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Paper 16
Entered: March 5, 2025

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MOBILEYE GLOBAL, INC.,
Petitioner,

v.

FACET TECHNOLOGY CORP.,
Patent Owner.

IPR2024-01110
Patent 9,335,255 B2

Before KEVIN F. TURNER, ROBERT J. SILVERMAN, and SEAN P. O'HANLON, *Administrative Patent Judges*.

O'HANLON, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. Background

Mobileye Global, Inc. ("Petitioner") filed a Petition for *inter partes* review of claims 12–15 and 17–23 of U.S. Patent No. 9,335,255 B2 (Ex. 1001, "the '255 patent"). Paper 1 ("Pet."), 1. Facet Technology Corp ("Patent Owner") filed a Preliminary Response. Paper 7 ("Prelim. Resp."). With our authorization (*see* Paper 11; Ex. 3001), Petitioner filed a Preliminary Reply (Paper 8, "Prelim. Reply") and a Second Preliminary Reply (Paper 12, "2nd Prelim. Reply"), and Patent Owner filed a Preliminary Sur-reply (Paper 10, "Prelim. Sur-reply") and a Second Preliminary Sur-reply (Paper 15, "2nd Prelim. Sur-reply").

Institution of an *inter partes* review is authorized by statute only when "the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a). We have authority, acting on the designation of the Director, to determine whether to institute an *inter partes* review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a). For the reasons set forth below, upon considering the parties' briefs and evidence of record, we conclude that the information presented shows that there is a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of claim 15 of the '255 patent, the only challenged, non-disclaimed claim. Thus, we institute *inter partes* review.

B. Real Parties in Interest

Petitioner identifies itself as the sole real party in interest. Pet. 56.

Patent Owner identifies itself and Mandli Communications, Inc. as the real parties in interest. Paper 4, 3.[1]

The parties are reminded of their continuing obligation to update their mandatory notice information "within 21 days of a change of the information." 37 C.F.R. § 42.8(a)(3).

C. Related Matters

The parties indicate that the '255 patent is the subject of the following district court proceedings:

> *Facet Technology Corp. v. General Motors LLC*, No. 2:24-cv-00035 (E.D. Tex. filed January 22, 2024),
>
> *Facet Technology Corp. v. Mobileye Global, Inc.*, No. 2:24-cv-00058 (E.D. Tex. filed January 26, 2024) ("the Texas Litigation"),
>
> *Facet Technology Corp. v. HERE Global B.V.*, No. 2:24-cv-00269 (E.D. Tex. filed April 22, 2024),
>
> *Facet Technology Corp. v. TomTom International B.V.*, No. 1:24-cv-00111 (D.N.H. filed April 23, 2024), and
>
> *Mobileye Vision Technologies Ltd. v. Facet Technology Corp.*, No. 0:24-cv-04149 (D. Minn. filed November 7, 2024).

Pet. 57; Paper 4, 3–4.

Petitioner notes another petition for *inter partes* review it filed challenging a related patent owned by Patent Owner, namely IPR2024-01111 challenging U.S. Patent No. 9,671,328 B2. Pet. 57.

[1] Patent Owner filed an identical copy of its mandatory notices as Paper 6.

D. The Challenged Patent

The '255 patent discloses "classifying different types of sheeting materials of road signs depicted in a videostream." Ex. 1001, 1:30–32. The '255 patent recognizes that "[t]he goal of using an automated image identification system to recognize road signs and traffic signs is well known." *Id.* at 1:36–37. Although there are "existing techniques for determining retroreflectivity," these techniques "require an operator to target individual signs from a known distance." *Id.* at 4:11–13.

The '255 patent purports to provide an improved "system for classifying different types of sheeting materials of road signs depicted in a videostream" that allows the user to "determine retroreflectivity without targeting individual signs" and to "automatically determine sheeting classification." Ex. 1001, 3:45–47, 4:11–16. The system "employs several enhancements that are designed to improve the accuracy of evaluating intensity measurements made over a view where the reflective surfaces are not individually targeted" and "neither the distance to the reflective surface or the normal vector to the reflective surface are known." *Id.* at 4:16–23. Figure 4 illustrates a typical configuration of a sensor suite within a capture vehicle and is reproduced below. *Id.* at 4:39–43, 10:7–10.

