

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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REALTEK SEMICONDUCTOR CORP.,  
Petitioner,

v.

ATI TECHNOLOGIES ULC,  
Patent Owner.

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IPR2023-00688  
Patent 11,184,628 B2

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Before JAMES P. CALVE, BRIAN J. McNAMARA, and  
KEVIN W. CHERRY, *Administrative Patent Judges*.

CHERRY, *Administrative Patent Judge*.

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

## I. INTRODUCTION

Realtek Semiconductor Corp. (“Petitioner”) filed a Petition to institute *inter partes* review of claims 7–12 of U.S. Patent No. 11,184,628 B2 (Ex. 1001, “the ’628 patent”). Paper 1 (“Pet.”). ATI Technologies ULC (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”).

We have authority under 35 U.S.C. § 314 to determine whether to institute an *inter partes* review. The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted unless “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” The Supreme Court has held that the Board, in a decision to institute under 35 U.S.C. § 314(b), may not institute review on less than all claims challenged in the petition. *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1355–56 (2018). Moreover, in accordance with our rules, “[w]hen instituting *inter partes* 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.” 37 C.F.R. § 42.108(a) (2020); *see also PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (interpreting the statute to require “a simple yes-or-no institution choice respecting a petition, embracing all challenges included in the petition”).

Applying those standards, and upon considering the Petition, the Preliminary Response, and the evidence of record, we determine the information presented fails to show a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of at least one of the challenged claims of the ’628 patent. Accordingly, we deny institution of *inter partes* review.

## II. BACKGROUND

### *A. Related Matters*

The parties identify the following proceeding as related matters involving the '628 patent: *Advanced Micro Devices, Inc. et al. v. TCL Industries Holdings Co., LTD., et al.*, Case No. 2:22-cv-00134 (E.D. Tex.) and *Certain Graphics Systems, Components Thereof, and Digital Televisions Containing The Same*, Inv. No. 337-TA-1318 (ITC). Pet. 1–2; Paper 4, 1.

### *B. Real Parties in Interest*

Petitioner identifies its real party in interest as Realtek. Pet. 1.

Patent Owner identifies ATI Technologies ULC as its real party in interest. Paper 4, 1.

### *C. Overview of the '628 patent*

The '628 patent is titled “Texture Decompression Techniques.” Ex. 1001, Code [54]. The '628 patent is a continuation of 15/237,134, filed on Aug. 15, 2016, issued as U.S. Patent No. 10,205,956, which claims priority to Application No. 11/513,190, filed Aug. 31, 2006, issued as U.S. Patent No. 9,418,450.

The '628 patent relates to “the field of texture compression and decompression in computer graphics.” *Id.* at 1:15–16. A texture is a one or more dimensional array of data items used in the “calculation of the color or appearance of fragments produced by rasterization of a computer graphics scene.” *Id.* at 1:20–23. The '628 patent explains that texture compression can “significantly reduce memory and bandwidth requirements.” *Id.* at 1:27–30. Various texture compression schemes were known according to the specification; however, they had problems with textures containing many different color hues within each pixel block. *Id.* at 2:24–38. According to

the specification, textures may be used to enhance or change the appearance of surfaces in graphics, wherein a “texel” is a texture element in the same way a “pixel” is a picture element, and the terms “pixel” and “texel” may be used synonymously to refer to discrete units of data in a frame buffer, texture buffer, or other type of memory or array. *Id.* at 3:49–53. The present invention uses a method for pre-compression partitioning of texture blocks. *Id.* at 4:51–54. According to the specification, pre-compression partitioning of the blocks into subsets of different shapes and sizes improves the ability to compress less common types of texture data. *Id.* at 6:5–16.

An example set of partitions having three disjoint subsets is illustrated in Figure 8 below.

|                                                          |                                                          |                                                          |                                                          |
|----------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------|
| 0, 0, 1, 1,<br>0, 0, 1, 1,<br>0, 2, 2, 1,<br>2, 2, 2, 2, | 0, 0, 0, 1,<br>0, 0, 1, 1,<br>2, 2, 1, 1,<br>2, 2, 2, 1  | 0, 0, 0, 0,<br>2, 0, 0, 1,<br>2, 2, 1, 1,<br>2, 2, 1, 1, | 2, 0, 0, 0,<br>2, 2, 0, 0,<br>2, 2, 1, 1,<br>2, 1, 1, 1, |
| 0, 0, 0, 0,<br>0, 0, 0, 0,<br>1, 1, 2, 2,<br>1, 1, 2, 2, | 0, 0, 1, 1,<br>0, 0, 1, 1,<br>0, 0, 2, 2,<br>0, 0, 2, 2, | 1, 1, 2, 2,<br>1, 1, 2, 2,<br>0, 0, 0, 0,<br>0, 0, 0, 0, | 1, 1, 0, 0,<br>1, 1, 0, 0,<br>2, 2, 0, 0,<br>2, 2, 1, 0, |
| 0, 0, 0, 0,<br>0, 0, 0, 0,<br>1, 1, 1, 1,<br>2, 1, 2, 2, | 0, 0, 0, 0,<br>1, 1, 1, 1,<br>1, 1, 1, 1,<br>2, 2, 2, 2, | 0, 0, 0, 0,<br>1, 1, 1, 1,<br>2, 2, 2, 2,<br>2, 2, 2, 2, | 0, 0, 1, 2,<br>0, 0, 1, 2,<br>0, 0, 1, 2,<br>0, 0, 0, 2, |
| 0, 1, 1, 2,<br>0, 1, 1, 2,<br>0, 1, 1, 2,<br>0, 1, 1, 2, | 0, 1, 2, 2,<br>0, 1, 2, 2,<br>0, 1, 2, 2,<br>0, 1, 2, 2, | 0, 0, 1, 1,<br>0, 1, 1, 2,<br>1, 1, 2, 2,<br>1, 2, 2, 2, | 0, 0, 1, 1,<br>2, 0, 0, 1,<br>2, 2, 0, 0,<br>2, 2, 2, 0, |

802

**FIG. 8**

Figure 8 illustrates a rectangular block of pixels having 16 partitions, each partition containing a 4x4 pixel block. *Id.* at 7:9–15. Exemplary partition

802 has been subdivided into three disjoint subsets. *Id.* at 7:10–15. Partition 802 contains one subset of pixels labeled 0, another subset of pixels labeled 1, and the final subset of pixels labeled 2. *Id.* “[E]ach subset is then independently compressed to form a compressed texture block.” *Id.* at 7:28–29. In one exemplary compression scheme, “each of the subsets may be compressed using two explicit endpoint parameters that define a line in the colo[r] space, and a plurality of implicit points on the line selected according to a predefined quantization.” *Id.* at 7:29–33.

