that is on or after March 16, 2013 or (2) claims or ever claimed the benefit of an earlier filing date under 35 U.S.C. §§ 120, 121, or 365 based upon an earlier application that ever contained such a claim, then AIA 35 U.S.C. §§ 102, 103 apply to the application, (i.e., the application is an AIA application). If there is ever even a single claim to a claimed invention in the application having an effective filing date on or after March 16, 2013, AIA 35 U.S.C. §§ 102, 103 apply in determining the patentability of every claimed invention in the application. This is the situation even if the remaining claimed inventions all have an effective filing date before March 16, 2013, and even if a claim to a claimed invention having an effective filing date on or after March 16, 2013, is canceled.

³ Recommendation ITU-T H.265 (ITU-T SERIES H Recommendations: AUDIOVISUAL AND MULTIMEDIA SYSTEMS, **High efficiency video coding**) (April 2013) (Ex. 1006, hereinafter “HEVC265”).

that the provisions of Section 6(d) “shall apply only to patents described in section 3(n)(1)”). Patents subject to the first-inventor-to-file provisions are those that issue from applications “that contain[] or contained at any time . . . a claim to a claimed invention that has an effective filing date as defined in section 100(i) of title 35, United States Code, that is on or after” March 16, 2013. AIA § 3(n)(1); *see supra* n.4.

Our rules require that each petitioner requesting post-grant review certify that the challenged patent is available for post-grant review. 37 C.F.R. § 42.204(a) (“The petitioner must certify that the patent for which review is sought is available for post-grant review. . . .”). In addition, “[a] petition for a post-grant review may only be filed not later than the date that is 9 months after the date of the grant of the patent or of the issuance of a reissue patent (as the case may be).” 35 U.S.C. § 321(c). Petitioner has the burden of demonstrating eligibility for post-grant review. *See Mylan Pharms. Inc. v. Yeda Res. & Dev. Co.*, PGR2016-00010, Paper 9 at 9–10 (PTAB Aug. 15, 2016).

*1. Legal Requirements for Post-Grant Review Eligibility:
Claim 1 of the '274 patent*

The post-grant review provisions apply to a patent that contains a claim with an effective filing date on or after March 16, 2013. *See* AIA §§ 3(n)(1), 6(f)(2)(A). The '274 patent issued from U.S. Application No. 16/407,086 (“the '086 application”), filed on May 8, 2019 (“the '086 application”). Ex. 1001, codes (21), (22). The '086 application was filed as (i) a continuation of U.S. Application No. 15/880,402 (“the '402 application”), filed on January 25, 2018, now U.S. Patent No. 10,334,252, which in turn is (ii) a continuation of U.S. Application No. 15/447,055 (“the '055 application”), filed on March 1, 2017, now U.S. Patent No. 9,918,093,

which in turn is (iii) a continuation of U.S. Application No. 15/260,240 (“the ’240 application”), filed on September 8, 2016, now U.S. Patent No. 9,641,849 (“the ’849 patent”), which in turn is (iv) a continuation of U.S. Application No. 12/977,928 (“the ’928 application”), filed on December 23, 2010, now U.S. Patent No. 9,467,705. *Id.* at code (63). The ’274 patent also claims priority to Korean Application KR 10-2009-0134017, which was filed on December 30, 2009. *Id.* at code (30).

Petitioner contends that the ’274 patent is eligible for post-grant review because at least one claim of the ’274 patent has an effective filing date that is later than March 16, 2013. Pet. 15. In particular, Petitioner contends “claim 1 of the ’274 Patent contains limitations that were not disclosed in the pre-AIA priority application, or indeed, in any other application in the ’274 Patent’s chain of priority” because

[l]imitation [1.1] of claim 1 recites determining a neighboring intra prediction mode associated with a neighboring block, the neighboring block being adjacent to a current block. A POSITA would not have understood that the inventors were in possession of, and actually invented, the invention in claim 1 as of the ’928 application’s filing, because the ’928 application does not determine a neighboring intra prediction mode associated with a neighboring block and does not describe an invention that relies on a determined intra prediction mode for a neighboring block.

Id. at 15, 19–20 (emphasis omitted).

We discuss the parties’ arguments about written description support in Section III.E below.

For the reasons that follow, we determine that the ’928 application does not provide sufficient written description support, for at least independent claim 1, so as to “reasonably convey[] to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing

date” of the ’928 application. *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). Accordingly, we are persuaded that the ’928 application lacks sufficient written description support for the invention recited in claim 1 of the ’274 patent, and thus, claim 1 does not receive an effective filing date as early as that of the ’928 application (i.e., December 23, 2010).

We further determine that Petitioner filed the Petition within the 9-month statutory period for requesting post-grant review in accordance with 35 U.S.C. § 321(c). The ’274 patent issued on September 14, 2021 (*see* Ex. 1001, code (45)), and the present Petition was accorded a filing date of June 9, 2022 (*see* Paper 5). Accordingly, the Petition was filed less than 9 months after the date of issuance of the ’274 patent.

At this stage of the proceeding, we are persuaded that the ’274 patent is eligible for post-grant review.

2. *Collateral Estoppel*

Petitioner argues that collateral estoppel in a related proceeding precludes patent owner from arguing in favor of written description support. Pet. 37–43. In particular, Petitioner argues “[c]ollateral estoppel applies in this case and precludes Patent Owner from relitigating the issue of written description support because the identical issue was decided by the Board in IPR2020-00702.” *Id.* at 37. Petitioner argues that: (i) limitation [1.1] of claim 1 of the ’274 patent is “substantively identical” to limitation [19.1] of proposed substitute claim 19, which the Board found unsupported by the ’240 application in the ’702IPR; (ii) the issue of written description support was actually litigated and adjudged in the ’702IPR; (iii) the ’702IPR necessarily required determination of the identical issue; and (iv) the

estopped party (Patent Owner) was fully represented in the '702IPR. *Id.* at 38–43.

