

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UNIFIED PATENTS INC.,
Petitioner,

v.

VELOS MEDIA, LLC,
Patent Owner.

Case IPR2019-00757
Patent 9,930,365 B2

Before MONICA S. ULLAGADDI, JASON W. MELVIN, and
AARON W. MOORE, *Administrative Patent Judges*.

ULLAGADDI, *Administrative Patent Judge*.

DECISION
Instituting *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

Unified Patents Inc. (“Petitioner”) requested an *inter partes* review of claims 1–20 (the “challenged claims”) of U.S. Patent No. 9,930,365 B2 (Ex. 1001, “the ’365 patent”). Paper 2 (“Petition” or “Pet.”). Velos Media, LLC (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”).

Under 35 U.S.C. § 314(a), an *inter partes* review may not be instituted unless it is determined that there is a reasonable likelihood that the petitioner would prevail with respect to at least one of the claims challenged in the petition. Based on the information presented in the Petition and the supporting evidence, we are persuaded that there is a reasonable likelihood Petitioner would prevail with respect to at least one of the challenged claims. Accordingly, we institute an *inter partes* review of claims 1–20 on all of the grounds set forth in the Petition.

Our factual findings and conclusions at this stage of the proceeding are based on the evidentiary record developed thus far. This is not a final decision as to patentability of the challenged claims.

II. BACKGROUND

A. *Related Proceedings*

Petitioner and Patent Owner indicate that the ’365 patent is not asserted in any related district court proceedings. In particular, Petitioner states that it “is unaware of any law suits in which the ’365 Patent is asserted or challenged” (Pet. 64) and Patent Owner states that, to date, it “has not filed a patent infringement lawsuit” (Prelim. Resp. 1).

Although Patent Owner states that “Petitioner has now filed thirteen IPRs against Velos patents,” specifically, IPR2019-00194, IPR2019-00635, IPR2019-00660, IPR2019-00670, IPR2019-00707, IPR2019-00710,

IPR2019-00720, IPR2019-00749, IPR2019-00757, IPR2019-00763, IPR2019-00806, IPR2019-00883, and IPR2019-01130, other than the instant proceeding (IPR2019-00757), none of these proceedings appear to concern either the '365 patent or a patent related to the '365 patent. *Id.* at 1–2 n.1.

B. The '365 Patent (Ex. 1001)

The '365 patent issued on March 27, 2018 based on application No. 15/696,263, which claims priority to, among other applications, provisional application Nos. 61/102,787 filed October 3, 2008, 61/144,357 filed January 13, 2009, and 61/166,631 filed April 3, 2009. Ex. 1001, [21], [45], [60]. The '365 patent concerns techniques for encoding and decoding digital video data using macroblocks. *Id.* at [57]. Figure 12 of the '365 patent is reproduced below.

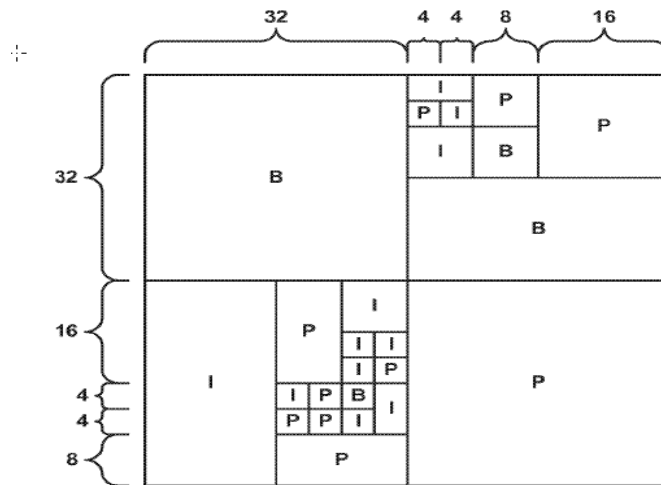


Figure 12 of the '365 patent illustrates a 64×64 pixel macroblock that has been partitioned into sub-partitions of varying sizes, each of which has an encoding mode.

“[V]ideo encoder 20 may receive a set of various-sized blocks for a coded unit,” which “may comprise a video frame, a slice, or a group of pictures (also referred to as a ‘sequence’),” and includes a macroblock or a

partition of a macroblock. *Id.* at 12:19–21, 38:45–47; *see id.* at 38:52–54. As shown in Figure 12, a large, 64×64 pixel macroblock has different sub-block partitions within the same large macroblock; these sub-blocks have different coding modes for each partition. *Id.* at 33:35–37, 33:47–49. The differently coded sub-blocks include, for example, a 32×32, B-coded partition and an 8×8, I-coded partition. *Id.* at 34:26–31. The encoder “generate[s] block-type syntax information that . . . identifies the partitions and the encoding modes used to encode the partitions.” *Id.* at 13:56–58. The syntax information further “includes values corresponding to the largest block in the coded unit and the smallest block in the coded unit.” *Id.* at 39:21–24.

A video decoder receives the “coded unit and the syntax information for the coded unit from the video encoder.” *Id.* at 39:27–28. The video decoder “determine[s] when a block does not have further separately encoded sub-partitions based on the indication in the coded unit syntax information of the smallest encoded partition.” *Id.* at 39:37–41. For example, when “the largest block is 64×64 pixels and the smallest block is also 64×64 pixels, then it can be determined that the 64×64 blocks are not divided into sub-partitions smaller than the 64×64 size.” *Id.* at 39:41–44. Alternatively, when “the largest block is 64×64 pixels and the smallest block is 32×32 pixels, then it can be determined that the 64×64 blocks are divided into sub-partitions no smaller than 32×32.” *Id.* at 39:44–48.

Using syntax information that identifies the encoding mode, the decoder “decode[s] the video block based on the block-type syntax information” that identifies the encoding mode. *Id.* at 14:19–21.

C. Challenged Claims

Challenged claims 1, 7, and 15 are independent. Challenged claims 2–6, 8–14, and 16–20 depend from claims 1, 7, and 15. Independent claim 1 is reproduced below.