In one embodiment, a computer system contains graphics memory and a texture decompression engine within a Graphics Processing Unit (“GPU”). *Id.* at 5:55–60. The texture decompression engine is responsible for decompressing or decoding compressed texture data. *Id.* at 5:60–62. A flow chart illustrating a decompression scheme of texture blocks that have been compressed is depicted in Figure 5, reproduced below.

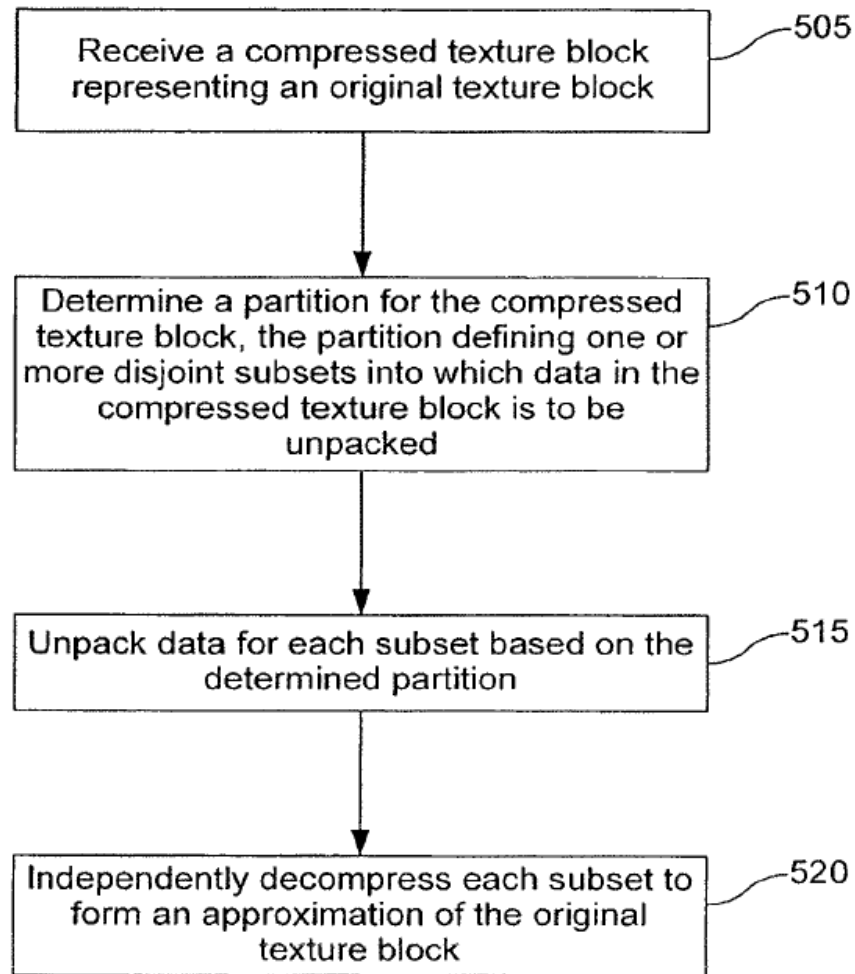


**FIG. 5**

Figure 5 is a flowchart illustrating a decompression method that includes four steps from 505 to 520. *Id.* at 8:38–41. At step 505, “a compressed texture block is received that represents an original texture block.” *Id.* at 8:41–43. The decompression method involves determining the partition (step 510) that was used for the compressed texture. *Id.* at 8:44–45. The partition defines the disjoint subsets into which the

compressed texture block is to be unpacked. *Id.* at 8:45–47. The data for each subset is then unpacked (step 515), which involves “extracting the information from the block that is required to decompress the data stored in the subset.” *Id.* at 8:53–56. The subsets are then independently decompressed. *Id.* at 8:56–59.

At step 520, approximations of the original texture blocks are generated based on the decompression of the subsets. *Id.* at 8:56–59. The approximations of the original texture block are then used by a GPU’s texture mapping algorithm and applied to a rendered surface for display. *Id.* at 8:59–61.

In one embodiment, colors are generated for a subset by using two explicit colors as endpoints of a line in RGB color space. *Id.* at 10:61–62. The remaining colors are then evenly distributed along the line. *Id.* at 10:63–64. In this decompression scheme, each pixel or texel in the subset has an index that looks up which color to use from the line. *Id.* at 10:67–11:1.

#### *D. The Challenged Claims*

Petitioner challenges claims 7–12 of the ’628 patent. Pet. 3. Of the challenged claims, claim 7 is independent. Claim 7, reproduced below with Petitioner’s identifiers for the claim limitations, is illustrative of the subject matter recited in the challenged claims.

**[7 Preamble]** A computer processing system comprising:

**[7(a)]** a processor and a memory, wherein the processor is configured to:

**[7(b)]** receive a compressed texture block, wherein the compressed texture block includes two or more disjoint subsets into which data in the compressed texture block is to be unpacked, wherein the two or

more disjoint subsets include a first subset having a first set of color endpoints and a second subset having a second set of color endpoints; and

[7(c)] individually decompress each of the two or more disjoint subsets to form texels, wherein the decompressing includes:

[7(d)] determining a first texel color for a first texel that is part of the first disjoint subset by interpolating between color endpoints of the first set of color endpoints based on a first index value for the first texel; and

[7(e)] determining a second texel color for a second texel that is part of the second disjoint subset by interpolating between color endpoints of the second set of color endpoints based on a second index value for the second texel.