Patent Owner responds that

[c]ollateral estoppel does not apply because the Board's previous decision in IPR2020-00702 involved a completely different claim, and because the Board's decision is not yet "final" for purposes of collateral estoppel analysis . . . [L]imitation [19.1] [in the '849 patent] is not equivalent to limitation [1.1] of claim 1 of the '274 Patent.

Prelim. Resp. 19–24.

At this stage of the proceeding, we do not decide the issue of collateral estoppel because, irrespective of whether we consider Patent Owner's arguments, we determine that the '928 application does not provide sufficient written description support for claim 1 of the '274 patent.

B. Claim Construction

In this post-grant review, filed on June 9, 2022, we construe the claims of the '274 patent using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. 37 C.F.R. § 42.200(b); *see Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–1314 (Fed. Cir. 2005) (en banc). In construing claims in accordance with their ordinary and customary meaning, we take into account the specification and prosecution history. *Phillips*, 415 F.3d at 1315–17.

Petitioner argues that "no claim term requires construction beyond their plain and ordinary meaning." Pet. 43. In its arguments, however, Petitioner construes the claim limitation "determining a neighboring intra

prediction mode associated with a neighboring block.” *Id.* at 20–23. More particularly, Petitioner contends that “determining” should be construed as “fix conclusively or authoritatively’ or . . . ‘ascertain or establish exactly, typically as a result of research or calculation,’” which Petitioner contends “is consistent with the ’928 application.” *Id.* at 20–21. Petitioner also contends that we should construe the claim phrase “a neighboring intra prediction mode” to be “singular in nature, despite the general rule that ‘the words ‘a’ or ‘an’ in a patent claim carry the meaning of ‘one or more.’”” *Id.* at 21–23 (“This is because the patentee ‘evinced a clear intent to limit ‘a’ or ‘an’ to ‘one’” in this context”). Petitioner concludes, “the claim phrase determining a neighboring intra prediction mode associated with a neighboring block must be interpreted to require a conclusive establishment of a singular intra prediction mode for a neighboring block.” *Id.* at 23 (citing Ex. 1008, 46–48) (arguing that the “panel in IPR2020-00702 interpreting claims to require determination of single intra mode of neighboring block”) (emphasis omitted).

Patent Owner argues that Petitioner’s proposed claim construction is improper because it is “unduly narrowing” and “depends on an improper application of a claim interpretation intent on excluding a supporting embodiment in the specification.” *Id.* at 11–13. Patent Owner explains that

[t]he context of the ’274 Patent and the ’928 application compels an interpretation of “determining” to include specifying or identifying a value. This interpretation tracks the term’s plain meaning. “Determine” has many dictionary definitions not limited to Unified’s narrow application, including: “specify the value” (Math) (Ex-1025); “decide” (Ex-1026); “to fix the form, position, or character of beforehand” (Ex-1024); etc.

. . . .

a POSITA would understand an example of the claimed determining is disclosed in the specification with reference to specifying or identifying (*i.e.*, determining) a value for i (“the intra mode number” analyzed in association with the neighboring block in Equation 2). That is, the value for i drives the choice of which equation to use for the cost function. Per this example, “[w]henver the neighboring block intra mode, i , for the cost function is determined as a directional mode ($i = 0, 1, 3-8$), the decoder chooses to apply the directional equation that leverages that directional property” and “[w]henver the neighbor block intra mode, i , for the cost function is determined as a non-directional mode (2), the decoder chooses to use the DC intra mode equation that calculates an average without directionality.”

Id. at 12–13 (citing Ex. 2001 ¶¶ 54, 55, 58, 60–64).⁴ Patent Owner further argues that Petitioner’s interpretation of the phrase “a neighboring intra prediction mode” as “singular in nature” in order to “allege an inconsistency with the specification, namely that there is not a single value i determined for the neighboring block. . . . is improper” as “[i]t is well settled that the indefinite article ‘a’ means ‘one or more.’” *Id.* at 13–14. Patent Owner urges that “a neighboring intra prediction mode” and to “a neighboring block” in limitation [1.1] are “properly interpreted as including both singular and non-singular meanings.” *Id.* at 14–15. But “even assuming that the phrase ‘a neighboring intra prediction mode’ is interpreted as singular in nature as suggested by Unified,” Patent Owner contends that “the claim is open ended

⁴ Petitioner points out that Patent Owner’s dictionary definition from Exhibit 1025 is incomplete. Prelim. Reply 4. According to Petitioner, “Exhibit 1025 defines ‘determine’ as ‘specify the value, position, or form of (a mathematical or geometrical object) **uniquely**’ (emphasis added [by Petitioner]) which is consistent with Petitioner’s position that ‘determine’ should mean to ‘fix conclusively or authoritatively.’” *Id.*

and thus includes within its scope additional steps of determining an intra prediction mode in association with a neighboring block.” *Id.* at 15–16.

In its Preliminary Reply, Petitioner responds that Patent Owner’s proposed claim constructions should be rejected because “Patent Owner relies on selective quotations of Petitioner’s dictionaries to contend that ‘determine’ also means ‘specify the value.’” Prelim. Reply 4 (citing Prelim. Resp. 12; Ex. 1025). Petitioner further contends that, “[u]nder any interpretation, the ’928 application does not determine an intra prediction mode for a neighboring block and does not use such a determination in determining an intra prediction mode for a current block.” *Id.* at 6 (citing Pet. 23–27).