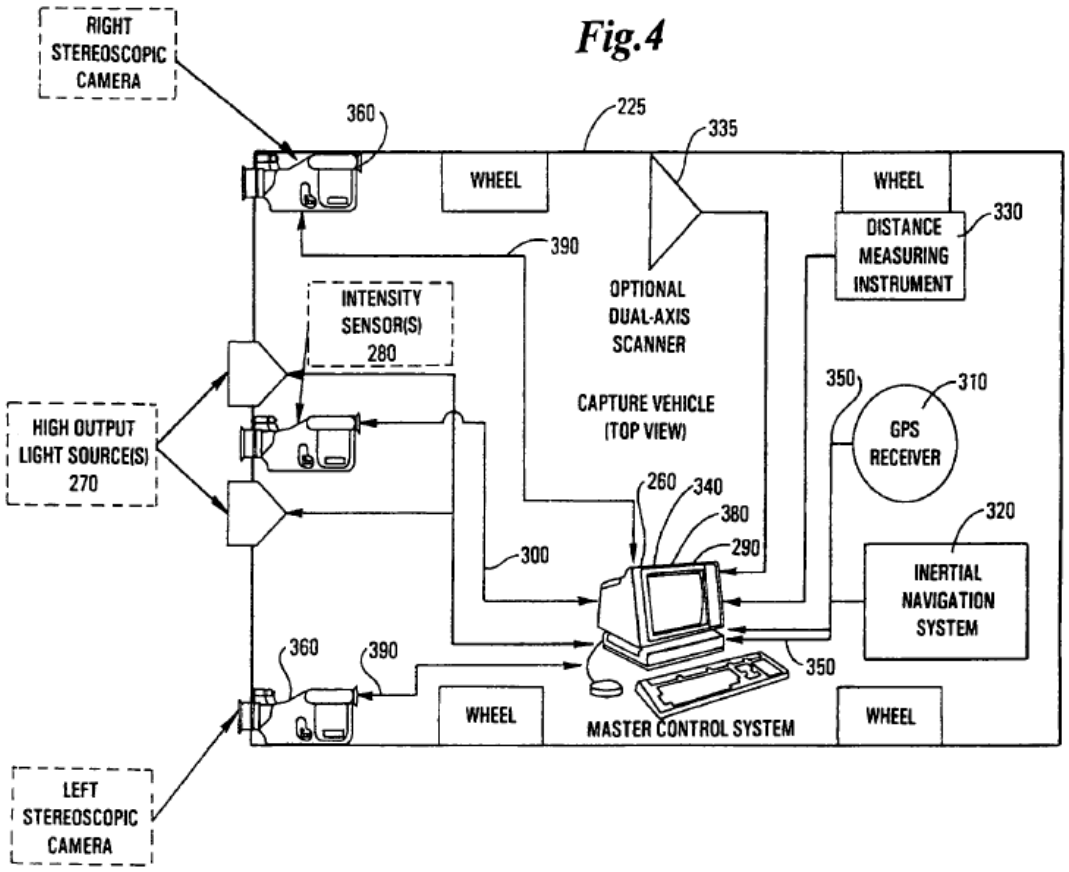

Fig.4

Figure 4 illustrates a preferred configuration of a sensor suite for use with a capture vehicle and the interconnections and couplings between the physical subcomponents of the system. *Id.* at 4:39–43. The system includes distance measuring instrument 330, GPS receiver 310, and inertial navigation system 320, which constitute the vehicle positioning subsystem. *Id.* at 10:10–13. The system includes high output light sources 270 and light intensity sensors 280, which constitute the light intensity measurement subsystem. *Id.* at 10:17–19. This subsystem "make[s] it possible to gather on-the-fly information for a desired highway 150 to allow the computation of object of interest retroreflectivity." *Id.* at 10:19–23. Figure 4 also illustrates stereoscopic cameras 360 and digital imagery system 390 "that

allows for the creation of objects of interest 460 and their associated attributes 465 during post-processing." *Id.* at 10:24–27.

In use, "[a] plurality of intensity measurements 300 are generated by the intensity measurement system 230 in response to the repeated strobing of the high output light source 270." Ex. 1001, 7:65–8:1. "A computer processor 450 identifies an object of interest 460 in a portion of the intensity frame 420 and determines the object of interest attributes 465 associated with that object of interest." *Id.* at 8:22–25. The processor uses "an intensity algorithm 490, a light intensity sensor characterization 275 and a look-up-table 475" to determine luminance values for the background and foreground of each object of interest. *Id.* at 8:38–41. The system compares the measured luminance values with the background and foreground colors and, based on a characterization of the light source wavelength, characterizes background retroreflectivity and foreground retroreflectivity. *Id.* at 8:42–48. The retroreflectivity values can be used to ensure the road signs and markers are reasonably visible to motorists. *Id.* at 18:16–21.

E. Disclaimer of Claims 12–14 and 17–23

A "patent owner may file a statutory disclaimer under 35 U.S.C. [§] 253(a) in compliance with § 1.321(a) of this chapter, disclaiming one or more claims in the patent. No *inter partes* review will be instituted based on disclaimed claims." 37 C.F.R. § 42.107(e). A disclaimer under 35 U.S.C. § 253(a) is "considered as part of the original patent" as of the date on which it is "recorded" in the U.S. Patent and Trademark Office ("Office"). 35 U.S.C. § 253(a). For a disclaimer to be "recorded" in the Office, the document filed by the patent owner must:

> (1) Be signed by the patentee, or an attorney or agent of record;
>
> (2) Identify the patent and complete claim or claims, or term being disclaimed. A disclaimer which is not a disclaimer of a complete claim or claims, or term will be refused recordation;
>
> (3) State the present extent of patentee's ownership interest in the patent; and
>
> (4) Be accompanied by the fee set forth in [37 C.F.R.] § 1.20(d).

37 C.F.R. § 1.321(a); *see also Vectra Fitness, Inc. v. TNWK Corp.*, 162 F.3d 1379, 1382 (Fed. Cir. 1998) (holding that a § 253 disclaimer is "recorded" on the date that the Office receives a disclaimer meeting the requirements of 37 C.F.R. § 1.321(a), and that no further action is required in the Office for a disclaimer to be "recorded").

Here, Patent Owner filed a statutory disclaimer of claims 12–14 and 17–23. Prelim. Resp. 1; Ex. 2002. Based on our review of Exhibit 2002, we determine that a disclaimer of claims 12–14 and 17–23 of the '255 patent under 35 U.S.C. § 253(a) has been filed with the Office as of December 9, 2024. Based on the information in the public record, we find that the disclaimer complies with the above-listed requirements of 37 C.F.R. § 1.321(a).

Because claims 12–14 and 17–23 have been disclaimed under 35 U.S.C. § 253(a), in compliance with 37 C.F.R. § 1.321(a), we do not reach challenges to claims 12–14 and 17–23. As a result, the remaining challenged claim is claim 15 ("the challenged claim").

F. The Challenged Claim

Petitioner challenges claim 15 of the '255 patent. Pet. 2. Claim 15 depends from disclaimed claim 12. Claims 12 and 15 are reproduced below.

> 12. An automated method of assessing reflective surfaces disposed along a roadway comprising:
>
> activating a light source as the light source is traversed along a roadway to illuminate an area that includes at least one reflective surface on a road marker, the road marker having a reflective characteristic;
>
> determining a plurality of light intensity values with at least one intensity sensor directed to cover a field of view which includes at least a portion of the area illuminated by the light source; and
>
> using a computer processing system configured to:
>
> identify a portion of at least one light intensity value of the plurality of light intensity values associated with one of the at least one reflective surface of the road marker; and
>
> analyze the portion of the at least one light intensity value of the plurality of light intensity values to determine an assessment for the reflective characteristic of the road marker.