Ex. 1001, 17:1–18:3 (Petitioner’s limitation designations added in brackets for ease of reference).

*E. Evidence*

Petitioner submits the following evidence:

| <b>Evidence</b>                                                                                | <b>Exhibit No.</b> |
|------------------------------------------------------------------------------------------------|--------------------|
| Declaration of Dr. Dinesh Manocha                                                              | 1003               |
| Sørgard et al., US 8,102,402 B2 (issued Jan. 24, 2012, filed Mar. 3, 2006) (“Sørgard”)         | 1004               |
| FXT1 Texture Compression Technology White Paper (1999) (“FXT1”)                                | 1005               |
| Reshetov et al., US 2004/0151372 A1 (published Aug. 5, 2004, filed Jan. 23, 2004) (“Reshetov”) | 1008               |

Patent Owner submits the Declaration of Anselmo Lastra in support of its preliminary response. Ex. 2001.

*F. Asserted Grounds of Unpatentability*

Petitioner asserts the following grounds of unpatentability:

| <b>Claim(s) Challenged</b> | <b>35 U.S.C. §<sup>1</sup></b> | <b>Reference(s)/Basis</b>                                          |
|----------------------------|--------------------------------|--------------------------------------------------------------------|
| 7–12                       | 103(a)                         | Sørgard, Knowledge of a Person of Ordinary Skill in the Art        |
| 7–12                       | 103(a)                         | FXT1, Knowledge of a Person of Ordinary Skill in the Art           |
| 12                         | 103(a)                         | FXT1, Reshetov, Knowledge of a Person of Ordinary Skill in the Art |

Pet. 25. Patent Owner argues that Petitioner has not established a reasonable likelihood of success for any grounds. Prelim. Resp. 1, 22–38.

III. PATENTABILITY ANALYSIS

Petitioner contends that claims 7–12 of the ’628 patent are unpatentable under 35 U.S.C. § 103(a) over Sørgard and the knowledge of a person of ordinary skill in the art, claims 7–12 are unpatentable under 35 U.S.C. § 103(a) over FXT1 and the knowledge of a person of ordinary skill in the art, and claim 12 is unpatentable under 35 U.S.C. § 103(a) over FXT1, Reshetov, and the knowledge of a person of ordinary skill in the art. Pet. 25.

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, “would have been obvious at the time the

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<sup>1</sup> The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. §§ 102, 103. Because the ’628 patent has an effective filing date prior to the effective date of the applicable AIA amendment, we refer to the pre-AIA version of § 103.

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.<sup>2</sup> *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

We organize our patentability analysis into four sections. First, we address the level of ordinary skill in the art. Second, we address claim construction. Third, we provide an overview of the asserted references. And fourth, taking account of the information presented, we consider whether the Petition satisfies the threshold requirement for instituting an *inter partes* review under 35 U.S.C. § 314(a).

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<sup>2</sup> Patent Owner does not present arguments or evidence of secondary considerations in its Preliminary Response. Therefore, secondary considerations do not constitute part of our analysis herein.

*A. Level of Ordinary Skill in the Art*

We consider the asserted grounds of unpatentability in view of the understanding of a person of ordinary skill in the art. In assessing the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (quoting *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986)). “[O]ne or more factors may predominate.” *Id.*

Neither Petitioner nor Patent Owner provides the level of ordinary skill in the art. However, Petitioner’s expert, Dr. Dinesh Manocha, applies the definition of a person of ordinary skill in the art found in a parallel International Trade Commission litigation in his obviousness analysis. Ex. 1003 (Manocha Decl.) ¶ 42. According to Dr. Manocha’s declaration,

a POSITA would have a bachelor degree in electrical engineering, computer engineering, computer science, or a related field, and at least two years of experience in “parallel computing or graphics processing including developing, designing, or programming software or hardware for graphics processing or parallel processing units, graphics accelerators[,] or other graphics processing systems,” with additional education substitut[ing] for experience and vice versa.

*Id.* ¶ 42 (quoting Ex. 1010, 9). Patent Owner does not address the level of ordinary skill. *See generally* Prelim. Resp.

Based on this record, we adopt Dr. Manocha’s articulation of the level of ordinary skill in the art, which is consistent with the ’628 patent and the asserted prior art, and we apply it in our obviousness evaluations below. *See*

*Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (the prior art, itself, can reflect appropriate level of ordinary skill in art).

*B. Claim Construction*

We consider the proper construction of the claims. In interpreting the claims of the '628 patent, we “us[e] the same claim construction standard that would be used to construe the claim[s] in a civil action under 35 U.S.C. [§] 282(b).” *See* 37 C.F.R. § 42.100(b) (2020). The claim construction standard includes construing claims in accordance with the ordinary and customary meaning of such claims as would have been understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. *See id.*; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (*en banc*).

Petitioner submits that several terms of the '628 patent were previously construed in a proceeding before the International Trade Commission. Pet. 12–13 (citing Ex. 1010). In particular, Petitioner asserts the claim term “unpacked” was construed to mean “extracted.” Pet. 13. For purposes of its Petition, Petitioner adopts this construction of the term “unpacked,” which Petitioner argues is a “more limiting construction.” Pet. 13. Patent Owner does not respond to Petitioner’s proposed construction of the term “unpacked” or argue for the express construction of any other claim terms. *See generally* Prelim. Resp.

Although neither party proposes them for express construction, we find that some clarification of the scope of the terms “texture block” and “second index value” would be helpful in resolving the issues in this proceeding.