In its Preliminary Sur-reply, Patent Owner argues that Petitioner’s arguments propose an “interpretation[] which is in direct conflict with patentee’s prosecution statements, [and] excludes a preferred embodiment.” Prelim. Sur-reply 3–7. Patent Owner concludes that “because claim 1 is open ended and includes within its scope multiple iterations of determining a unique value of an intra prediction mode in association with a neighboring block (as done in Equation 2), the Board should deny Unified’s Petition and decline to institute a trial.” *Id.* at 7.

For purposes of this Decision, and based on the record before us, we determine that it is not necessary to expressly construe any claim term to resolve the parties’ disputes, at this stage of the proceeding. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe 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))).

As we discuss in further detail below, irrespective of whether “determining” is properly construed to require a single, unique value or multiple values and irrespective of whether “a neighboring intra prediction mode” encompasses a single or multiple neighboring intra prediction modes, the ’928 application does not disclose “determining a neighboring intra prediction mode associated with a neighboring block, the neighboring block being adjacent to a current block,” as recited in claim 1.

C. Legal Standards

“The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same.” 35 U.S.C. § 112(a). The Federal Circuit “has consistently held that § 112, first paragraph, contains a written description requirement separate from enablement.”⁵ *Ariad*, 598 F.3d at 1351. “[T]he test for sufficiency [of the written description] is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *Id.*

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros., Inc. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987).

A patent claim is unpatentable under 35 U.S.C. § 103 if the differences between the claimed subject matter and the prior art are such that

⁵ The AIA recodified 35 U.S.C. § 112, first paragraph, as 35 U.S.C. § 112(a). Pub. L. No. 112-29, 125 Stat. at 296–97.

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. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). 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.⁶ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

In a post-grant review, as in an *inter partes* review, “the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *See Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016). This burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). In determining whether the ’274 patent is eligible for post-grant review, we consider the present record in its entirety. We analyze the challenges presented in the Petition in accordance with the above-stated principles.

D. Level of Ordinary Skill in the Art

Petitioner contends that:

A person of ordinary skill in the art at the priority date for the ’274 Patent (“POSITA”) would have had a bachelor’s degree in electrical or computer engineering, or a closely related scientific field such as physics or computer science, and two years of work experience with video processing. A lack of experience can be remedied with additional education (e.g., a Master’s degree), and

⁶ Patent Owner does not present objective evidence of nonobviousness at this stage of the proceeding.

likewise, a lack of education can be remedied with additional work experience (e.g., 4–5 years). This definition would apply at the earliest claimed priority date of the '274 Patent as well as any later date.

Pet. 12 (citing Ex. 1005 ¶¶ 50–52).

At this time, Patent Owner does not dispute the level of ordinary skill in the art. *See generally* Prelim. Resp. At this stage of the proceeding, we adopt Petitioner's definition as it appears to be consistent with the Specification of the '274 patent and the cited reference.

E. Challenge based on Lack of Written Description of Claim 1

Petitioner contends claims 1–13 are invalid because they lack written description under 35 U.S.C. § 112(a). Pet. 23–37, 82–85.

1. Petitioner's Initial Contentions

Petitioner contends limitation [1.1] of claim 1 of the '274 patent, which recites “determining a neighboring intra prediction mode associated with a neighboring block, the neighboring block being adjacent to a current block,” has no written description support in the '928 application. Pet. 23–37.⁷ Instead, Petitioner contends that the '928 application describes, “at best,

⁷ The '928 application and the '086 application, which issued as the '274 patent, share a common specification. We refer to the '928 application to be consistent with the parties' contentions. We determine that none of the '928 application, the '086 application, the '274 patent, or any other patent or application in the priority chain of the '274 patent provides written description support for independent claim 1 challenged in the present proceeding. This corresponds with our determination in the '702IPR in which Petitioner contends that we “previously found that the Specification of the '240 Application, which matured into the '849 Patent *and which is identically found in the disclosure of the '274 Patent*, did not provide adequate written description support for the first limitation of the '849 Patent: ‘determining an intra mode of a neighboring block.’” Pet. 82 (citing

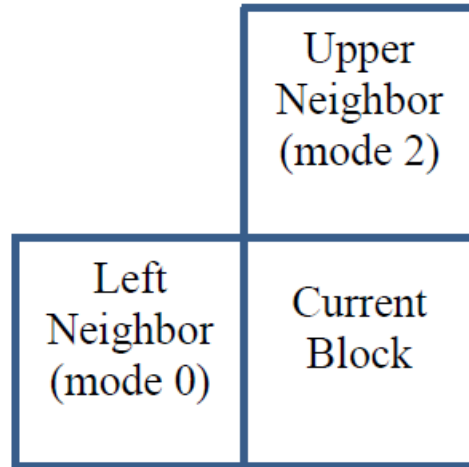
. . . an exploratory process by which multiple intra modes for the current block are evaluated based on different candidate directionalities for pixel pairs in neighboring blocks,” but “does not determine, or conclusively establish, the intra prediction mode of the neighboring block—[the process] has no need to and does not use this information.” *Id.* at 20, 25 (citing Ex. 1005 ¶¶ 75–83) (emphasis omitted); *see id.* at 25 (citing Ex. 1029, 27:11–13 (deposition testimony of Patent Owner’s expert, Dr. Reader, in the ’702IPR); Ex. 1005 ¶ 83; Ex. 1021 ¶¶ 62–67). According to Petitioner, “it is sufficient for purposes of the ’928 application to identify that the current block is similar enough to the pixels surrounding it.” *Id.* at 25–26; *see id.* at 26 (citing Ex. 1005 ¶¶ 84–90; Ex. 1021 ¶¶ 62–68).