Ex. 1001, 19:42–20:4.

> 15. The automated method of claim 12, further comprising determining a luminance value utilizing the plurality of light intensity values and a characterization profile of the at least one light intensity sensor.

Id. at 20:11–14.

G. Asserted Ground of Unpatentability

The Petition relies on the following prior art references:

Name	Reference	Exhibit
Gallagher	US 2002/0063638 A1, published May 30, 2002	1005
Lumia	*A Mobile System for Measuring Retroreflectance of Traffic Signs*, Optics, Illumination, and Image Sensing for Machine Vision V, published 1990	1014

Petitioner asserts the following ground of unpatentability, based on an evaluation of the claims that may be challenged in this proceeding:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
15	103(a)[2]	Gallagher, Lumia

Pet. 2. Petitioner submits a declaration of Charles E. Thorpe, Ph.D. (Ex. 1003, "Thorpe Declaration") in support of its contentions. Patent Owner does not submit any witness testimony with its Preliminary Response.

II. DISCRETIONARY DENIAL

Patent Owner argues that we should exercise discretion under 35 U.S.C. § 314(a) to deny institution in light of the Texas Litigation. Prelim. Resp. 21–24. For the reasons set forth below, we decline to do so.

[2] The application resulting in the '255 patent claims priority to a date prior to the date when the Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112–29, 125 Stat. 284 (2011), took effect. Thus, we refer to the pre-AIA version of section 103.

A. Legal Framework

Under 35 U.S.C. § 314(a), the Director has discretion to deny institution. In determining whether to exercise that discretion on behalf of the Director, we are guided by the Board's precedential decision in *NHK Spring Co., Ltd. v. Intri-Plex Technologies, Inc.*, IPR2018-00752, Paper 8 (PTAB Sept. 12, 2018) (precedential).

In *NHK*, the Board found that the "advanced state of the district court proceeding" was a "factor that weighs in favor of denying" the petition under § 314(a). *NHK*, Paper 8 at 20. The Board determined that "[i]nstitution of an *inter partes* review under these circumstances would not be consistent with 'an objective of the AIA . . . to provide an effective and efficient alternative to district court litigation.'" *Id.* (citing *Gen. Plastic Indus. Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 at 16–17 (precedential in relevant part)).

"[T]he Board's cases addressing earlier trial dates as a basis for denial under *NHK* have sought to balance considerations such as system efficiency, fairness, and patent quality." *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 5 (PTAB Mar. 20, 2020) (precedential). *Fintiv* sets forth six non-exclusive factors for determining "whether efficiency, fairness, and the merits support the exercise of authority to deny institution in view of an earlier trial date in the parallel proceeding." *Id.* at 6. These factors are reproduced below:

> 1. whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;
>
> 2. proximity of the court's trial date to the Board's projected statutory deadline for a final written decision;

3. investment in the parallel proceeding by the court and the parties;

4. overlap between issues raised in the petition and in the parallel proceeding;

5. whether the petitioner and the defendant in the parallel proceeding are the same party; and

6. other circumstances that impact the Board's exercise of discretion, including the merits.

We discuss the parties' arguments in the context of considering the above factors. In evaluating the factors, we take a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review. *Fintiv*, Paper 11 at 6.

B. Analysis

1. Likelihood of a Stay

The existence of a district court stay pending Board resolution of an *inter partes* review has weighed strongly against discretionary denial, while a denial of such a stay request sometimes weighs in favor of discretionary denial. *Fintiv*, Paper 11 at 6–8.

The parties agree that no motion for a stay of the Texas Litigation has been filed. 2nd Prelim. Reply 2; Prelim. Resp. 22.

On this record, it is unclear how the District Court Judge would proceed, and we decline to speculate regarding whether the district court will grant a stay if this proceeding is instituted. Accordingly, the facts underlying this factor are neutral.

2. Proximity of Trial Date to Projected Statutory Deadline

When a district court's trial date will occur before the projected statutory deadline for the final written decision, the Board generally weighs this factor in favor of exercising discretion to deny institution. *Fintiv*, Paper 11 at 9. "If the court's trial date is at or around the same time as the projected statutory deadline or even significantly after the projected statutory deadline, the decision whether to institute will likely implicate other factors discussed herein, such as the resources that have been invested in the parallel proceeding." *Id.*

Patent Owner asserts that trial in the Texas Litigation is set to begin on February 17, 2026. Prelim. Resp. 21 (citing Ex. 2004, 1).

Petitioner argues that it is unlikely that trial will occur prior to the latest due date for a final written decision in this proceeding because the Texas Court authorized additional discover as to whether venue is proper. 2nd Prelim. Reply 3 (citing Ex. 1025).

We agree that the Texas court's consideration of venue may delay the trial date in the Texas Litigation. Nonetheless, even considering Patent Owner's asserted trial date of February 17, 2026, that date is only three weeks before the latest date on which a final decision can be issued in this proceeding (March 10, 2026).

Accordingly, the facts underlying this factor are neutral.

3. Investment in the Parallel Proceeding

If, at the time of the institution decision, the district court has issued substantive orders related to the challenged patent, such as a claim construction order, this fact weighs in favor of denial. *See Fintiv*, Paper 11

at 9-10. On the other hand, if the district court has not issued such orders, this fact weighs against discretionary denial. *Id.* at 10. However, we also consider Petitioner's diligence in filing the Petition in weighing this factor. *Fintiv*, Paper 11 at 11 ("If the evidence shows that the petitioner filed the petition expeditiously, such as promptly after becoming aware of the claims being asserted, this fact has weighed against exercising the authority to deny institution under *NHK*.").

Petitioner argues that the Texas court has not issued any substantive orders, claim construction has not begun, and the only discovery that has occurred is in regards to venue. 2nd Prelim. Reply 4.

Patent Owner argues that discovery has begun and the parties have exchanged infringement and invalidity contentions. Prelim. Resp. 22–23.