1. “*texture block*”

Petitioner argues that a “texture block” can include an entire texture image. Pet. 55. Patent Owner argues that the plain and ordinary meaning of a “texture block” is “a division of an original texture image, not the image itself.” Prelim. Resp. 31. The claims recite in relevant part “receive a compressed texture block, wherein the compressed texture block includes two or more disjoint subsets into which data in the compressed texture block is to be unpacked.” Ex. 1001, 17:4–7. The claim language does not particularly illuminate this dispute. Petitioner is correct that the claim language does not necessarily preclude Petitioner’s construction, but neither does the claim language compel Petitioner’s construction.

The Specification, however, supports Patent Owner’s construction. In the Background section, the Specification consistently uses the term “block” as a division of an image. *See, e.g.*, Ex. 1001, 1:67–2:3 (“The codebook entries are blocks of pixels of some size (typically 2×2 or larger). For each block of pixels in the original texture, an index is stored to the codebook entry that most closely approximates the block.”). Moreover, the Background section describes the prior-art DXTC technique as “a block-based texture compression scheme” that “explicitly stores two 16-bit colors per 4×4 pixel block.” *Id.* at 2:24–29. The Background section also describes FXT1, which Petitioner asserts in one of its challenges here, as “a competing compression scheme with DXTC,” which “essentially extends DXTC with some additional block types that can be mixed within any given image.” *Id.* at 2:46–48.

The Specification also uses “block” in the same way in its “Detailed Description of the Preferred Embodiments.” Indeed, the Specification states that

[T]he present invention further refines block-based image compression techniques such as DXTC with a flexible method for pre-compression partitioning of texture blocks. The pre-compression partitioning enhances image quality by flexibly selecting partitions suitable to the characteristics of the texture block being compressed, rather than adopting the one-size-fits-all approach suggested in other methods.

Ex. 1001, 4:52–57; *see also id.* at 5:66–6:4 (noting “the present invention represents a further refinement of block-based texture compression schemes such as DXTC” and “the basic compression algorithm . . . divides or splits the image up into discrete blocks of pixels”). The Specification goes to reinforce the understanding of the term “block” as a division of the entire image. For example, when discussing the preferred embodiment, the Specification explains

As with other block-based texture compression schemes, the original texture is then split or divided into original blocks of pixels according to step 305. Typically, the original block of pixels is a square or rectangular block—e.g., 4×4 or 8×8 pixel. The size of the original block of pixels is variable, and may be selected according to user needs, application demands and/or system capabilities.

*Id.* at 6:20–26; *see also id.* at 9:12–13 (“[T]he texture is divided into blocks of 8x8 pixels for compression.”). Thus, we determine that the Specification consistently uses the term “block” to indicate a division of an image, not the image itself, which supports Patent Owner’s construction.

Finally, Petitioner argues that “block” is not a term of art and that the extrinsic evidence supports a broader construction. Pet. 55 (citing Ex. 1008

¶ 75; Ex. 1003 ¶ 140). Patent Owner asserts that the extrinsic evidence, including the extrinsic evidence relied on by Petitioner, supports their construction. *See* Prelim. Resp. 31–32 (citing Ex. 2001 ¶¶ 91–101; Ex. 1008 ¶¶ 49, 75; Ex. 1005, 5; Ex. 2006, 1). Here, we find the extrinsic evidence offered by the parties to be of less assistance than the intrinsic record in this case. However, we agree with Patent Owner that the extrinsic evidence offered generally aligns with the understanding reached in light of the Specification discussed above. In particular, we agree with Patent Owner that Exhibit 1008, cited by the Petitioner, appears to define “[t]exture [b]locks” as “[p]ortions of a texture that contain a plurality of texels.” *See* Ex. 1008 ¶ 49 (emphasis added). The other evidence cited by Patent Owner also supports Patent Owner’s construction. *See* Ex. 2001 ¶¶ 91–101; Ex. 1008 ¶¶ 49, 75; Ex. 1005, 5; Ex. 2006, 1. Petitioner’s expert testimony on this point, Ex. 1003 ¶ 140, simply repeats the arguments offered in the Petition without citing any additional evidence or offering any additional reasoning and support. Thus, we give it little weight. Accordingly, the extrinsic evidence does not support Petitioner’s broader construction.

Having considered the intrinsic and extrinsic evidence, we determine that the plain and ordinary meaning in light of the Specification of a “texture block” is “a division of an original texture image, not the image itself.”

2. “*second index value*”

Patent Owner argues that a person of ordinary skill in the art would “understand the plain and ordinary meaning of the claims require that the first and second texels are interpolated using two different index values, each specific to its respective texel: ‘a first index value for the first texel,’ and ‘a second index value for the second texel.’” Prelim. Resp. 26–27

(citing Ex. 2001 ¶ 87). Patent Owner asserts that “[c]laim interpretation also requires that the ‘first index value’ and the ‘second index value’ be different index values, each specific to their respective texel.” *Id.* (citing *SimpleAir, Inc. v. Sony Ericsson Mobile Communs. AB*, 820 F.3d 419, 431 (Fed. Cir. 2016); *Bd. of Regents of the Univ. of Tex. Sys. v. BENQ Am. Corp.*, 533 F.3d 1362, 1371 (Fed. Cir. 2008)). Patent Owner also argues that “allowing the same index value to read on both the ‘first index value’ and ‘second index value’ would render the ‘second index value’ superfluous.” *Id.* at 27 (citing *Merck & Co. v. Teva Pharms. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005)).

We begin with the language of the claims themselves. *Phillips*, 415 F.3d at 1314. Claim 7 recites two particularly relevant limitations. First, claim 7 recites “determining a first texel color for a first texel that is part of the first disjoint subset by interpolating between color endpoints of the first set of color endpoints based on a *first index value* for the first texel.” Ex. 1001, 17:14–17 (emphasis added). Second, claim 7 recites “determining a second texel color for a second texel that is part of the second disjoint subset by interpolating between color endpoints of the second set of color endpoints based on a *second index value* for the second texel.” *Id.* at 17:18–18:3 (emphasis added). Thus, claim 7 differentiates between two index values—a “first” and a “second”—each associated with a texel in one of the disjoint subsets. As Patent Owner correctly explains, “[d]ifferent claim terms are presumed to have different meanings.” *BENQ*, 533 F.3d at 1371. Thus, the language of the claims supports Patent Owner’s contention that the claim requires two distinct index values.