Petitioner contends that “Figures 7A–7H and 8 of the ’928 application, the method described in the ’928 application examines pixel pairs in multiple different neighboring blocks to determine the intra prediction mode of the current block, and does not rely on any single neighboring block.” *Id.* at 26. Petitioner further contends that “the ’928 application’s method **does not establish or determine** what the intra prediction mode of the neighboring block is for purposes of determining the intra prediction mode of the current block— if it did, it would not calculate the cost value ‘for each of the intra modes.’” *Id.* at 29 (citing Ex. 1005 ¶¶ 75–84; Ex. 1021 ¶¶ 69–72). “The ’928 application could, or would, result in a much simpler process, relying on a singular determined intra prediction mode for the neighboring block,” but “[t]his is not what is disclosed.” *Id.* According to Petitioner, “[t]he ’928 application’s process is a brute-force

Ex. 1008, 36–50; Ex. 1032 (redline comparison of the ’086 application and the ’240 application)) (emphasis added).

method of determining an intra prediction mode for the current block, which always tries 9 scenarios, and selects one scenario.” *Id.* at 30 (citing Ex. 1005 ¶ 92; Ex. 1016 ¶ 89).

Petitioner presents a figure, reproduced below, illustrating a current block and surrounding neighboring blocks. *Id.* at 31.



In Petitioner’s figure,

one neighboring block [left] was predicted in a directional mode (mode 0, the vertical direction), with another neighboring block [upper] being predicted in the nondirectional mode (mode 2) . . . These equations use the deviations between pairs of pixels in the surrounding neighboring blocks, but the equations do not use as an input the intra prediction mode of any neighboring block (e.g., in the above example, Equations 2 and 3 do not have a variable that would be replaced by zero for the left neighboring block or two for the upper neighboring block). This occurs no matter the intra prediction mode for the neighboring blocks. If the ’928 application determined the intra prediction mode of the left neighboring block as mode zero, it would have no need to perform the cost calculations that are disclosed. This is again confirmed by Patent Owner’s previous expert, who alleged there is an “assumption that the directionalities for the current block and the neighboring block would likely be similar”—for this assumption to mean anything, once the ’928 application allegedly came to the determination that the left neighboring block’s intra prediction mode was zero, it could just assume that

the current block's intra prediction mode would be the same, and it would stop there. But it does not; it must calculate the costs for the remaining eight intra prediction modes.

Id. at 31–32 (citing Ex. 1005 ¶¶ 94–105; Ex. 1016 ¶¶ 91, 92; Ex. 1028, 20:3–7; Ex. 1021 ¶¶ 76, 77; Ex. 1019 ¶ 20).

Petitioner also contends that

original claim 6 recites a “mode selector configured to select one from among a plurality of intra modes on the basis of directionality of at least one neighboring block”; again, the claim would have read “on the basis of a determined intra mode of at least one neighboring block” if it supported the claims of the '274 Patent, but it does not. As the Board previously recognized, “directionality” and “intra mode” are not synonymous, and as Dr. Freedman previously testified, “directionality is a concept that is evaluated after performance of intra . . . whereas the intra mode or number is a concept used during performance of intra prediction.” They are not equivalent in the context of the '928 application.

Id. at 32–33 (citing Ex. 1028, 24:14–24; Ex. 1008, 40; Ex. 1016 ¶ 79) (emphasis omitted).

In view of the foregoing arguments, Petitioner contends that claim 1 of the '274 patent is not entitled to claim priority to the December 23, 2010 filing date of the '928 application such that the '274 patent is eligible for post-grant review, because all other domestic applications in the priority chain of the '274 patent have effective filing dates after March 16, 2013. *Id.* at 35–37.

2. *Patent Owner's Preliminary Response*

Patent Owner argues that “[c]laims 1-13 as properly construed are fully supported by the '274 Patent and its '928 U.S. priority Application, and thus satisfy all requirements of §112(a).” Prelim. Resp. 25. With respect to limitation 1.1, Patent Owner argues that “[a] POSITA would understand an

example of the claimed determining is disclosed in the specification with reference to specifying or identifying (*i.e.*, determining) one or more values for *i* (“the intra mode number(s)” in association with the neighboring block(s)).” *Id.* at 16 (citing Ex. 2001 ¶¶ 61, 65). Patent Owner points to Dr. Reader’s testimony that

“[w]henver the neighboring block intra mode, *i*, for the cost function is determined as a directional mode (*i* = 0, 1, 3-8), the decoder chooses to apply the directional that leverages that directional property” and “[w]henver the neighbor block intra mode, *i*, for the cost function is determined as a non-directional mode (2), the decoder chooses to use the DC intra mode equation that calculates an average without directionality.”

Id. at 16–17 (citing Ex. 2001 ¶¶ 54, 55).