1. A method of decoding video data, the method comprising:

decoding a first syntax element associated with a sequence of pictures of the video data, the first syntax element representing a minimum size of blocks of the sequence of pictures;

decoding a second syntax element, separate from the first syntax element, associated with the sequence of pictures, the second syntax element representing a maximum size of the blocks of the sequence of pictures, wherein the maximum size is greater than 16×16 pixels;

determining that a current block of a plurality of blocks of the sequence of pictures has a starting size equal to the maximum size using the second syntax element;

partitioning the current block to obtain a plurality of sub-blocks for the current block, wherein partitioning comprises determining that a sub-block of the sub-blocks of the current block does not include further separately encoded sub-partitions when the size of the sub-block is equal to the minimum size indicated by the first syntax element;

decoding a third syntax element, separate from the first syntax element and the second syntax element, the third syntax element representing an encoding mode used to encode the sub-block, wherein the encoding mode comprises one of an intra-prediction mode and an inter-prediction mode; and

decoding the sub-block according to the encoding mode, without further partitioning the sub-block, based on the determination

that the block does not include further separately encoded subpartitions.

Ex. 1001, 40:28–59.

D. Proposed Grounds of Unpatentability

Petitioner supports the following challenges with the Declaration of Dr. Immanuel Freedman (Ex. 1009).

Reference(s)	Basis	Claims Challenged
U.S. Patent No. 5,999,655 ¹ to Kalker et al. (“Kalker,” Ex. 1006) and U.S. Publication No. 2005/0123282 A1 ² to Novotny et al. (“Novotny,” Ex. 1007)	§ 103	1–4, 6–10, 12–18, and 20
Kalker, Novotny, and U.S. Patent No. 6,084,908 ³ to Chiang et al. (“Chiang,” Ex. 1008)	§ 103	5, 11, and 19

III. ANALYSIS

A. 35 U.S.C. § 314(a)

In its Preliminary Response, Patent Owner argues that we should exercise our discretion to deny institution under 35 U.S.C. § 314(a). Prelim. Resp. 33–35. Patent Owner asserts Petitioner has filed a total of thirteen petitions against patents assigned to Patent Owner and that such filings

¹ Kalker issued on December 7, 1999. Ex. 1006, [45]. Kalker’s issue date predates the earliest possible priority date of the ’365 patent. *See* Ex. 1001, [60], [63].

² Novotny published on June 9, 2005. Ex. 1007, [45]. Novotny’s publication date predates the earliest possible priority date of the ’365 patent. *See* Ex. 1001, [60], [63].

³ Chiang issued on July 4, 2000. Ex. 1008, [45]. Chiang’s issue date predates the earliest possible priority date of the ’365 patent. *See* Ex. 1001, [60], [63].

constitute “serial attacks against Patent Owner’s HEVC portfolio [that] are an abuse of the IPR process that undermines the policies and objectives of the AIA.” *Id.* at 1, 2, and 55. According to Patent Owner, because it “has not filed a single lawsuit on any patent in its portfolio,” reviewing those patents does not serve the purposes of the AIA. *Id.* at 55–58. Patent Owner claims it is unfair that it must respond to multiple challenges and that Petitioner will be able to gain an advantage by seeing Patent Owner’s various preliminary responses. *Id.* at 57.

We do not agree that the present Petition constitutes part of a “serial attack.” Patent Owner does not assert facts that support the position that Petitioner gained or will gain an unfair advantage due to a prior filing or proceeding. *See Gen. Plastic Indus. Co. v. Canon Kabushiki Kaisha*, Case IPR2016-01357, Paper 19 (Sept. 6, 2017) (Precedential as to § II.B.4.i) (addressing discretionary denial under § 314(a) in light of factors stemming from “whether the same petitioner previously filed a petition directed to the same claims of the same patent”); *Valve Corp. v. Elec. Scripting Prods., Inc.*, IPR2019-00062, Paper 11 (April 2, 2019) (Precedential) (applying *General Plastic* factors to serial petitions filed by different petitioners). Thus, we decline to exercise our discretion to deny institution under 35 U.S.C. § 314(a) in the present proceeding.

B. 35 U.S.C. § 325(d)

In its Preliminary Response, Patent Owner argues that we should exercise our discretion to deny institution under 35 U.S.C. § 325(d). Prelim. Resp. 51–55. More particularly, Patent Owner asserts that the Kalker reference and a reference that was before the Examiner during prosecution,

Divorra⁴, are “nearly identical” and thus, the issues presented by the Petition with respect to Kalker are similar to those previously considered by the Examiner. *See id.* at 51. Even assuming that Kalker *is* substantially similar to Divorra, the Examiner did not consider the prior art presented by Petitioner in the combination set forth by Petitioner, construe the claims of the ’365 patent under the claim construction standard applied in this decision, or consider the testimony of Dr. Freedman. At least for these reasons, we decline to exercise our discretion to deny institution under 35 U.S.C. § 325(d).

C. Claim Construction

For *inter partes* reviews filed on or after November 13, 2018, we apply the same claim construction standard used by Article III federal courts and the ITC, both of which follow *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), and its progeny. 83 Fed. Reg. 51340 (Oct. 11, 2018). Because the instant Petition was filed on February 28, 2019, we apply that standard here. Accordingly, we construe each challenged claim of the ’365 patent to generally have “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. § 42.100(b).

Petitioner does not propose any particular constructions for any claim terms. Pet. 13–14 (“At this time, Petitioner proposes that the claims be construed pursuant to their plain and ordinary meaning in light of the specification of the ’365 Patent.”). Patent Owner proposes constructions for four limitations, as discussed in detail below.

⁴ Publication No. WO2008/027192 A2 to Divorra was based on Application No. PCT/US2007/018027 and published on March 6, 2008.