We next look at the Specification. *See Phillips*, 415 F.3d at 1315 (“Claims must always be read in light of the specification.”). In its “Detailed Description of the Preferred Embodiments,” the Specification discloses that

Colors are then generated for the subset by using the two explicit colors as the endpoints of a line in RGB color space. The remaining (implicit) colors are evenly distributed along that line. For higher quality in this embodiment it is desirable for the implicit colors to be derived at higher precision than the endpoints—i.e. more than 8 bits-per-component. *Each pixel or texel in the subset has an index that looks up which color to use from the line.*

Ex. 1001, 10:61–11:1 (emphasis added). In other words, the Specification discloses an embodiment with multiple indexes. While this does not compel Patent Owner’s construction, it is consistent with it.

Because Patent Owner’s proposed construction is most consistent with the claim language and is consistent with the Specification, we adopt Patent Owner’s understanding “that the ‘first index value’ and the ‘second index value’ be different index values, each specific to their respective texel.”

### 3. *Remaining Terms*

Having considered the record, we determine that no express claim construction is necessary for any other claim terms. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (holding that only claim terms in controversy need to be construed, and only to the extent necessary to resolve the controversy (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

### C. The Prior Art

Before turning to Petitioner’s asserted grounds of unpatentability, we provide brief summaries of the asserted references.

#### 1. Sørsgard (Ex. 1004)

Sørsgard is titled “Method Of And Apparatus For Encoding Data.” Ex. 1004, Code [54]. Sørsgard discloses methods and apparatuses “for use to compress (and decompress) texture data in computer graphics systems.” *Id.* at 1:9–12.

In one embodiment Sørsgard describes partitioning an image into 8x4 texture data blocks, and each block is further encoded into two 4x4 texture element arrays. *Id.* at 4:62–5:3.

Figure 1, reproduced below, shows schematically the encoding of an array of image data as a plurality of encoded data blocks.

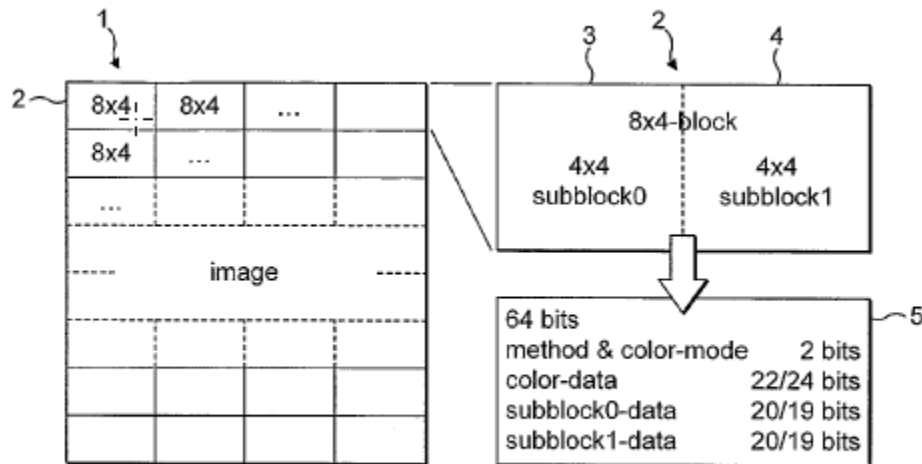


FIG. 1

Figure 1 illustrates an encoding process in which an original image or array of texture data elements is subdivided into a plurality of 8x4 texture element blocks. *Id.* at 24:23–28. Each 8x4 block is further encoded into two 4x4 texture element sub-blocks. *Id.* at 24:26–28.

Sørgard discloses a color generation method that selects the colors for half the texels encoded in each 4x4 sub-block, and generates colors for the remaining texels by interpolating between texture element values according to a predefined “fading pattern.” *Id.* at 33:1–8.

Figure 5, reproduced below, shows possible fading patterns for an embodiment.

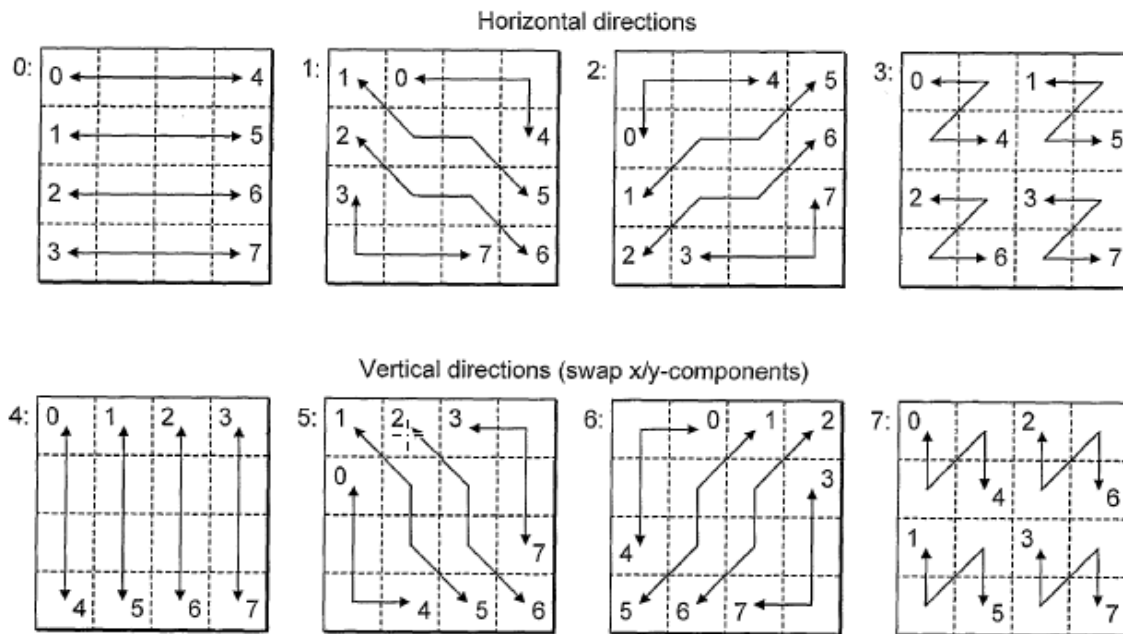


FIG. 5

Figure 5 schematically shows a color interpolation process. *Id.* at 24:12–14. Each fading pattern has a major direction, either horizontal or vertical, and a sub-direction identifying the specific fade patterns. *Id.* at 33:29–35. Figure 5 labels each fade pattern with a direction from 0 to 7. Direction 0, for example, contains four horizontal interpolation paths.