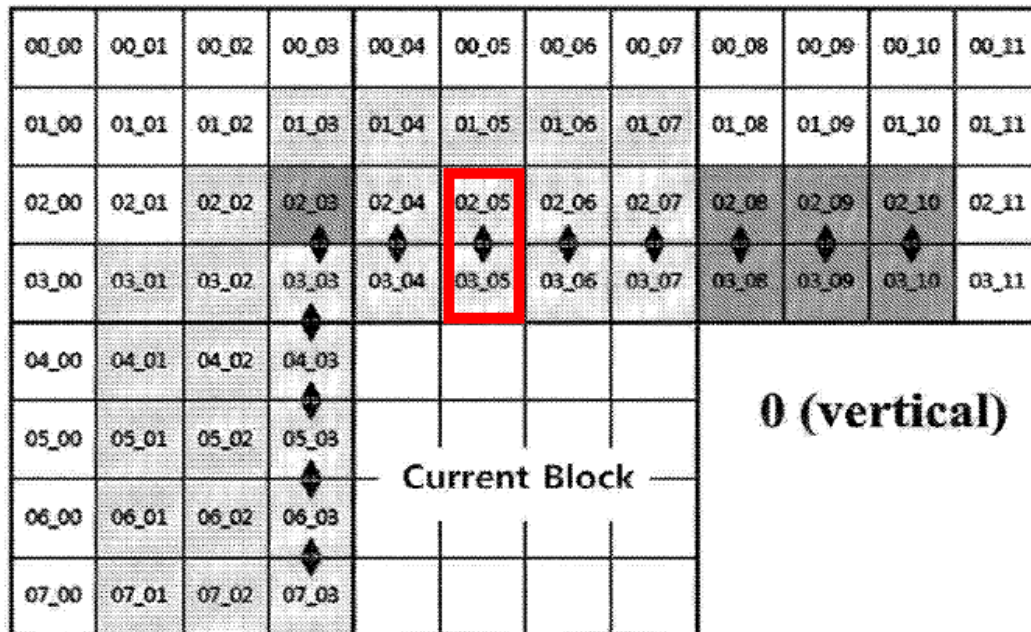
Patent Owner points to the Board’s earlier Final Written Decision in the ’702IPR and characterizes the Board as “disagree[ing] with Patent Owner’s contention that *i* is the intra prediction mode for the neighboring block.” *Id.* at 17 (citing Ex. 1008, 42–48). According to Patent Owner,

one foundation of the Board’s position is that the ’928 application only discloses looking at multiple neighboring blocks. For example, the Board stated “if *i* is the intra mode of the neighboring block, *which neighboring block?*” (emphasis added); “the pixel pairs selected of the neighboring blocks spans *four different neighboring blocks*”; and “there is no ‘determination’ of *a singular* intra mode *for a* neighboring block. . . . This is true even under Patent Owner’s of ‘determining’ as ‘specifying or identifying a value.’”

Id. at 17–18 (citing Ex. 1008, 42, 43, 47). Patent Owner contends that “the ’928 application specifically describes an embodiment in which the number of pixel pairs, *i.e.*, the variable *n*, may be some number other than 12. *Id.* at 18 (citing Ex. 1028, 18 (“symbol *n* may be selected by another number depending on an embodiment”). Patent Owner explains that, “[t]aking, for

example, $n=1$, only one pixel pair would be used in Equation 2, and such a single pixel pair would correspond to a single neighboring block.” *Id.* (citing Ex. 2001, n.2). In Patent Owner’s annotated figure below, Patent Owner depicts a scenario in which it contends $n=1$.

FIG. 7 A



Patent Owner’s Annotated Version of Figure 7A of
the ’928 application and the ’274 patent.

Patent Owner contends that “[e]ven though the ’928 application does not provide figures showing an implementation in which n is not equal to 12 (i.e., where $n=4, 2$, or 1), specific examples are not required for finding sufficient written description support.” *Id.* at 18–19 (citing *LizardTech, Inc. v. Earth Res. Mapping, Inc.*, 424 F.3d 1336, 1345 (Fed. Cir. 2005) (“A claim will not be invalidated on section 112 grounds simply because the embodiments of the specification do not contain examples explicitly covering the full scope of the claim language.”)). According to Patent Owner, “[i]n the instant case, one of ordinary skill would readily understand

how to evaluate Equations 2 and 3 when the variable n is set to a value other than 12 as explicitly set forth in the specification.” *Id.* at 19 (citing Ex. 1001, 9:64–65).

3. *Petitioner’s Preliminary Reply and Patent Owner’s Preliminary Sur-reply*

The arguments in Petitioner’s Preliminary Reply and Patent Owner’s Preliminary Sur-reply concern claim construction and claim interpretation as it relates to collateral estoppel. *See generally* Prelim. Reply; Prelim. Sur-reply. As set forth above in Section III.B, we determine that we need not construe “determining a neighboring intra prediction mode associated with a neighboring block, the neighboring block being adjacent to a current block,” as recited in claim 1. We further hold in abeyance a determination on the parties’ collateral estoppel arguments. *Supra* § III.A.2. With respect to Patent Owner’s argument that limitation 1.1 of the ’274 patent is not substantially identical to limitation 19.1 of substitute claim 19 proposed (and denied) in the ’702IPR, we determine that the record does not support this argument at this stage of the proceeding. *Infra* § III.E.4.

4. *Analysis of the Parties’ Arguments*

At this stage of the proceeding, Petitioner has the more persuasive position. On the current record, we see no reason to deviate from the findings and conclusions rendered in the ’702IPR. In that proceeding, we determined that the ’240 application was substantially identical to the ’928 application at issue in the present proceeding. Ex. 1008, 36, n.6. Here, we determine that the issue of written description support in the ’240 application for limitation 19.1 of proposed substitute claim 19 from the ’702IPR is substantially identical to the issue of written description support in the ’928 application for limitation 1.1 in claim 1 of the ’274 patent challenged in the

present proceeding. Patent Owner’s argument that limitation 19.1 and limitation 1.1 differ in scope because “in feature [19.1] [of proposed substitute claim 19 in the ’702IPR] an intra mode is determined ‘for a neighboring block,’” whereas “in feature [1.1] [of claim 1 of the ’274 patent] an intra prediction mode ‘associated with a neighboring block’ is determined” is unavailing. *See* Prelim. Resp. 21. At this stage of the proceeding, there is insufficient evidence of record to support a determination that an intra mode “for a neighboring block” as recited in proposed substitute claim 19 from the ’702IPR is somehow narrower or more conclusive than an intra prediction mode “associated with a neighboring block” as recited in claim 1 of the ’274 patent. In any event, we determine that we need not construe limitation 1.1, including, for example, to determine the metes and bounds of the claim term “associated with” because we determine that the ’928 application does not provide sufficient written description support for determining either a single intra prediction mode *or* multiple intra prediction modes *either* for or associated with a neighboring block. *Supra* § III.B.