1. “a first syntax element . . . representing a minimum size of blocks of the sequence of pictures”

Independent claim 1 recites “a first syntax element . . . representing a minimum size of blocks of the sequence of pictures.” Patent Owner proposes to construe the first syntax element limitation as “a first parameter that identifies the minimum block size of the sequence of pictures as specified by the value it contains, where the value can vary.” Prelim. Resp. 16–18. Patent Owner contends that “[s]yntax elements are distinct from the possible values that may be contained by the syntax element,” and that, “[a]ccompanying a syntax element will be a value of the element.” *Id.* at 14. Patent Owner further contends that a syntax element “will be represented as digital information in a stream of video information.” *Id.*

In support of its contentions, Patent Owner cites the H.264 standard, which states that, “[w]ithin the bounds imposed by the syntax of a given profile[,] it is still possible to require a very large variation in the performance of encoders and decoders *depending upon the values taken by syntax elements,*” in a discussion of exemplary syntax elements. *Id.* Patent Owner accordingly relies on the H.264 standard to “distinguish[] between syntax elements and the values they can take[.]” *Id.* at 15 (arguing that “the behavior of a given profile in H.264 can vary as a result of the *values* taken by the *syntax elements*” and that the H.264 standard discloses that “[a] level is a specified set of *constraints imposed on values of the syntax elements* in the bitstream”).

Petitioner does not propose an express construction for the first syntax element limitation or any other limitation. *See generally* Pet. In its analysis concerning Kalker, however, Petitioner argues that

Kalker teaches an encoding-side transmitting station that *assigns* particular size values to multiple block-size codes (i.e., *syntax elements*) for an entire coded unit (e.g., a picture or frame *in Kalker*) and uses these codes to communicate the different block sizes contained in the coded unit; and these block-size codes for the coded unit are then used by the decoding-side receiving station to decode the data and reconstruct the image.

* * *

[I]t is not the fact that an S-code is attached to a particular block to indicate the partitioning size for that block that satisfies this limitation; rather, it is the fact that the value corresponding to the block-size code (S=1) is set based on the actual minimum size of blocks in the coded unit, e.g., a picture.

Pet. 26 (citing Ex. 1006, 3:8–18, claim 1), 29 n.5.

As best understood, Petitioner implicitly construes syntax elements as a block-size codes and more particularly, construes first syntax element as a block-size code that is determined based on the minimum block size in a picture. *See id.* Unlike Patent Owner, it is not clear whether Petitioner draws a distinction between a syntax element and the value it takes on.

At this stage of the proceeding, we determine whether to preliminarily adopt Patent Owner’s proposed construction for the first syntax element limitation. The ’365 patent does not explicitly define a first syntax element, a second syntax element, or a third syntax element. The ’365 patent discloses, in relevant part, the following:

Each macroblock encoded by an encoder may require data that describes one or more characteristics of the macroblock. The data may indicate, for example, macroblock type data to represent the size of the macroblock, the way in which the macroblock is partitioned, and the coding mode[.]

* * *

The information communicated over channel 16 may include syntax information defined by video encoder 20, which is also

used by video decoder 30, that includes syntax elements that describe characteristics and/or processing of the large macroblocks[.]

* * *

The coded bitstream may include . . . other syntax elements including, for example, macroblock-type identifier values, coded unit headers indicating the maximum size of macroblocks in the coded unit, QP_Y values, coded block pattern (CBP) values, values that identify a partitioning method of a macroblock or sub-block, and transform size flag values[.]

* * *

The large macroblock is a macroblock identified by a macroblock syntax element that identifies the macroblock type, e.g., `mb64_type` or `mb32_type`, for a given coding standard such as an extension of the H.264 coding standard. The macroblock type syntax element may be provided as a macroblock header syntax element in the encoded video bitstream.

Ex. 1001, 8:1–5, 11:13–18, 17:10–19, 33:50–56.

The above-quoted disclosures in the '365 patent do not support the distinction that Patent Owner attempts to make between a syntax element and the value it takes on because the disclosures in the '365 patent describe the term syntax element in terms of what it does, as opposed to what it is. *See id.* Even assuming the H.264 standard supports the distinction Patent Owner attempts to make, the '365 patent does not limit its encoding/decoding methods and devices to employing the H.264 standard. *See e.g., id.* at 11:43–46 (“Video encoder 20 and video decoder 30 *may* operate according to a video compression standard, *such as* the ITU-T H.264 standard, alternatively described as MPEG-4, Part 10, Advanced Video Coding (AVC).” (emphasis added)).

As to whether the term syntax element encompasses a value that can vary, it is not clear whether Patent Owner takes the position that the value must vary from one sequence of pictures to another, one picture to another, one block to another, or one sub-block to another—the independent claims only recite a single sequence of pictures. *See* Prelim. Resp. 16–18.

Irrespective of this ambiguity, we decline to construe the term first syntax element to specifically require variability because we do not discern that the '365 patent defines or even describes this term as one that *must* vary, nor does Patent Owner present any other evidence that would tend to support this construction.

Based on the above-quoted portions of the '365 patent, we preliminarily construe the first syntax limitation to encompass data or information that conveys a minimum size of blocks of the sequence of pictures. This preliminary construction is consistent with the Specification, which discloses that syntax information further “includes values corresponding to the largest block in the coded unit *and the smallest block in the coded unit.*” *Id.* at 39:21–24 (emphasis added); *see also id.* at 39:21–24 (syntax information further “includes values corresponding to the largest block in the coded unit *and the smallest block in the coded unit*” (emphasis added)).

The parties are encouraged to fully address the proper construction of at least the first, second, and third syntax element limitations and, specifically, whether there is a distinction between a syntax element and a value it may take on.

2. “a second syntax element . . . representing a maximum size of the blocks of the sequence of pictures”

Independent claim 1 recites “a second syntax element . . . representing a maximum size of the blocks of the sequence of pictures.” Patent Owner proposes to construe “second syntax element” as “a second parameter that identifies the maximum size of the sequence of pictures as specified by the value it contains, where the value can vary.” Prelim. Resp. 18. Petitioner does not propose an express construction for the “second syntax element” limitation. *See generally* Pet.

The analysis for this claim limitation is substantially similar to the analysis set forth above in Section III.C.1 with respect to the first syntax element limitation. Based on the above-quoted portions of the ’365 patent, we preliminarily construe the second syntax limitation to encompass data or information that conveys a maximum size of blocks of the sequence of pictures. This preliminary construction is consistent with the Specification, which discloses that “a coded unit (e.g., a frame, slice, sequence, or group of pictures) comprising macroblocks of varying sizes may include a *syntax element that indicates the size of the largest macroblock in the coded unit.*” Ex. 1001, 8:34–37 (emphasis added); *see id.* at 39:21–24 (syntax information further “includes values corresponding to *the largest block in the coded unit* and the smallest block in the coded unit” (emphasis added)).