Each fading pattern comprises a set of four interpolation paths that together cover all of the texture elements in the 4x4 sub-block. *Id.* at 33:24–28. Each endpoint of an interpolation path is given a number, 0 to 7. *Id.* at 33:52–54. The color to be used for each endpoint is encoded by means

of a two bit index into the set of four colors to be generated for the texture data block. *Id.* at 33:47–51. The colors of the remaining elements are then calculated by interpolating between each endpoint color. *Id.* at 33:62–67.

2. *FXT1 (Ex. 1005)*

FXT1 describes texture compression technology for creating textures at higher resolutions and reducing memory bandwidth. Ex. 1005, 2. The “texture compression works by dividing an image into multiple 4x4 and/or 4x8 texel blocks.” *Id.* at 5. Each texel within a block “is compressed to an average of four bits-per-texel.” *Id.* FXT1 describes four different compression algorithms, with the best one chosen per texel block. *Id.*

In one algorithm, referred to as “CC\_MIXED,” each 4x4 texel block has two 16-bit colors stored in an RGB 565 format. *Id.* at 5. The two RGB 565 colors along with two additional colors created by interpolating between the RGB 565 colors are stored in a four color lookup table. *Id.* A 2-bit index is then used to determine which color from the lookup table will be used for each texel in the 4x4 block. *Id.*

FXT1 discloses that “texture decompression happens during the texture mapping process.” *Id.* at 6. The decompression algorithm for each texel block depends on the compression algorithm used for that block. *Id.*

3. *Reshetov (Ex. 1008)*

Reshetov is titled “Color Distribution for Texture and Image Compression.” Ex. 1008, Code [54]. Reshetov discloses systems and methods “for compressing computer graphics and textures for three dimensional computer graphics.” *Id.* ¶ 3. Reshetov explains that an error function may be used to quantify the ability of a color palette to represent the original color values for a group of texels. *Id.* ¶ 42. The color palette is

created during texture compression by iteratively changing color values from the color palette to reduce the error function. *Id.* ¶45.

*D. Alleged Ground of Unpatentability Over Sörgard*

Petitioner contends that claims 7–12 of the ’628 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Sörgard in view of the knowledge of a person of ordinary skill in the art. Pet. 25–47. Patent Owner offers counterarguments. Prelim. Resp. 22–28. Having considered the arguments and evidence before us, we determine that the record fails to establish a reasonable likelihood that Petitioner would prevail on this asserted ground of unpatentability. We focus our analysis on limitations 7(d) and 7(e) because it is dispositive of this dispute.

*1. Claim 7*

- (a) 7(d): determining a first texel color for a first texel that is part of the first disjoint subset by interpolating between color endpoints of the first set of color endpoints based on **a first index value** for the first texel; and*
- 7(e) Determining a second texel color for a second texel that is part of the second disjoint subset by interpolating between color endpoints of the second set of color endpoints based on **a second index value** for the second texel*

With respect to the claimed “first index value,” Petitioner argues that “S[ø]rgard uses an index to determine the fading pattern of the interpolation paths.” Pet. 36 (citing Ex. 1004, 33:43–47). Petitioner contends that “[f]or example, a 3-bit index is used to select one of the eight fading patterns in Figure 5.” *Id.* (citing Ex. 1003 ¶99). Petitioner asserts that “[f]or each texel, this index determines the interpolation formula used to derive its

color.” *Id.* Petitioner provides an annotated version of Figure 5 of Sørsgard reproduced below.

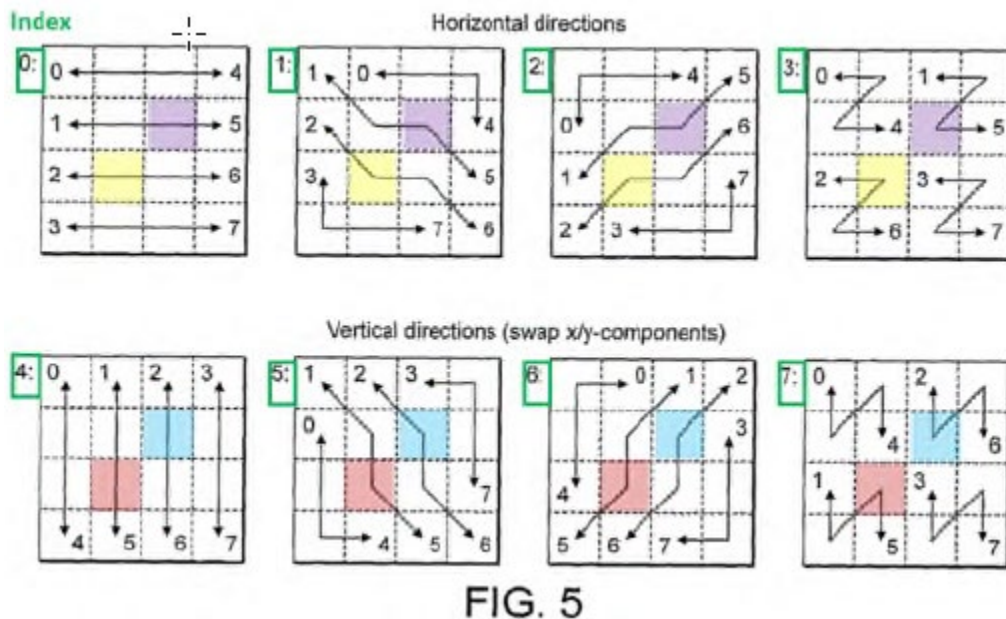


FIG. 5

Figure 5 of Sørsgard shows the possible fading patterns that can be used in an embodiment of Sørsgard. *Id.* at 37; Ex. 1004, 33:23–24.