The ’928 application discloses that a mode selector selects “a mode suitable for a current block from along a plurality of intra modes using *directionality of neighboring blocks of the current block* which have already been reconstructed.” Ex. 1028, 18:2–4 (emphasis added). The ’928 application further discloses that

[f]irst, the mode selector 210 or 540 calculates a cost C_i , with respect to *a specific directionality i* by means of a sum (or an average) of deviations according to the directionalities using Equation 2 below.

[Equation 2]

$$C_i = \sum_{k=0}^{n-1} D_{ik}.$$

In Equation 2, n is the number of pixel pairs k for calculating the deviation, i is the intra mode number, and D_{ik} is the deviation between the pixel pairs k corresponding to the specific directionality i . The symbol n may be selected by another number depending on an embodiment. In example embodiments of the present invention, the description will be made on the assumption that n is set to 12.

Id. at 18:9–18 (emphasis added).

In the '928 application, “a cost C_i with respect to a specific directionality i ” is calculated using Equation 2 for each candidate intra mode—for example, the “cost C_0 of the vertical direction” (mode 0) “is obtained by selecting 12 pixel pairs in the vertical direction from among adjacent pixels of the neighboring blocks.” *Id.* at 18:9–10, 18:19–21. After the cost C_0 for the candidate intra vertical mode is calculated, the '928 Application describes calculating the cost for the other intra modes numbered 1 through 8, such that costs C_0 through C_8 are ultimately determined. *See id.* at 19:3–4, 19:12–15; 19:20–23.

After this process, the '928 application has nine cost values, corresponding to nine directionality scenarios for pixel pairs in the neighboring blocks. *See id.* at 20:3–7. The '928 application explains that “mode selector 210 or 540 can calculate the costs C_i of a total of nine intra modes . . . and then select one having a minimum cost from among the intra modes” and that this cost calculation is done “to select the intra mode suitable for the current block.” *Id.* at 20:3–9 (emphasis added); Ex. 1005 ¶¶ 78, 79, 102 (explaining that the process uses the smallest cost value as the intra mode of the current block), 91, 92 (describing the process shown in

Figures 7A–7H and how the cost calculation iterates through the nine hypothetical intra modes).

Based on our review of the '928 application, the terms directionality and intra mode are not synonymous—they are closely related, but not the same. *See supra* n.1 (determining that “intra prediction mode” is interchangeable with “intra mode”). For example, in the Related Art section, the '928 application describes H.264 having “nine prediction modes including a total of eight modes (modes 0, 1, and 3 through 8) having *directionality*.” Ex. 1028, 3:10–13 (emphasis added). Also, in the Summary of the Invention the '928 application states that

[t]he performing an intra-prediction according to a directionality of the selected intra mode to reconstruct the current block may includes: obtaining a prediction block of the current block from the at least one neighboring block *according to the directionality* of the selected mode; and reconstructing the current block by adding the residual signal of the current block and the prediction block.

Id. at 7:24–8:4 (emphasis added). The '928 application repeatedly makes clear that *directionality* and *intra mode* are related, but distinct concepts. They are not interchangeable as Patent Owner argues. On this point, we find Dr. Freedman’s explanation in paragraph 85 of his Declaration on the relationship between “intra mode” and “directionality” to be particularly well-reasoned and persuasive. As Dr. Freedman explains,

[t]hroughout the '928 application, the text uses the term “directionality” to refer to characteristics of neighboring blocks, whereas the term “intra mode” is used when referring to the current block. For example, the '928 application describes that “directionality” of neighboring blocks is “estimated from the neighboring blocks” that “have already been reconstructed” while the “intra mode” is selected for the current block for purposes of reconstructing that current block. This is likely

because the neighboring blocks “have already been reconstructed” and thus, the intra mode number that was used in reconstructing those blocks is no longer pertinent. Instead, what is pertinent in the ’928 application’s method is the directionality characteristic of those neighboring blocks. Phrased differently, in the ’928 application, *directionality* is a concept that is evaluated *after performance of intra prediction* (i.e., after reconstruction), whereas the *intra mode* or number is a concept used *during performance of intra prediction*. They are not equivalent in the context of the ’928 application.

Ex. 1005 ¶ 86 (citing Ex. 1028, 11:14–12:4, 25:10–15; Ex. 1036, 706 (“The DCT coefficients gathered from the MPEG 2 process are used to estimate the directional features in a picture. The estimated directional features are then used to compute the intra prediction modes in the H.264 encoding stage.”)).⁸ Thus, we are persuaded by Dr. Freedman’s testimony, supported by Kalva, that these terms are not synonymous, as is Patent Owner’s and its expert’s position.