The parties' arguments indicate that some work has been done in the Texas litigation, but significant work still remains to be done. *See* Ex. 2004. Moreover, we agree that Petitioner filed the Petition expeditiously. *See* 2nd Prelim. Reply 4.

Accordingly, the facts underlying this factor weigh strongly against exercising our discretion to deny institution.

4. Overlap of Issues

"[I]f the petition includes the same or substantially the same claims, grounds, arguments, and evidence as presented in the parallel proceeding, this fact has favored denial." *Fintiv*, Paper 11 at 12. "Conversely, if the petition includes materially different grounds, arguments, and/or evidence than those presented in the district court, this fact has tended to weigh against exercising discretion to deny institution under *NHK*." *Id.* at 12-13.

Petitioner argues that it has filed a stipulation, so there will be no overlap of issues between this proceeding and the Texas Litigation. 2nd Prelim. Reply 4.

Patent Owner argues that "Petitioner's stipulation is facially inadequate" because "it only purports to bind Petitioner itself" and "ignores the relevant related parties that may attempt to assert—in the same court—the invalidity grounds that were raised or could have been raised in this IPR." Prelim. Sur-reply 3–4. Patent Owner notes that it moved to add two parties as defendants in the Texas Litigation, that those two parties filed a declaratory judgment complaint against Patent Owner in a different district court, and that Patent Owner filed another complaint against an unrelated third party in the same district court as the Texas litigation. *Id.* at 4 (citing Ex. 2015, 1, 5; Ex. 2016, 2–4, 7; Ex. 2017 ¶¶ 17–18, 21, 24; Ex 2018 ¶¶ 2, 16, 37–40, 51–54; Ex. 2019). Patent Owner asserts that these three parties are real parties in interest in this proceeding. *Id.*

Petitioner notes that the two parties Patent Owner seeks to add to the Texas Litigation "have made the same stipulation as Petitioner." 2nd Prelim. Reply 2 (citing Ex. 1024).

Patent Owner has not advanced persuasive evidence to put into dispute Petitioner's identification of itself as the sole real party in interest. Patent Owner asserts that the two third parties it seeks to add as defendants in the Texas Litigation produce products that incorporate components manufactured by Petitioner and that Patent Owner has asserted that these Petitioner products infringe the '255 patent in the Texas Litigation. Prelim. Sur-reply 4. Patent Owner also asserts that these two third parties asserted an obligation to defend Petitioner and the other third party against Patent

Owner's infringement assertions. *Id.* However, Patent Owner does not assert or provide any evidence that *Petitioner* must indemnify any of the three third parties or that any of the third parties controls any aspect of this *inter partes* review proceeding. *See id.*

Moreover, Petitioner stipulates that, if we institute *inter partes* review in this proceeding, it will not pursue in the Texas Litigation "'any ground that [Petitioner] raised or reasonably could have raised' during this proceeding." Prelim. Reply 4 (alteration in original) (citing *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 18–19 (PTAB Dec. 1, 2020) (precedential in relevant part)). Furthermore, to the extent that the two parties Patent Owner seeks to add as defendants in the Texas Litigation should be named as real parties in interest in this proceeding, those parties have also filed a stipulation here (*see* Ex. 1024), alleviating any concerns of conflict with district court litigation.

Accordingly, the facts underlying this factor weigh strongly against exercising our discretion to deny institution.

5. Identity of Parties

"If a petitioner is unrelated to a defendant in an earlier court proceeding," this fact has weighed against exercising discretion to deny institution. *Fintiv*, Paper 11 at 13–14.

There is no dispute that the parties in this proceeding are identical to the parties in the Texas litigation. Thus, the facts underlying this factor are neutral.

6. Other Considerations, Including the Merits

As discussed in more detail below, we find the evidence and arguments presented by Petitioner persuasive on this preliminary record and sufficient to meet our standard for instituting *inter partes* review.

Accordingly, the facts underlying this factor weigh against exercising our discretion to deny institution.

7. Holistic Assessment of the Fintiv *Factors*

On this record, after weighing all of the factors and taking a holistic view, we determine that the facts in this case that weigh against exercising discretion outweigh the facts that favor exercising discretion. Accordingly, we determine that the circumstances presented weigh against exercising our discretion under 35 U.S.C. § 314(a) to deny institution of *inter partes* review based on the Texas litigation.

III. PATENTABILITY ANALYSIS

A. Principles of Law

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 invention was made to a person having ordinary skill in the art to which the 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) when in evidence, any objective

evidence of nonobviousness.[3] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

The level of ordinary skill in the art is "a prism or lens" through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). The person of ordinary skill in the art is a hypothetical person presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In determining the level of ordinary skill in the art, we may consider certain factors, including: "(1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field." *Best Med. Int'l, Inc. v. Elekta Inc.*, 46 F.4th 1346, 1353 (Fed. Cir. 2022) (quoting *Daiichi Sankyo Co. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007)). "The patent's purpose can also be informative." *Id.*

Petitioner contends that a person having ordinary skill in the art at the time of the invention would have had "at least a bachelor's degree in mechanical engineering, electrical engineering, computer science, physics, or related discipline, and four years of experience in research, design, or development in computer vision systems." Pet. 7 (citing Ex. 1003 ¶ 33). Petitioner contends that "[h]igher levels of education may offset less

[3] At this stage of the proceeding, the parties have not directed us to any such objective evidence.

experience and extensive experience can substitute for formal education." *Id.* (citing Ex. 1003 ¶ 33).

Patent Owner does not contest Petitioner's proposed definition or proffer a definition of its own. Prelim. Resp. 5.

Based on the arguments presented and the cited references, we find Petitioner's definition of the level of ordinary skill reasonable and for purposes of this Decision, adopt it as our own.