Petitioner explains that “an index value of 0, 1, 2, or 3 (shown in green boxes below) determines that the texel at coordinate (1, 2) (yellow) is to be interpolated between  $\text{endpoint}_{\text{color}}[2]$  and [6], with  $\text{endpoint}_{\text{color}}[2]$  weighed more heavily, while the texel at coordinate (2, 1) (purple) is to be interpolated as between  $\text{endpoint}_{\text{color}}[5]$  and [1], with  $\text{endpoint}_{\text{color}}[5]$  weighed more heavily.” Pet. 36. Petitioner further explains that “[s]imilarly, an index value of 4, 5, 6, or 7 determines that the texel at coordinate (1, 2) (red) is to be interpolated as  $(\text{endpoint}_{\text{color}}[5] * 5/8) + (\text{endpoint}_{\text{color}}[1] * 3/8)$ , while the texel at coordinate (2, 1) (blue) is to be interpolated as  $(\text{endpoint}_{\text{color}}[2] * 5/8) + (\text{endpoint}_{\text{color}}[6] * 3/8)$ .” *Id.* at 37 (citing Ex. 1003 ¶100).

Petitioner also asserts that “Sørgard disclosed an index that is used to determine the direction of the fading pattern or interpolation path.” *Id.* (citing Ex. 1004, 33:43–47; Ex. 1003 ¶ 101). Petitioner argues that “[t]o the extent that the determination of the texel color is applied to a texel based on this index indicating the direction of the interpolation path, such determination is based on an index value for the texel whose color is to be determined.” *Id.* Petitioner asserts that “[p]ut differently, it would have been obvious that texel position (or equivalent, e.g., texel location in the compressed data representation) together with the 3-bit index constitute the index value of the ’628 patent. *Id.* (citing Ex. 1003 ¶ 101).

With respect to the claimed “second index value,” Petitioner contends that the reasons given for the “first index value” apply to this limitation, and Sørgard’s decompression algorithm is repeated for a second texel that is part of a second disjoint set, “which a [person of ordinary skill in the art] would have understood to be inherent in Sørgard.” Pet. 38 (citing Ex. 1003 ¶ 103).

Patent Owner contends that Petitioner fails to identify a “second index value” different from the claimed “first index value.” Prelim Resp. 26–28 (citing Ex. 1004, 33:1–22, 33:43–47, Fig. 5; Ex. 2001 ¶¶ 85–89). We agree. As we explained above, the claim language requires “the ‘first index value’ and the ‘second index value’ be different index values, each specific to their respective texel.” *See supra* III.B.2. However, Petitioner’s cited portions of Sørgard only reference one index. *See* Ex. 1004, 33:43–47 (“For this encoding, one bit is used to indicate the major direction of the fading pattern, and two bits are used to indicate the sub-direction (i.e. as an index into which of the four sub-directions is to be used).”). We agree with Patent Owner that Sørgard provides that one index value applies to the entirety of

the 4x4 subblock, as it must because the single fading pattern governs the entirety of a 4x4 subblock. *See* Ex. 2001 ¶¶ 86–88. We agree with Patent Owner that “[a]lthough this index value has two components to it, one that indicates the direction (horizontal or vertical) of the fading pattern and another that indicates the sub-direction of the fading pattern, both components work together to identify the single fading pattern applicable to the entire 4x4 subblock, which is Petitioner’s identified block.” Prelim. Resp. 28 (citing Ex. 1004, 33:1–22, 33:37–47; Ex. 2001 ¶¶ 88–89).

Petitioner’s specific arguments with respect to limitation 7(e) do not correct this omission. Petitioner merely refers to the arguments addressed above that only discuss a single index, and states that a person of ordinary skill would understand that Sørsgard’s decompression algorithm is repeated for a second texel that is part of a disjoint subset. However, even accepting that Sørsgard repeats its decompression algorithm for a second texel, it does not identify a “second index value,” because, as we explained above, Petitioner’s evidence merely shows that a single index is applied to the entire texture block. *See* Ex. 2001 ¶¶ 88–89. Therefore, Petitioner has failed to sufficiently show that Sørsgard discloses using two different index values, one respective to a first texel and a second respective to a second texel as required by limitation 7(e).<sup>3</sup>

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<sup>3</sup> To the extent that Petitioner argues that it would be obvious to combine Sørsgard’s index with the texel to account for the claimed “index value,” *see* Pet. 37, we find that Petitioner has provided insufficient explanation why a person of ordinary skill would view the combined location and Sørsgard’s index as the claimed “index value.”

Accordingly, we find that Petitioner has failed to demonstrate a reasonable likelihood of prevailing in showing that Sørgard in view of the knowledge of a person of ordinary skill render obvious claim 7.

*2. Remaining Claims*

Because all of the challenged claims depend from claim 7 and contain limitation 7(e) and rely on the same reasoning found inadequate above, we determine that Petitioner has also failed to establish a reasonable likelihood of prevailing on those claims as well.

*E. Alleged Ground of Unpatentability Over FXT1*

Petitioner contends that claims 7–12 of the '628 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over FXT1 in view of the knowledge of a person of ordinary skill in the art. Pet. 47–68. Patent Owner offers counterarguments. Prelim. Resp. 28–38. Having considered the arguments and evidence before us, we determine that the record fails to establish a reasonable likelihood that Petitioner would prevail on this asserted ground of unpatentability.