The position that “intra mode” (or “intra predication mode”) is synonymous with “directionality” taints Patent Owner’s and Dr. Reader’s entire written description analysis and leads to the second more significant error, i.e., that the ’928 application says that the variable *i* is the intra mode of the neighboring block. With the proper understanding of “intra mode” and “directionality,” we agree with Petitioner and Dr. Freedman that “the variable *i* does not refer to the intra mode of a neighboring block.” Ex. 1005 ¶ 76. According to Dr. Freedman, “a POSITA would instead have

⁸ Kalva et al., “Exploiting the Directional Features in MPEG-2 for H.264 Intra Transcoding,” *IEEE Transactions on Consumer Electronics*, Vol. 52, No. 2, May 2006 (Ex. 1036, “Kalva”).

understood the variable i to refer to the intra mode that is to be determined for the current block that is undergoing the decoding process.” *Id.*

A review of any of Figures 7A–7H helps shed light on the flaws in Patent Owner’s and Dr. Reader’s analysis. For example, Figure 7A of the ’928 application illustrates a precursor to a cost calculation for intra mode 0.

FIG. 7A

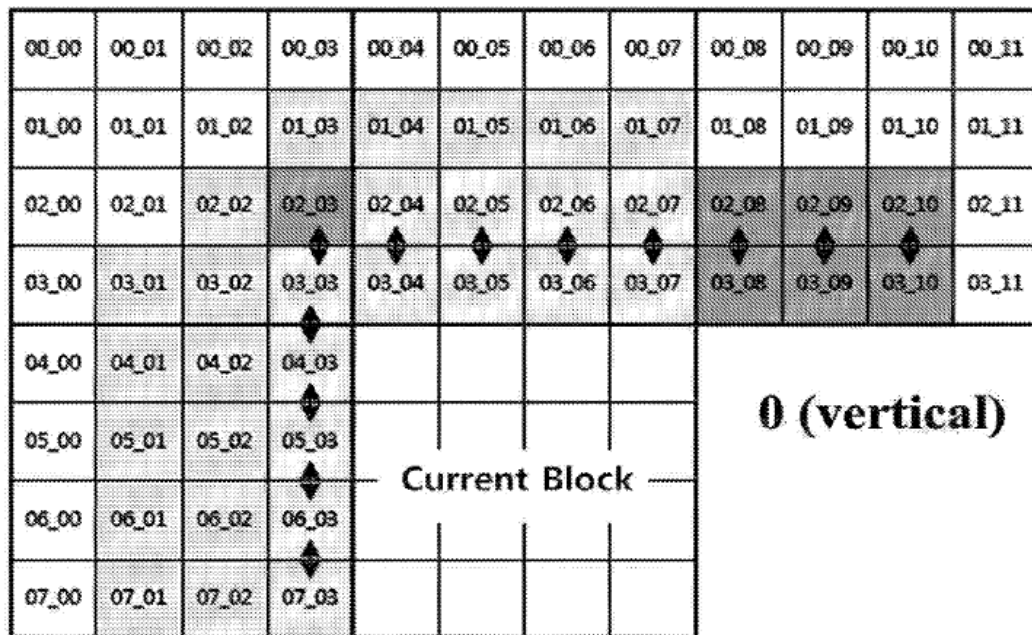


Figure 7A, reproduced above, shows exemplary pixel pairs considered in calculating the cost of a vertical direction. As the ’928 application explains,

[t]he cost C_0 of the vertical direction is obtained by selecting 12 pixel pairs in the vertical direction from among adjacent pixels of the neighboring blocks of the current block, and calculating a sum of deviations with respect to each pixel pair as in Equation 2.

Ex. 1028, 18:19–22. Both this disclosure and Figure 7A support a finding, at this stage of the proceeding, that the cost calculation centers on the current block, not the neighboring blocks—this would be unusual if i is the intra mode of a neighboring block, as Patent Owner contends.

Moreover, as shown in Figure 7A, the pixel pairs selected of the neighboring blocks spans *four different* neighboring blocks. Patent Owner never explains which of these four blocks the variable i is supposedly representing. We find persuasive Petitioner's argument set forth with respect to its annotated figure depicting neighboring blocks of a current block— "[i]f the '928 application determined the intra prediction mode of the left neighboring block as mode zero, it would have no need to perform the cost calculations that are disclosed." Pet. 31–32.

In furtherance of its arguments, Patent Owner also contends that "the '928 application specifically describes an embodiment in which the number of pixel pairs, *i.e.*, the variable n , may be some number other than 12" and that, if $n=1$, "only one pixel pair would be used in Equation 2, and such a single pixel pair would correspond to a single neighboring block." Prelim. Resp. 18 (citing Ex. 1028, 18 ("symbol n may be selected by another number depending on an embodiment"); Ex. 2001, n.2). This argument is unavailing because the current record does not support a finding that the variable n would ever take on a value of 1, at this stage of the proceeding. As we understand the '928 application, if n was set equal to 1, then Equation 2 would not iterate and would not sum any deviations of pixel pairs and in such case, the main objective of the disclosed invention would be obviated.

At this stage of the proceeding, given Figure 7A and the accompanying disclosure in the '928 application, we find Dr. Freedman's testimony in Paragraph 79 of his Declaration, initially submitted in connection with the '702IPR and now made of record in the present

proceeding, to be persuasive in explaining how this process works. Ex. 1005

¶ 79. In this regard, Dr. Freedman testifies that

the '928 application's technique of determining, or selecting, the intra mode suitable for the current block evaluates nine hypothetical scenarios for the current block, where each scenario corresponds to an intra mode. Each scenario evaluates a different arrangement of pixel pairs in neighboring blocks to determine the cost associated with applying the scenario to the current block, using Equations 2 and 3. That is to say, the cost C_i is the cost associated with using the intra mode i for the current block. Thus, for example, if the vertical intra mode (mode 0) is determined to be applied to the current block, that means that the cost C_0 was the lowest cost out of the costs C_0 through C_8 . If the non-directional mode (mode 2) is determined to be applied to the current block, that means that the cost C_2 was the lowest cost out of the costs C_0 through C_8 . Accordingly, a POSITA would have recognized the variable i to refer to the intra mode for the current block, not the intra mode for a neighboring block, as Patent Owner and Dr. Reader previously asserted.