3. “a third syntax element . . . representing an encoding mode used to encode the sub-block”

Independent claim 1 recites “a third syntax element . . . representing an encoding mode used to encode the sub-block.” Patent Owner proposes to construe “third syntax element” as “a third parameter that identifies an encoding mode used to encode the sub-block by the value it contains, where

the value can vary.” Prelim. Resp. 19. Petitioner does not propose an express construction for the third syntax element limitation. *See generally* Pet.

The analysis for this claim limitation is substantially similar to the analysis set forth above in Section III.C.1 with respect to the first syntax element limitation. Based on the above-quoted portions of the ’365 patent, we preliminarily construe the third syntax limitation to encompass data or information that conveys an encoding mode used to encode a sub-block in the sequence of pictures. This preliminary construction is consistent with the Specification, in which an encoder “generate[s] block-type syntax information that . . . identifies the partitions and the encoding modes used to encode the partitions.” Ex. 1001, 13:56–58.

4. *“a second syntax element, separate from the first syntax element”*

Patent Owner contends that it does not “seek a formal construction of the term ‘separate from,’ as it has a plain and ordinary meaning that would be understood to a person of ordinary skill in the art (‘POSITA’).” Prelim. Resp. 19. Patent Owner further “emphasizes that the ordinary meaning of ‘separate’ is ‘forming or viewed as a unit apart or by itself’” and notes that “synonyms for ‘separate’ include the terms unconnected, unrelated, different, discrete, and distinct.” *Id.* (citing Ex. 2003). Petitioner does not propose an express construction for this term and limitation.

At this stage of the proceeding, we do not discern a dispute between the parties regarding this limitation and, therefore, we decline to preliminarily construe this term. *See, e.g., 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))).

D. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *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 skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations. *See 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”)). The 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) (citing *Tech. Licensing Corp. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)) (discussing the burden of proof in an *inter partes* review). Furthermore, Petitioner cannot satisfy its burden of proving obviousness by employing “mere conclusory

statements.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

Thus, to prevail in an *inter partes* review, Petitioner must explain how the proposed combinations of prior art would have rendered the challenged claims unpatentable. We analyze the challenges presented in the Petition in accordance with the above-stated principles.

E. Obviousness over Kalker and Novotny

Petitioner contends that claims 1–4, 6–10, 12–18, and 20 are unpatentable under 35 U.S.C. § 103 as obvious over Kalker and Novotny. Pet. 14–59. At this stage of the proceeding, we are persuaded that the evidence supports Petitioner’s arguments and Dr. Freedman’s testimony and, thus, establishes a reasonable likelihood of prevailing with respect to this ground.

1. Overview of Kalker (Ex. 1006)

Kalker concerns a video encoding and decoding technique which “encod[es] [a] segmentation map” of a video picture by “assigning a block-size code to each block size . . . to obtain a one-dimensional series of block-size codes.” Ex. 1006, 1:46–50; *see id.* at Claim 1. Figure 9 of Kalker is reproduced below.

right) 8*8 block. Then the bottom left 8*8 block is analyzed. It is segmented into smaller blocks and will thus be scanned before proceeding to the next 8*8 block. Accordingly, an S=1 block size code is generated for the top left 4*4 block, the top right 4*4 block, the bottom left 4*4 block and the bottom right 4*4 block, successively.

Id. at 5:38–52. The scanning of the segmentation map of Figure 9 “yields the following sequence of block size codes: 3,2,2,1,1,1,1,2,3,3,EOS[end-of-scan code].” *Id.* at 5:58–60. The sequence of block code sizes is decoded via a corresponding segmentation map-decoding circuit and a segmentation map reconstruction circuit in which “an element is extracted from the sequence” to assign “the value S to each grid location within said block.”

Id. at 4:36–37, 43–45, 53–59.

2. *Overview of Novotny (Ex. 1007)*

Novotny concerns video encoding and decoding techniques. Ex. 1007 ¶ 22. In particular, Novotny describes “a picture (e.g., an image, a frame, a field, etc.) 70i may be divided (e.g., segmented, partitioned, etc.) into a number of macroblocks 86.” *Id.* ¶ 31. Novotny further describes that encoded video includes macroblock syntax elements “that may include but are not limited to: macroblock type[s]” (*id.* ¶ 37) which “generally include, but are not limited to, Intra16×16 [and] Intra4×4” (*id.* ¶ 50).

3. *Independent Claim 1*

Preamble—“A method of decoding video data”

Petitioner contends that “Kalker teaches a video-receiving station (i.e., a non-transitory computer-readable storage medium) that includes a video decoder (i.e., a device for decoding video data that performs a method of decoding video data)[.]” Pet. 23–24 (citing Ex. 1006, Fig. 1) (emphasis omitted). Petitioner further contends “Kalker teaches both encoding and

decoding video data,” and that while “[i]ts most detailed discussion is provided from the perspective of the encoding process . . . a PHOSITA would have recognized [that] Kalker’s teachings of its encoding steps would be reversed by a corresponding decoder device.” *Id.* at 25 (emphasis omitted) (citing-in-part Ex. 1006, 2:43–3:5, 3:8–18, 3:36–67; Ex. 1009 ¶ 52).

Patent Owner argues that “[t]he preamble states that Claim 1 is directed to a method of decoding video data,” which contrasts with “Petitioner’s primary reference, *Kalker*, [which] is focused on *encoding* data.” Prelim. Resp. 12. We are not persuaded by Patent Owner’s argument⁵ because we are persuaded, at this stage of the proceeding, by Dr. Freedman’s testimony that a “PHOSITA would have recognized [] that Kalker’s decoding unit is simply reversing the encoding process in both embodiments given Kalker’s teachings describing that ‘scanning order [employed by the decoder] corresponds to the scanning order in the encoder.’” Ex. 1009 ¶ 52 (emphasis omitted) (quoting Ex. 1006, 48–50).