*1. Claim 7*

*(a) 7(b) Receive a compressed texture block, wherein the compressed texture block includes two or more disjoint subsets into which data in the compressed texture block is to be unpacked, wherein the two or more disjoint subsets include a first subset having a first set of color endpoints and a second subset having a second set of color endpoints*

Petitioner contends that FXT1 discloses partitioning a texture block into 4x4 or 4x8 nonoverlapping or disjoint subsets. Pet. 49–57 (citing Ex. 1005, 2, 5; Ex. 1003 ¶¶ 129–136, 138–143; Ex. 1008 ¶ 75). Petitioner

further contends the plain and ordinary meaning of the term “compressed texture block” can read on a block comprising an entire image. *Id.* at 55. Petitioner also contends that FXT1 discloses disjoint subsets each containing two 16-bit colors which constitute a set of color endpoints. *Id.* at 54 (citing Ex. 1005, 5; Ex. 1003 ¶ 139).

Patent Owner contends that FXT1 does not disclose a compressed texture block that includes disjoint subsets because a “texture block” is not an original image and a “subset” is a division of a texture block. Prelim. Resp. 29–34 (citing Ex. 2001 ¶¶ 91–104; Ex. 1008 ¶¶ 49, 75). Patent Owner also contends that treating an entire image as the claimed “texture block” would render the resulting system inoperable. *Id.* at 34–36 (citing Ex. 2001 ¶¶ 45–48, 92–96, 106–108). Patent Owner further contends that Petitioner’s obviousness analysis relies on hindsight. *Id.* at 36–38 (citing Ex. 2001 ¶¶ 110–111).

We agree with Patent Owner that Petitioner has failed to show that FXT1 accounts for limitation 7(b). Petitioner offers two theories to account for this limitation, and neither of them is persuasive. *See* Pet. 55–57. First, Petitioner argues that “the claimed ‘compressed texture block’ in its plain and ordinary meaning can read on a block comprising an entire image or a part of an image.” *Id.* at 55. However, as we explained above, we agree with Patent Owner that the correct construction of “texture block” is “a division of an original texture image, not the image itself.” *See supra* III.B.1. Thus, we disagree with Petitioner that the entire image can comprise the claimed “texture block.” Accordingly, do not find Petitioner’s first theory persuasive.

Second, Petitioner argues that a person of ordinary skill in the art “would have found it obvious to partition an image into a plurality of texture blocks each of which including two or more disjoint 4x4 and/or 4x8 texel blocks.” Pet. 55–56. Petition argues that partitioning blocks into smaller subsets was known in the art. *Id.* at 56. Petitioner asserts that a person of ordinary skill in the art “would have found it obvious that other block sizes are available.” *Id.* Petitioner submits that “[f]or example, an image may be partitioned into square blocks with each side having a length that is a multiple of 8 (8, 16, 24, etc.). And FXT1 disclosed texture sizes such as 64x64, 128x128, . . . , 2048x2048, etc.” *Id.* (citing Ex. 1005, 2). Petitioner argues that “[e]ach such a square block may include two or more disjoint 4x4 and/or 4x8 texel blocks,” and “it would have been obvious to partition a 2048x2048 image into, for instance, 1,024 64x64 blocks, each of which may be further partitioned into a plurality of 4x4 and 4x8 disjoint subsets.” *Id.* Petitioner contends that “[m]aking such an additional level of partitioning would have been nothing more than applying a well-understood, conventional image decomposition or partitioning technique with predictable results.” *Id.* at 57. Petitioner asserts that a person of ordinary skill in the art “would have been motivated to make an additional level of partitioning to, for example, break up a large image into sets of data such that performing compression on each block would preserve the image fidelity of the texture.” *Id.* (citing Ex. 1003 ¶ 143).

We agree with Patent Owner that Petitioner’s purported motivation that the modification would “preserve the image fidelity of the texture” lacks sufficient reasoning and support. Importantly, we fail to see, and Petitioner provides inadequate explanation or support, why adding an additional level

of partitioning above the 4x4 and 8x8 blocks would “preserve the image fidelity of the texture” any more than what FXT1 already does. *See* Pet. 57. We also decline to give weight to Petitioner’s expert declaration, which merely repeats this conclusory reasoning without providing any additional explanation or evidentiary support. *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.”). “Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning.” *InTouch Techs., Inc. v. VGo Communs., Inc.*, 751 F.3d 1327, 1347, 1351 (Fed. Cir. 2014). Here, we find Petitioner’s reasoning and rational underpinning as to why FTX1 would be modified in the manner proposed to be lacking. Accordingly, because we find that Petitioner has failed to account for limitation 7(b), we find that Petitioner has failed to demonstrate a reasonable likelihood of prevailing in showing that claim 7 would have been obvious in view of FXT1.

## *2. Remaining Claims*

Because all of the challenged claims depend from claim 7 and rely on the same reasoning found inadequate above, we determine that Petitioner has also failed to establish a reasonable likelihood of prevailing on those claims as well.

### *F. Alleged Ground of Unpatentability Over FXT1 and Reshetov*

Petitioner contends that claim 12 of the ’628 patent is unpatentable under 35 U.S.C. § 103(a) as obvious over FXT1 and Reshetov in view of the knowledge of a person of ordinary skill in the art. Pet. 69–71. Claim 12

depends from claim 7. Petitioner relies on the same reasoning regarding “texture block” found insufficient in the ground based on FXT1 alone. Having considered the arguments and evidence before us, we determine that the record fails to establish a reasonable likelihood that Petitioner would prevail on this asserted ground of unpatentability.

#### IV. CONCLUSION

After considering the arguments presented in the Petition, the Preliminary Response, and the evidence of record, we determine that Petitioner has failed to demonstrate a reasonable likelihood of success in proving that at least one claim of the ’628 patent is unpatentable. Thus, we deny the Petition for *inter partes* review.

#### V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition for *inter partes* review is denied.

IPR2023-00688  
Patent 11,184,628 B2

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