Id. (citing Ex. 1029, 28:20–29:6 (deposition testimony of Dr. Reader from the '702IPR)).

We further determine, as we did in the '702IPR, that “the intra modes are hypothetical scenarios for application to the block while calculating costs with respect to neighboring block pixel pairs—thus, no intra mode used to decode a neighboring block is needed much less determined.” Ex. 1008, 48 (citing Ex. 1035 ¶ 68).

The Specification of the '274 patent supports this determination. The '274 patent discloses that

in an example embodiment of the present invention, unlike the conventional H.264, *the encoder does not transmit the intra mode information*, and the decoder can obtain an optimal intra mode, in which a cost function is minimized on the basis of the directionality of the neighboring blocks that have already been

reconstructed before the current block is reconstructed, for the current block, and thereby perform the intra-prediction. Alternatively, in another example embodiment of the present invention, the encoder may obtain an optimal intra mode, in which a cost function is minimized on the basis of the directionality of the neighboring blocks that have already been reconstructed, for the current block, and then may transmit the obtained intra mode information to the decoder.

....

By contrast, the existing H.264 is different from example embodiments of the present invention in that it employs a method of performing the intra-prediction on the current block using the nine intra modes and selecting the intra mode having a minimum cost, rather than the method of selecting the intra mode of the current block on the basis of the directionality of the neighboring blocks that have already been reconstructed as in example embodiments of the present invention.

....

In this manner, the method of determining the intra mode at the mode selector 550 is identical to that of selecting the intra mode at the mode selector 210 of the video encoder 200. Thus, according to an example embodiment of the present invention, the video decoder 500 need not receive information about the intra mode from the video encoder 200.

....

Of course, when the directionality of the neighboring block is different from that of the current block, there is a possibility of the energy of a residual increasing compared to the existing H.264. This possibility is nothing but a problem of trade-off for benefits obtained by not encoding the intra mode information.

....

According to example embodiments of the present invention, in comparison with an existing H.264 standard, since the intra mode information is not coded while using intra

prediction coding as it stands, it is greatly reduce[s] the overhead of a bitstream transmitted from an encoder to a decoder.

Ex. 1028, 11:4–13, 11:23–12:4, 16:11–25, 20:11–15, 21:21–24.

The cited disclosures in the '928 application (and corresponding disclosures in the '274 patent (*see* Ex. 1001, 6:5–21, 6:34–42, 8:52–58, 10:55–60, 11:34–39) make clear that, in at least some embodiments, it would not make sense for the encoder to determine the intra mode information for the neighboring block if it does not even transmit intra mode information for *any* block (*see* Ex. 1028, 11:4–8, 16:13–15) or encode intra mode information for any block (*see id.* at Ex. 1028, 20:11–15, 21:21–24).

Independently of limitation 1.1, we further determine that the '928 application does not provide written description support for limitation 1.2. For the same reasons set forth above with respect to limitation 1.1, it is clear that limitation 1.2—“determining a current intra prediction mode associated with the current block *based on whether the neighboring intra prediction mode associated with the neighboring block has directionality or not*”—also lacks written description support in the '928 application. As discussed in detail above, the intra prediction mode of the current block is determined based on the directionality of pixel pairs in neighboring blocks, not based on any intra prediction mode, let alone an intra prediction mode associated with the neighboring block.

5. *Other Arguments*

Petitioner further argues that corresponding limitations in independent claims 7 and 13 are not supported by the written description of the '274 patent. Pet. 83–85.

6. *Summary*

For purposes of this Decision, we are persuaded that the Petition

shows that it is more likely than not that Petitioner would prevail in demonstrating that at least claim 1 lacks written description support in the '274 patent, '086 application, and any other patent or application in the priority chain of the '274 patent. *See* Pet. 36–37.

As we preliminarily conclude that Petitioner demonstrates that it is more likely than not to prevail on its challenge to independent claim 1 based on lack of written description support, we institute review on all challenged claims on all grounds set forth in the Petition, including Petitioner's challenge to claims 2–13 based on lack of written description support. *See SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1354 (2018); *PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018).

F. Anticipation and Obviousness Challenges Based on HEVC265

Petitioner contends that claims 1–4 and 6 are anticipated by, or alternatively, rendered obvious in view of HEVC265. Pet. 49–52.

Patent Owner argues that HEVC265 is not prior art because it was published in 2013. Prelim. Resp. 24. Insofar as we determine that the '928 application does not provide sufficient written description support for at least claim 1, and insofar as no other patent or application in the priority chain of the '274 patent was filed before 2013 (*see* Pet. 19), Patent Owner's argument is unavailing as to this claim.

As we preliminarily conclude that Petitioner demonstrates that it is more likely than not to prevail on its challenge to independent claim 1 based on lack of written description support, we institute review on all challenged claims on all grounds set forth in the Petition, including Petitioner's anticipation and obviousness challenges to claims 1–4 and 6 applying HEVC265. *See SAS*, 138 S. Ct. at 1354; *PGS*, 891 F.3d at 1360.

IV. CONCLUSION

For the foregoing reasons, we conclude that the information presented in the Petition demonstrates that it is more likely than not that Petitioner would prevail in showing that at least one of the challenged claims of the '274 patent is unpatentable.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 324 and 37 C.F.R. § 42.4(a), a post-grant review is instituted with respect to all challenged claims and all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 324(d) and 37 C.F.R. § 42.4(b), notice is hereby given of the institution of a trial; the trial will commence on the entry date of this Order.

PGR2022-00044
Patent 11,122,274 B2

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