Having reviewed Petitioner’s arguments and the cited evidence of record, we are persuaded, at this stage of the proceeding, that Kalker teaches this claim limitation.

⁵ Although Patent Owner disputes Petitioner’s showing, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

“decoding a first syntax element associated with a sequence of pictures of the video data, the first syntax element representing a minimum size of blocks of the sequence of pictures”

Petitioner contends “Kalker teaches an encoding-side transmitting station that *assigns* particular size values to multiple block-size codes (i.e., *syntax elements*) for an entire coded unit (e.g., a picture or frame *in Kalker*),” and transmitting these block-size codes to a decoding-side receiving station, which “decode[s] the data and reconstruct[s] the image.” Pet. 26 (Ex. 1006, 3:8–18, claim 1). More particularly, Petitioner asserts that

[T]he encoder sets a block-size code of “3” to represent the largest blocks in the coded unit, such as 16×16 blocks, a block-size code of “2” can represent intermediary blocks, such as 8×8 blocks, and a block-size code of “1” represents the smallest, or minimum block size in the coded unit, e.g., 4×4 blocks.

Pet. 27–28 (citing Ex. 1006, 3:25–34, 5:36–57, 4:43–67).

Petitioner asserts that “[b]ecause the block-size codes may vary from picture to picture, the encoder must not only communicate” which particular block-size code (e.g., 1 or 3) is assigned to a given partition in a current picture, “it must also communicate what value the block-size code represents for a given picture (e.g., 4×4, 8×8, 16×16).” *Id.* at 15–16 (citing Ex. 1006, 5:15–21 (describing alternatives for block-size codes, such as S=3 corresponding to an 8×8 block); Ex. 1009 ¶ 49). Petitioner further asserts that, accordingly, “the actual block size value to which a block size code corresponds may vary from picture to picture.” *Id.* at 16. Petitioner contends that, because of this variability, “a PHOSITA would have reasonably understood that the encoder would communicate information to

the decoder providing the value of each block-size code (including the maximum block-size code, $S=3$ in the example provided) as such varied for [each] coded unit.” Pet. 38–39 (citing Ex. 1009 ¶¶ 49, 55–57).

Petitioner further contends that, although Kalker discloses applying a block-size code that could represent minimums and maximums, which may vary from *picture to picture*, it would have been obvious to the ordinarily skilled artisan to apply Kalker’s block-size code to a “sequence of pictures” as claimed, instead of a single picture, to reduce overhead, which was recognized as a desired goal of video coding at the time of the ’365 patent. Pet. 31 (citing Ex. 1009 ¶¶ 46, 58). Petitioner argues that “reduced overhead is a predictable result of using a larger coded unit to which syntax data is applied,” and that the ordinarily skilled artisan “would have had a reasonable expectation of success in making such a modification because it would have required nothing more than a minor modification in software[.]” *Id.* at 32.

As discussed above, Petitioner asserts “Kalker teaches both encoding and decoding video data,” and that while “[i]ts most detailed discussion is provided from the perspective of the encoding process . . . a PHOSITA would have recognized, *Kalker*’s teachings of its encoding steps would be reversed by a corresponding decoder device.” Pet. 25 (citing-in-part Ex. 1006, 2:43–3:5, 3:8–18, 3:36–67, 4:36–42, 4:48–50; Ex. 1009 ¶ 52). At this stage of the proceeding, we are persuaded, based on the teachings of Kalker and Dr. Freedman’s testimony discussed above with respect to the preamble, that Kalker’s teachings of encoding would have been understood to be reversed by a decoder device and corresponding decoding process. *See id.*

First, Patent Owner contends that Kalker “expressly states that block code S applies to a single block,” rather than “to sequences of pictures

(which could contain many more blocks).” Prelim. Resp. 45; *see id.* at 44–46.

Second, Patent Owner contends that Kalker’s “alleged syntax elements do not disclose a ‘minimum size of blocks of the sequence of pictures’ and a ‘maximum size of the blocks of the sequence of pictures’” because Kalker’s “alleged syntax elements simply represent the size of a *particular* block” and “have nothing to do with blocks yet to come in a sequence of pictures.” *Id.* at 39–44. In support of this contention, Patent Owner argues that “Petitioner relies completely (and improperly) on its expert to fill in this missing limitation.” *Id.* at 45.

We address these contentions together. Petitioner supports its contention that it would have been obvious to the ordinarily skilled artisan to apply Kalker’s block-size code to a “sequence of pictures” with Dr. Freedman’s testimony that “[i]t was desirable to apply a syntax element or parameter to as large a coding unit for which it would be consistent to eliminate the need to send the same data repeatedly, thus reducing the amount of overhead data required for each coding unit.” Ex. 1009 ¶ 46 (citing Ex. 1012, 27–28; Ex. 1020 ¶ 6, [57]). We determine, at this stage of the proceeding, that Bennet (Ex. 1020) supports Dr. Freedman’s testimony. Bennet explains that an

[I]mage frame or series of image frames may be supplied to a video stream encoder along with the metadata wherein the video stream encoder is operable to apply the metadata to the image *or series of images in order to produce a set of instructions* that allow subsequent images to be generated from the image or images produced by the video processor.

Ex. 1020, [57] (emphasis added). Bennet further explains that metadata can include instructions regarding images. *Id.* ¶ 6.

We are not persuaded that Petitioner relies on Dr. Freedman’s testimony to “fill in” a limitation entirely missing in Kalker because Kalker does not disclose only a single picture—it also discloses encoding multiple video *pictures*. See Ex. 1006, 1:7–15, claim 1 (“transmitting encoded video pictures”). We understood Petitioner to rely on Dr. Freedman’s testimony not to “fill in” a missing sequence of pictures, but rather to explain why Kalker’s block-size code would have been understood to apply to the multiple video pictures as disclosed by Kalker instead of only a single video picture. See Ex. 1009 ¶ 46.

Having reviewed Petitioner’s arguments and the cited evidence of record, we are persuaded, at this stage of the proceeding, that Kalker teaches this claim limitation.