C. Claim Construction

In an *inter partes* review, claims are construed using the same claim construction standard that would be used to construe the claims in a civil action under 35 U.S.C. § 282(b), including construing the claims in accordance with the ordinary and customary meaning of such claims 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). "[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention" and "after reading the entire patent." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313, 1321 (Fed. Cir. 2005) (en banc). In addition to the specification and prosecution history, we also consider use of the terms in other claims and extrinsic evidence including expert and inventor testimony, dictionaries, and learned treatises, although extrinsic evidence is less significant than the intrinsic record. *Id.* at 1312–17. Usually, the specification is dispositive, and it is the single best guide to the meaning of a disputed term. *Id.* at 1315.

The specification may reveal a special definition given to a claim term by the patentee, or the specification may reveal an intentional disclaimer or disavowal of claim scope by the inventor. *Phillips*, 415 F.3d at 1316; *see also Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014) (citing *Thorner v. Sony Computer Ent. Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012)) ("We depart from the plain and ordinary meaning of claim terms based on the specification in only two instances: lexicography and disavowal."). If an inventor acts as his or her own lexicographer, the definition must be set forth in the specification with reasonable clarity, deliberateness, and precision. *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998). A disavowal, if any, can be effectuated by language in the specification or the prosecution history. *Poly-America, L.P. v. API Indus., Inc.*, 839 F.3d 1131, 1136 (Fed. Cir. 2016). "In either case, the standard for disavowal is exacting, requiring clear and unequivocal evidence that the claimed invention includes or does not include a particular feature." *Id.* "Ambiguous language cannot support disavowal." *Id.* (citing *Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1324 (Fed. Cir. 2003)).

"The Board is required to construe 'only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.'" *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (alteration in original) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Petitioner does not propose a definition for any term of the challenged claim. *See* Pet. 7–8 (discussing a recitation appearing only in disclaimed claims).

Patent Owner proposes a definition for "characterization profile," arguing that "the '255 [p]atent describes the sensor's characterization profile as 'empirical information about the light intensity sensor 280 that is used to create [for example] the LUT [look up table] 475.'" Prelim. Resp. 11 (second and third alterations in original) (citing Ex. 1001, 11:56–60). Patent Owner argues that this interpretation is "consistent with [the] ordinary meaning in the field. In particular, 'sensor characterization' is the process of describing the properties and performance characteristics of a sensor across *various* conditions." *Id.* at 12 (emphasis in original) (citing Ex. 2011, 10–11; Ex. 2012, 2–3; Ex. 2013, 1–2). Patent Owner concludes that "[a] characterization profile is thus the compilation of that description into a set of characteristics presented in a usable format." *Id.* (citing Ex. 2014, 3).

Petitioner replies that, in the Texas Litigation, "Patent Owner read the 'characterization profile' on a histogram without further conditions." Prelim. Reply 2 (citing Ex. 1023, 14–15). Petitioner argues that we should "hold Patent Owner to its district court construction in this IPR." *Id.* at 2–3 (citing *Scout Energy Mgmt., LLC v. Pilot Intell. Prop., LLC*, IPR2024-00385, Paper 11 (PTAB Aug. 9, 2024)).

Patent Owner clarifies that it is "Lumia's *specific* histogram, together with how Lumia *uses* that histogram," not histograms in general, that it contends fails to disclose or suggest a characterization profile. Prelim. Sur-reply 1. Patent Owner argues that Lumia's system is distinguishable from the accused system in the Texas litigation because "Lumia uses a single 'scale factor' to translate light intensity values into retroreflectivity values," whereas the accused system is run on three histograms along with various other sensor data. *Id.* at 1–2. Moreover, Patent Owner notes that the

Petition maps Lumia's calibration to the recited characterization profile and argues that "Lumia's calibration is not a characterization profile because it does not describe the properties and performance characteristics of a sensor across various conditions." *Id.* at 1.

The '255 patent discloses that the recited characterization profile allows the system to be used with multiple colors of reflected light:

> Intensity values will vary according to the color of the reflected light, since not all colors of incoming light excite the light intensity sensor 280 pixels in the same way. By knowing the background or foreground color of the object of interest 460 along with the light intensity sensor's 280 ability to sense, or the light intensity sensor's 280 profile for a particular color, the intensity value 300 for a particular color can be converted into a luminance value. Light intensity sensor 280 characterization is essential for high precision computations since N photons of a given particular color (or wavelength) of light will represent a different gray value (intensity level) in the sensor than N photons of another color (or wavelength) of light.

Ex. 1001, 11:41–53. A look-up table is used to convert the measured light intensity to luminance based on the sheeting color. *Id.* at 11:53–56. Thus, on this preliminary record, we understand "characterization profile" as used in the '255 patent to refer to a conversion factor to convert measured light intensity into luminance.[4]

The parties are hereby given notice that claim construction, in general, is an issue to be addressed at trial and any claim construction implicitly addressed in this Decision is preliminary in nature. Claim construction will be determined at the close of all the evidence and after any hearing. The

[4] We note that "characterization profile" was not discussed in any meaningful manner during prosecution of the application that resulted in the '255 patent. *See generally* Ex. 1002.

parties are expected to assert all of their claim construction arguments and evidence during trial as permitted by our rules.

D. Overview of the Asserted Prior Art

1. Gallagher

Gallagher discloses "a method and apparatus for assessing the integrity of road markers and markings." Ex. 1005 ¶ 1. Figure 1 illustrates the reflectivity measuring apparatus and is reproduced below.