“decoding a second syntax element, separate from the first syntax element, associated with the sequence of pictures, the second syntax element representing a maximum size of the blocks of the sequence of pictures, wherein the maximum size is greater than 16×16 pixels”

Petitioner contends

Kalker teaches providing a block-size code of “S=3,” that is set to represent the actual maximum size of the blocks in the coded unit (i.e., second syntax element...associated with the sequence of pictures). This S=3 code is separate from the block size code “S=1” representing the smallest block size (i.e., the first syntax element). The maximum block-size code (S=3) can be set to represent, for example, 16×16 blocks in a given coded unit, which is then scanned on the basis of a 16×16 grid size[.]

Pet. 33 (emphasis omitted). In Kalker’s Figure 9, the largest blocks are depicted as being associated with a block-size code of S=3.

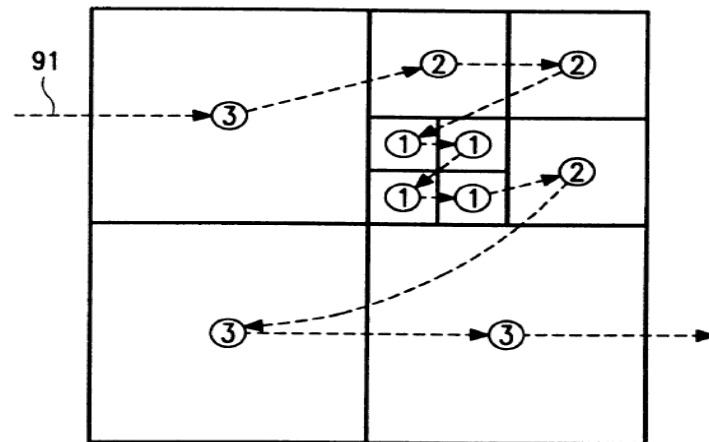


FIG. 9

Figure 9 of *Kalker* (Ex. 1006) depicts the largest blocks having a block-size code of 3.

Petitioner acknowledges that “[a]s with the preceding limitation, *Kalker* teaches that the largest block size represented by $S=3$ can vary in size from one coded unit to another, with another provided example being a maximum block size of 8×8 .” *Id.* at 34–35 (citing Ex. 1006, 1:50–54, 5:15–20).

Petitioner further acknowledges that *Kalker* does not explicitly disclose “a maximum size of the blocks of the sequence of pictures, wherein the maximum size is greater than 16×16 pixels,” as recited in the independent claims. Petitioner contends that “[i]t would have been obvious to a PHOSITA that the teachings in *Kalker* would have been applicable to systems employing block sizes” greater than 16×16 pixels and cites Novotny as disclosing an encoding system based on MPEG/H.264 in which the maximum block can take on sizes larger than 16×16 pixels and could be, for example, 32×32 . *Id.* at 36 (citing Ex. 1007 ¶¶ 30, 31, 37).

Rationale for Combining Kalker and Novotny

Petitioner contends it would have been obvious to one ordinary skill in the art at the time of the '365 patent to incorporate the teachings of Novotny into a system such as Kalker's because both "contemplate[] the use of MPEG-like coding methods," larger blocks more efficiently encode "sequences of images where little variance occurs across pictures," and using large blocks "as a starting block size" would result in higher compression efficiency. Pet. 37 (citing-in-part Ex. 1009 ¶¶ 40–42, 63, 64). At this stage of the proceeding, we are persuaded that Petitioner's stated rationale for combining the references is supported by sufficient rational underpinning.

Patent Owner contends "*Kalker's* use of this single syntax element is fundamentally different than the '365 Patent's use of two syntax elements (one for the largest block size and one for the smallest block size of a sequence of pictures)." Prelim. Resp. 37. More particularly, Patent Owner characterizes Petitioner's showing as one in which "each possible value of *S*" taught by Kalker "is a separate syntax element." *Id.* Patent Owner further contends that

The maximum block size syntax element recited in Claim 1 can take on values representing 32×32, 64×64, or 128×128 blocks. Yet, it is always characterized as a single syntax element. The same applies for the syntax element representing the minimum block size. Under Petitioner's reasoning, the maximum block size syntax element described in the Claim 1 example above would actually be *multiple* separate syntax elements, because it could have different values.

Id. at 38.

Patent Owner's contentions appear to be rooted in the purported distinction between a syntax element and the value it takes on, as discussed above in Section III.C.1, which we did not find to be reflected in a proper construction of either the first syntax element limitation or the second syntax element limitation. We further did not find persuasive Patent Owner's argument that the values taken on by the first syntax element or the second syntax element must be variable, and thus we did not construe either the first syntax element or the second syntax element to include the limitation, "where the value can vary." *See id.* at 17 ("the values communicated by the minimum block size syntax element must be variable"), 18.

Furthermore, it appears that Patent Owner is attempting to argue that the independent claims require an *a priori* determination of a minimum and maximum value for block sizes in the sequence of pictures. Stated differently, Patent Owner appears to argue that the minimum block size for the sequence of pictures needs to be communicated to a decoder before the entire sequence of pictures is scanned, and the same for the maximum block size. Patent Owner's argument, however, does not appear to be commensurate in scope with the claim, which does not place a limitation on when or how the first syntax element or the second syntax element are determined. For these reasons, we are not persuaded by Patent Owner's contentions, although we note the burden of persuasion always remains on the Petitioner. *See supra* n.4.

Having reviewed Petitioner's arguments and the cited evidence of record, we are persuaded, at this stage of the proceeding, that Kalker teaches this claim limitation.⁶

“determining that a current block of a plurality of blocks of the sequence of pictures has a starting size equal to the maximum size using the second syntax element”

Petitioner contends that

[T]he partitioning process in Kalker scans a current block in the grid with a starting size equal to the maximum size as indicated by (i.e., determined using) the second syntax element, and then partitions down through an iterative partitioning process potentially to the smallest block size.