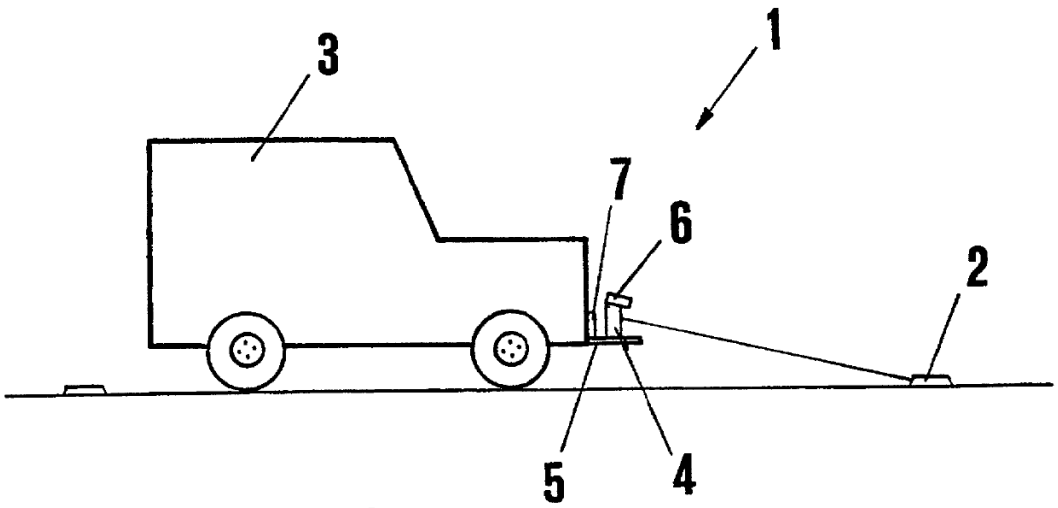

Figure 1

Figure 1 illustrates a side view of reflectivity measuring apparatus 1. *Id.* ¶¶ 26, 31. The apparatus is mounted on vehicle 3 and is designed to measure the reflectivity of road markings 2 when travelling at speeds of up to about 100 kph. *Id.* ¶ 32. The apparatus includes light source 4 mounted on platform 5, light sensor 6 (which may be provided as an array of sensors in module 6a), and computer 8. *Id.* ¶¶ 35, 38, 45–46; *see also id.* Fig. 3 (illustrating a block diagram of the apparatus components). The apparatus

can be used to assess a variety of road marking types, such as raised pavement markers. *Id.* ¶¶ 2, 33.

> In operation, an operator in the vehicle 3 initiates the measurement process by sending a signal via the computer 8 to activate the light control relay 10. . . . The relay 10 switches power from the power supply 12 to the light source 4. The light source 4 subsequently illuminates a reflective surface of a marker 2 and the reflected light is detected by one or a number of the light sensors 6 in the module 6a which has been aligned to detect light from a particular area of road.

Id. ¶ 46. The computer determines the reflectance level of each road marker and determines whether it meets a predetermined minimum acceptable reflectance level. *Id.* ¶¶ 67–68. Any road marker that does not meet this level is tagged to identify it for replacement. *Id.* ¶ 68.

2. Lumia

Lumia recognizes the need "to evaluate the nighttime visibility of existing traffic signs and provide data for making decisions on sign replacement" and discloses "[a] mobile system . . . which can measure the average retroreflectance of sign legend and background from a moving vehicle during daylight hours." Ex. 1014, 15.[5] "This system uses a video camera to acquire sign images, a xenon flash as a source of light, a personal computer to analyze the sign images, and a laser rangefinder to measure the distance to the sign." *Id.* The system calculates retroreflectance as a

[5] Petitioner cites to the original pagination rather than the added exhibit pagination. *See, e.g.*, Pet. 44. Patent Owner cites to both the added exhibit pagination (*see, e.g.*, Prelim. Resp. 8) and the original pagination (*see, e.g.*, Prelim. Sur-reply 1). For consistency, we cite to the original pagination and, where needed, convert Patent Owner's citations to the original pagination.

function of "the absolute brightness of the [sign] for a given amount of incident illumination on the [sign]." *Id.* at 16. The incident illumination is measured with an illumination meter or it is inferred based on the intensity of the light source and the distance between the light source and the sign. *Id.* The light source's intensity is measured in laboratory setting and the distance is measure with a laser rangefinder. *Id.* at 15–16. The reflected luminance of the sign is measured with a luminance meter, such as a video camera. *Id.* at 16.

Lumia's system creates a histogram from the measurements, illustrated in Figure 3(b) reproduced below.

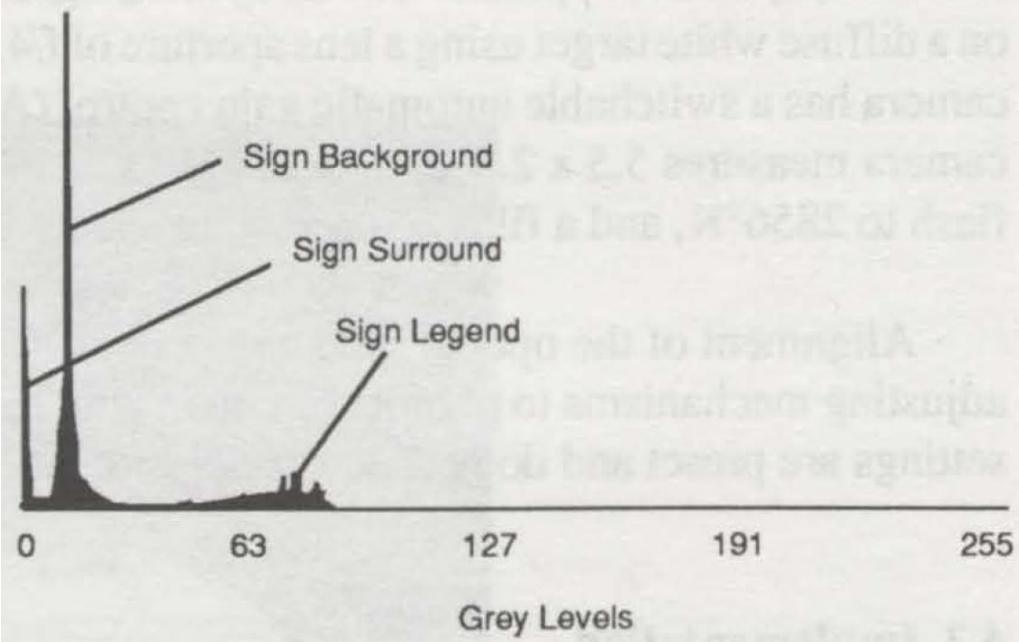

Figure 3(b). Related histogram of image of figure 3(a).

Figure 3(b) illustrates a histogram of measured retroreflectance data, "plotted as relative number of image points versus reflected light intensity (camera gray levels)." Ex. 1014, 16. The largest peak corresponds to the sign background, which has a larger background area that the sign legend.

Id. The smaller peak corresponds to the sign legend. *Id.* Intensity levels corresponding to the areas surrounding the sign generally does not exceed four gray levels, so they are easily excluded. *Id.* The intensity levels of the peaks are averaged to obtain retroreflectivities for the sign background and legend. *Id.* The system is calibrated using a sheeting material with known retroreflectance to compute a scale factor to convert the gray levels to retroreflectance values. *Id.* at 24.

E. Petitioner's Challenge

Petitioner argues that claim 15 would have been obvious in view of Gallagher and Lumia. Pet. 44–47. In support of its showing, Petitioner relies upon the Thorpe Declaration. *Id.* (citing Ex. 1003). We have reviewed Petitioner's assertions and supporting evidence. For the reasons discussed below, and based on the record before us, we determine that Petitioner demonstrates a reasonable likelihood of prevailing in showing that claim 15 would have been obvious in view of the combination of Gallagher and Lumia.

Claim 15 recites "[t]he automated method of claim 12, further comprising determining a luminance value utilizing the plurality of light intensity values and a characterization profile of the at least one light intensity sensor." Ex. 1001, 20:11–14. Petitioner relies on Gallagher to disclose or teach all of the recitations of parent claim 12, including mapping Gallagher's array of light sensors to the recited intensity sensor, and relies on Lumia to teach the recitations of claim 15. Pet. 27–35, 44–47. Petitioner argues that Lumia's video camera divides its field of view into multiple areas and acts as a luminance meter for each area. *Id.* at 44 (citing Ex. 1014,

16; Ex. 1003 ¶ 114). Petitioner argues that, when Lumia's "system is 'properly calibrated,' the average intensity value of each area in the [field of view] of similar intensity 'corresponds to the average luminance.'" *Id.* at 44–45 (citing Ex. 1014, 16; Ex. 1003 ¶ 114). Petitioner notes that Lumia discloses creating a histogram of measured values and argues that the "histogram can be used to identify and average legend and background values, which 'correspond[] to the average luminance' of the legend and background, respectively." *Id.* at 45 (alteration in original) (citing Ex. 1014, 15–17; Ex. 1003 ¶ 114). Petitioner argues that an ordinarily skilled artisan "would have understood Lumia's calibration to disclose a characterization profile that relates the light intensity values of the video camera (light intensity sensor) to corresponding luminance values." *Id.* (citing Ex. 1003 ¶ 115).

Petitioner argues that it would have been obvious to an ordinarily skilled artisan "to implement Lumia's determining a luminance value utilizing the plurality of light intensity values and a characterization profile of the at least one light intensity sensor to allow Gallagher's apparatus to calculate the retroreflectivity of road markers." Pet. 46. Petitioner argues that such an artisan "would have been motivated to do so because, as was well known at the time, several road authorities specified minimum retroreflectivity values for road markings along a roadway," and the modification would allow Gallagher's apparatus "to identify and tag any markers 'that do not meet the predetermined minimum acceptable reflectance level.'" *Id.* (citing Ex. 1003 ¶ 116; Ex. 1005 ¶¶ 49, 77; Ex. 1019, 6, 8–11).

Patent Owner argues that Petitioner's arguments are lacking for several reasons. Prelim. Resp. 7–20. First, Patent Owner argues that Lumia does not determine any luminance value. *Id.* at 8–10. Patent Owner contends that, instead, "Lumia creates a histogram of light intensity reflected by grey levels of pixels in a captured image of the road sign." *Id.* at 8–9 (emphasis omitted). Continuing, Patent Owner argues that Lumia "simply converts the peak histogram values of the greyscale camera's digital light intensity measurements directly into a R' value (the coefficient of retroreflection)." *Id.* at 10 (emphasis omitted) (citing Ex. 1014, 24).

On this record, Patent Owner's argument is unavailing. Patent Owner defines "luminance" as "the luminous intensity projected on a given area and direction, i.e. the amount of visible light leaving a point on a surface in a given direction." Prelim. Resp. 7. By measuring the intensity of light reflected off a traffic sign, Lumia measures the sign's luminance. *See* Ex. 1014, 15. Indeed, Lumia discloses using a "luminance meter" to obtain such measurements. *Id.* at 16. Furthermore, Lumia's histogram is a plot of the number of image points versus *reflected light intensity*, so the histogram is a measure of luminance. *Id.*

Next, Patent Owner argues that Lumia does not disclose a characterization profile of its light intensity sensor because "Lumia's calibration process simply computes a single number—the 'scale factor'—which converts '8-bit digital gray levels' to 'R' [retroreflectivity] values.'" Prelim. Resp. 13 (alteration in original) (citing Ex. 1014, 24). According to Patent Owner, "rather than evaluating the sensor under various conditions, Lumia's calibration (and the scale factor) is limited to a single calibration." *Id.* (emphasis omitted) (citing Ex. 1014, 21, 24).

Petitioner replies that "Lumia teaches a 'characterization profile' based on a set of sensor characteristics across various conditions (e.g., different sign placements within the field of view and different sign colors) to determine a luminance value." Prelim. Reply 3 (citing Ex. 1014, 16).

Patent Owner replies that the portion of Lumia cited by Petitioner "discusses *applying* Lumia's system to signs of different colors and at different locations," but it "gives no details about *calibrating* Lumia's system . . . with various different signs." Prelim. Sur-reply 2–3 (citing Ex. 1014, 16).