FIG. 9 shows a segmentation map illustrating [an] embodiment. The scanning pattern is denoted 91 in this Figure. First, the top left 16*16 block is analyzed. As this block is not further divided into smaller blocks, the block

⁶ Although we are persuaded that Petitioner has made a sufficient showing regarding the “syntax elements” at this stage, the parties are encouraged to focus on precisely how they are taught or suggested in the references and how and why they would be implemented so as to apply to a “sequence of pictures.” For example, do the first and second syntax elements correspond to the value of S (i.e., 1, 2, or 3) for a specific block, or to the block sizes (e.g., 4×4 or 8×4) that are represented by the values? If they correspond to the values of specific blocks, why would they be transmitted for sequences of pictures, given that they may not necessarily represent a maximum or minimum for a specific picture in a sequence of pictures? If, instead, they correspond to block sizes, how do the references contemplate transmission of that information, and what would the ordinarily skilled artisan have understood to be the advantages of sending it for specific sequences of pictures, as opposed to hard coding it?

size code S=3 is generated. Then, the next (top right) 16*16 block is analyzed.

Pet. 40 (emphasis omitted) (quoting Ex. 1006, 5:36–41). Petitioner asserts that “while this embodiment is describing the development of the segmentation map at the encoder, a PHOSITA would have recognized that the decoder is performing the inverse of these steps.” *Id.* (citing Ex. 1009 ¶¶ 43, 52; Ex. 1006, 4:43–50). Based on the assertion that the decoder performs the inverse of the encoding steps, Petitioner contends that “[w]hen the decoder encounters a grid block that is also represented by the highest S-value (S=3), the decoder recognizes that the given grid block is a maximum size block, and the decoder proceeds to the next grid block, again starting at the maximum block size[.]” Pet. 40.

Having reviewed Petitioner’s arguments and the cited evidence of record, we are persuaded, at this stage of the proceeding, that Kalker teaches this claim limitation.

“partitioning the current block to obtain a plurality of sub-blocks for the current block, wherein partitioning comprises determining that a sub-block of the sub-blocks of the current block does not include further separately encoded sub-partitions when the size of the sub-block is equal to the minimum size indicated by the first syntax element”

To teach this limitation, Petitioner quotes the following portion of Kalker:

Then, the next (top right) 16*16 block is analyzed. This block is segmented into smaller blocks and will now completely be scanned before proceeding to the next 16*16 block. More particularly, the top left 8*8 block is now analyzed. As it is not further divided, the block size code S=2 is generated. Similarly, the block size code S=2 is generated for the next (top right) 8*8 block. Then **the bottom left 8*8 block is analyzed. It is**

segmented into smaller blocks and will thus be scanned before proceeding to the next 8*8 block. Accordingly, an S=1 block size code is generated for the top left 4*4 block, the top right 4*4 block, the bottom left 4*4 block and the bottom right 4*4 block, successively.

Pet. 43 (quoting Ex. 1006, 5:40–52). Petitioner contends Kalker teaches that “when an S=2 block is partitioned, the sub-blocks are each assigned S=1 *without the need for performing further scanning of the S=1 block for sub-partitions.*” Pet. 44–45 (citing Ex. 1006, 5:47–52) (emphasis added).

Petitioner notes that the ’365 patent makes the claimed “determination” in the same way: “[w]hen the size of a sub-block is equal to the minimum size, it is recognized that the block does not have separately encoded sub-partitions.” *Id.* at 45 (citing Ex. 1001, 39:37–41, 39:5–12).

Having reviewed Petitioner’s arguments and the cited evidence of record, we are persuaded, at this stage of the proceeding, that Kalker teaches this claim limitation.

“decoding a third syntax element, separate from the first syntax element and the second syntax element, the third syntax element representing an encoding mode used to encode the sub-block, wherein the encoding mode comprises one of an intra-prediction mode and an inter-prediction mode”

Petitioner acknowledges that although Kalker “expressly discloses that the decoder reverses the process done by the encoder,” and that “a PHOSITA would have found it obvious that the encoding mode for a system employing motion-compensated prediction would need to be supplied to the decoder so that it could reverse the encoding process,” Kalker does not necessarily teach that “the encoding mode is sent and decoded as a third syntax element.” Pet. 46 (citing Ex. 1006, 4:48–50; Ex. 1009 ¶¶ 45, 65).

Petitioner cites Novotny to teach a “third syntax element representing an encoding mode used to encode the sub-block, wherein the encoding mode comprises one of an intra-prediction mode and an inter-prediction mode.” *Id.* at 47 (emphasis omitted) (quoting Ex. 1007 ¶ 50) (citing Ex. 1007 ¶¶ 25–28, 51–65; Ex. 1009 ¶ 45). Novotny discloses that “the macroblock (MB) type generally specifies how a macroblock (e.g., a 16×16 block of video frame pixels) is partitioned (or segmented) and/or encoded,” and that “[t]he MB types generally include, but are not limited to, Intra16×16, Intra4×4, Skip, Direct, Inter and PCM.” Ex. 1007 ¶ 50. Petitioner further contends that

A PHOSITA would have recognized that, like disclosed in Novotny where the syntax element representing the encoding mode (e.g. “Intra”) is associated with a syntax element representing block size (e.g., 16×16), that the encoding mode would similarly be associated with Kalker’s block-size codes, S. *See id.*; *see also* Ex. 1009 ¶ 65. A PHOSITA also would have recognized that this would require nothing more than including bits representing “Intra” or “Inter” into Kalker’s run length encoded bit stream. *Id.* The result of the inclusion of these bits representing “Intra” or “Inter” would predictably be the transmission of a third syntax element, separate from the first syntax element (S=1) and the second syntax element (S=3). As should also be obvious, Novotny expressly discloses that the syntax elements, including data indicating “intra” or “inter” encoding mode, are in fact decoded. *See e.g.*, Novotny at Claim 1 (referencing decoded syntax elements).

Pet. 47–48 (emphases omitted).

Additional Rationale for Combining Kalker and Novotny

Petitioner contends that the ordinarily skilled artisan would have modified the teachings of Kalker with block-based coding mode taught by Novotny because “such information must be conveyed to a decoder to

enable it to perform motion compensation prediction and improve video quality” and “*Kalker*, like *Novotny*, is already transmitting block size syntax elements in an encoded bit stream.” *Id.* at 48 (citing Ex. 1009 ¶¶ 45, 65).

Petitioner further contends

A PHOSITA would have had a reasonable expectation of success in implementing the teachings of *Novotny* with respect to transmitting a syntax element representing an encoding mode in the system of *Kalker*, as such would have required minor software modifications and yielded predictable results with no need for experimentation because sending an encoding mode was already a well-known and practiced element used to instruct a decoder on how to reconstruct encoded images.