We agree with Patent Owner that Lumia does not appear to teach a "'characterization profile' based on a set of sensor characteristics across various conditions" as asserted by Petitioner. *See* Prelim. Reply 3 (citing Ex. 1014, 16). We see no disclosure on page 16 of Lumia (or elsewhere) to support Petitioner's contentions. However, for the reasons explained below, we agree, on this preliminary record, with Petitioner's contention that Lumia's calibration scale factor corresponds to the recited characterization profile.

Lumia states that its "design must be able to accommodate signs of different colors." Ex. 1014, 15. Lumia's system was tested using ten signs having "a white background color with background [retroreflectance] values ranging from approximately 4 to 350." *Id.* at 24. The system was calibrated by determining an appropriate scale factor to convert the measure light intensity (gray level) to retroreflectance values. *Id.* As noted above, Lumia's system calculates retroreflectance as a function of measured luminance compared to the amount of incident illumination. *Id.* at 15. Accordingly, we agree, on this preliminary record, that Lumia's calibration

scale factor corresponds to the recited characterization profile, as both operate to convert measured light intensity into a luminance value. *See* § III.C above (interpreting "characterization profile").

We are not persuaded by Petitioner's assertion that Patent Owner proposes contradictory interpretations of "characterization profile" here and in the Texas Litigation. Petitioner mentions Patent Owner's preliminary infringement contentions filed in the Texas Litigation (Prelim. Reply 2 (citing Ex. 1023, 14–15)), but Petitioner does not provide a detailed analysis to explain the asserted inconsistent positions. We note that, in its preliminary infringement contentions, Patent Owner references the histogram disclosed in one of Petitioner's patents (which Patent Owner relies on to show the functionality of Petitioner's products (*see* Ex. 1023, 1)), but Petitioner has not made that patent of record here. Thus, we are unable to determine the veracity of Petitioner's contentions.

Finally, Patent Owner argues that the Petition fails to explain adequately "*how* the combination of the Gallagher and Lumia (or their teachings) is supposed to work," instead relying only on conclusory assertions. Prelim. Resp. 14–15. Patent Owner argues that "Petitioner ignores the significant differences in the function, structure, and operation of Lumia and Gallagher," characterizing Gallagher as disclosing "a system where photodiodes *continuously* record intensity values in order to identify peak responses as indicating the presence of pavement markers" and Lumia as disclosing "a system where an operator *separately* locks onto an *individual* sign with a video camera, takes a gray scale *image* of the sign, and uses a histogram of the frequency of grey level values among the pixels of the image to measure the sign's retroreflectivity." *Id.* at 15–18. Patent

Owner argues that the Petition does not explain adequately how the Gallagher-Lumia combination would satisfy the recitations of parent claim 12 because the Petition does not identify clearly whether it maps Gallagher's photodiodes or Lumia's camera to the recited intensity sensor. *Id.* at 18–20.

We disagree with Patent Owner's characterization that the Petition fails to rely on evidence. *See* Prelim. Resp. 14–15. To the contrary, Petitioner relies on Lumia's disclosure and the declaration testimony of its witness, Dr. Thorpe, as evidence. *See* Pet. 44–47 (citing Ex. 1014, 15–17, Figs. 3(a)–3(b); Ex. 1003 ¶¶ 114–117). We also fail to see the significant differences in Gallagher's system and Lumia's system as asserted by Patent Owner. We note that the purpose of Gallagher's system is to "assess[]the integrity of road markers and markings" (Ex. 1005 ¶ 1), and the purpose of Lumia's system is "to evaluate the nighttime visibility of existing traffic signs and provide data for making decisions on sign replacement" (Ex. 1014, 15). Petitioner proposes to incorporate Lumia's teaching of measuring luminance values into Gallagher's system, and argues that an ordinarily skilled artisan would have had a reasonable expectation of success given Gallagher's disclosure of determining calibration factors for each individual sensor in the array of sensors. Pet. 47 (citing Ex. 1005 ¶¶ 58–59; Ex. 1014, 16; Ex. 1003 ¶ 117). On this preliminary record, we are persuaded by Petitioner's arguments.

Additionally, we determine, on this preliminary record, that Petitioner sets forth reasoning with rational underpinning to support its contentions that it would have been obvious to combine the teachings of Gallagher and Lumia. For example, Petitioner argues that implementing Lumia's teaching

of determining the luminance of traffic signs in Gallagher's system would allow Gallagher's system to calculate the retroreflectivity of road markers as a means of identifying any markers that do not meet minimum acceptable reflectance levels. Pet. 46 (citing Ex. 1003 ¶ 116; Ex. 1005 ¶¶ 49, 77; Ex. 1019, 6, 8–11[6]). Dr. Thorpe testifies that the modification would further Gallagher's stated goal of identifying markers that do meet the minimum acceptable reflectance level, as several road authorities specify minimum retroreflectivity values for road markings. Ex. 1003 ¶ 116 (citing Ex. 1005 ¶¶ 49, 77; Ex. 1019, 6, 8–11). On this preliminary record, we find Dr. Thorpe's testimony to be reasonable and supported by the cited portions of the exhibits.

Accordingly, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that claim 15 would have been obvious in view of the combination of Gallagher and Lumia.

IV. CONCLUSION

For the foregoing reasons, we determine that the information presented establishes a reasonable likelihood that Petitioner would prevail in showing that claim 15 of the '255 patent is unpatentable. At this preliminary stage, we have not made a final determination with respect to the patentability of the challenged claim or any underlying factual and legal issues. *See TriVascular, Inc. v. Samuels*, 812 F.3d 1056, 1068 (Fed. Cir. 2016) (noting that "there is a significant difference between a petitioner's

[6] Petitioner and Dr. Thorpe cite to the original pagination of Exhibit 1019 rather than the added exhibit pagination.

burden to establish a 'reasonable likelihood of success' at institution, and actually proving invalidity by a preponderance of the evidence at trial").

Accordingly, *inter partes* review is instituted. *See* 37 C.F.R. § 42.108(a).

V. ORDER

Accordingly, it is:

ORDERED that pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claim 15 of the '255 patent is instituted with respect to the ground set forth in the Petition; and

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, which commences on the entry date of this decision.

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