Id. at 48–49 (emphases omitted) (citing Ex. 1009 ¶ 65). At this stage of the proceeding, we are persuaded that Petitioner’s stated rationale for combining the references is supported by sufficient rational underpinning.

Patent Owner contends that “the third syntax element recited in Claim 1 describes how *sub-blocks* are encoded, whereas *Novotny*’s macroblock type syntax element describes how *macroblocks* are encoded.” Prelim. Resp. 46; *see id.* at 46–51. We disagree with Patent Owner—the Intra4×4 MB type in *Novotny* teaches an encoding/decoding mode for a 4×4 block, which is a sub-block, not a macroblock.

Having reviewed Petitioner’s arguments and the cited evidence of record, we are persuaded, at this stage of the proceeding, that *Kalker* and *Novotny* teach this claim limitation.

“decoding the sub-block according to the encoding mode, without further partitioning the sub-block, based on the determination that the block does not include further separately encoded subpartitions”

Petitioner contends “[a]s the decoder determines that a given sub-block has been assigned a given partition or has no further partitions, the receiving side decodes the picture data according to the assigned encoding mode based on a prediction list representing the reference frame used to predict a block.” Pet. 50 (citing Ex. 1007 ¶ 66, Figs. 8, 9; Ex. 1006, 2:46–48, 4:48–50; Ex. 1009 ¶ 65). Upon review of the cited evidence at this stage of the proceeding, we are persuaded that Kalker and Novotny teach this limitation.

We have reviewed Petitioner’s arguments and evidence concerning claim 1 and we are persuaded, at this stage of the proceeding, that Petitioner has shown a reasonable likelihood of prevailing in demonstrating that claim 1 is obvious in view of Kalker and Novotny.

4. Independent Claims 7 and 15

Petitioner relies on the same analysis for its challenges to claims 1, 7, and 15. For reasons substantially similar to those set forth above, we are persuaded that Petitioner has shown a reasonable likelihood of prevailing in demonstrating that claims 7 and 15 are obvious in view of Kalker and Novotny at this stage of the proceeding.

5. Dependent Claims 2–4, 6–8, 10, 12–14, 16–18, and 20

Patent Owner does not present separate arguments for claims 2–6, 8–14, and 16–20. *See* Prelim. Resp. 2–3. We have reviewed Petitioner’s arguments and evidence concerning claims 2–6, 8–14, and 16–20 and are persuaded that Petitioner has shown a reasonable likelihood of prevailing in

demonstrating that these claims are obvious in view of Kalker and Novotny, at this stage of the proceeding. *See* Pet. 51–59.

F. Obviousness over Kalker, Novotny, and Chiang

Petitioner contends that claims 5, 11, and 19 are unpatentable under 35 U.S.C. § 103 as obvious over Kalker and Novotny. *Id.* at 59–62. At this stage of the proceeding, we are persuaded that the evidence supports Petitioner’s arguments and Dr. Freedman’s testimony and thus, establishes a reasonable likelihood of prevailing with respect to this ground.

1. Overview of Chiang (Ex. 1008)

Chiang concerns techniques for encoding video image sequences in which “each picture (frame) is represented by a plurality of blocks having different sizes.” Ex. 1008, 1:8–9, 5:27–28. Chiang describes that an “initial block can be a 256 by 256 block,” which is then subdivided or partitioned into smaller and smaller sub-blocks. *Id.* at 5:45–52.

2. Dependent Claims 5, 11, and 19

Claims 5, 11, and 19 each recite, “wherein the current block has a size of at least 64×64 pixels.” Petitioner contends that although Novotny discloses that an initial block size may include sizes other than a 16×16 block, for example, a 32×32 block, it “does not explicitly provide that block sizes may be at least 64×64 pixels.” Pet. 61. Petitioner further contends Chiang discloses “employing a video coding/decoding system wherein an initial block size may be as large as 256×256 pixels.” *Id.*

Rationale for Combining

According to Petitioner, it would have been obvious to incorporate the teachings of Chiang in the combined system of Kalker and Novotny because Chiang expressly discloses “the benefits of using larger blocks—enabling

lower rates for highly redundant prediction images without the penalty of introducing greater distortion.” Pet. 62 (citing Ex. 1008, 2:14–23 (explaining trade-offs between small and large blocks), 5:61–6:4). Dr. Freedman explains that using a larger initial block size would have been understood to allow a programmer to employ a video codec system that “use[s] very little data for areas of large redundancy, such as background elements of a scene, while not compromising the encoder’s ability to partition the block further for scenes with greater variance.” Ex. 1009 ¶ 70. At this stage of the proceeding, we are persuaded that Petitioner’s stated rationale for combining the references is supported by sufficient rational underpinning.

Patent Owner does not present separate arguments for claims 5, 11, and 19. *See* Prelim. Resp. 2–3.

Having reviewed Petitioner’s arguments and evidence concerning claims 5, 11, and 19 and we are persuaded, at this stage of the proceeding, that Petitioner has shown a reasonable likelihood of prevailing in demonstrating that these claims are also obvious in view of Kalker, Novotny, and Chiang. *See* Pet. 59–62.

IV. SUMMARY

At this stage of the proceeding, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing on its challenge to claims 1–4, 6–10, 12–18, and 20 over the combination of Kalker and Novotny and claims 5, 11, and 19 over the combination of Kalker, Novotny, and Chiang. At this preliminary stage, we have not made a final determination as to the patentability of claims 1–20, or any underlying factual and legal issues.

V. ORDER

It is, therefore,

ORDERED that pursuant to 35 U.S.C. § 314(a), an *inter partes* review of the '365 patent is hereby instituted on:

the challenge to claims 1–4, 6–10, 12–18, and 20 under 35 U.S.C. § 103 over Kalker and Novotny; and

the challenge to claims 5, 11, and 19 under 35 U.S.C. § 103 over Kalker, Novotny, and Chiang;

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial commencing on the entry date of this Decision.

IPR2019-00757
Patent 9,930,365 B2

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