

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ams AG, AMS-TAOS USA INC.,
SAMSUNG ELECTRONICS AMERICA, INC., and
SAMSUNG ELECTRONICS CO. LTD.,
Petitioner,

v.

511 INNOVATIONS, INC.,
Patent Owner.

Case IPR2016-01793
Patent 7,397,541 B2

Before KARL D. EASTHOM, DAVID C. McKONE, and
JOHN A. HUDALLA, *Administrative Patent Judges*.

HUDALLA, *Administrative Patent Judge*.

DECISION

Denying Institution of *Inter Partes* Review
35 U.S.C. § 314(a) and 37 C.F.R. § 42.108

ams AG, AMS-TAOS USA Inc., Samsung Electronics America, Inc.,
and Samsung Electronics Co., Ltd. (collectively “Petitioner”) filed a Petition
(Paper 3, “Pet.”) requesting an *inter partes* review of claims 1, 3, and 11 of
U.S. Patent No. 7,397,541 B2 (Ex. 1001, “the ’541 patent”) pursuant to
35 U.S.C. §§ 311–319. Petitioner proffered a Declaration of R. Jacob Baker,

Ph.D., P.E. (Ex. 1008) with its Petition. Patent Owner, 511 Innovations, Inc.,¹ filed a Preliminary Response (Paper 8, “Prelim. Resp.”) to the Petition.

Under 35 U.S.C. § 314(a), the Director may not authorize an *inter partes* review unless the information in the petition and preliminary 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.” For the reasons that follow, we do not institute an *inter partes* review of the ’541 patent.

I. BACKGROUND

A. *Related Proceedings*

The parties identify the following proceedings related to the ’541 patent (Pet. 1; Paper 7, 1–2):

511 Innovations, Inc. v. HTC Am., Inc., No. 2:15-cv-01524
(E.D. Tex.);

511 Innovations, Inc. v. Microsoft Mobile Inc., No. 2:15-cv-01525
(E.D. Tex.);

511 Innovations, Inc. v. Samsung Telecomms. Am., LLC, No. 2:15-cv-01526 (E.D. Tex.);

511 Innovations, Inc. v. Apple, Inc., No. 2:16-cv-00868 (E.D. Tex.);

511 Innovations, Inc. v. LG Elecs., Inc., No. 2:16-cv-01197
(E.D. Tex.);

511 Innovations, Inc. v. Motorola Mobility LLC, No. 2:16-cv-01198
(E.D. Tex.);

¹ An assignment of the ’541 patent to 511 Innovations, Inc., was recorded on January 11, 2017, at Reel 40944, Frame 162.

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511 Innovations, Inc. v. Pantech Co., No. 2:16-cv-01199 (E.D. Tex.);
and

511 Innovations, Inc. v. Sony Corp., No. 2:16-cv-01200 (E.D. Tex.).

Petitioner also filed additional petitions for *inter partes* review of other patents owned by 511 Innovations, Inc., in the following cases (Pet. 2; Paper 7, 1):

IPR2016-01787 – U.S. Patent No. 8,472,012

IPR2016-01788 – U.S. Patent No. 8,786,844

IPR2016-01792 – U.S. Patent No. 7,110,096

IPR2016-01804 – U.S. Patent No. 6,490,038

IPR2016-01810 – U.S. Patent No. 6,307,629

IPR2016-01818 – U.S. Patent No. 7,113,283

IPR2016-01819 – U.S. Patent No. 6,915,955

B. The '541 Patent

The '541 patent relates to “measuring the color and other optical characteristics of teeth, fabric or other objects or surfaces with a hand-held probe.” Ex. 1001, 1:22–27. Figure 1 of the '541 patent is reproduced below.

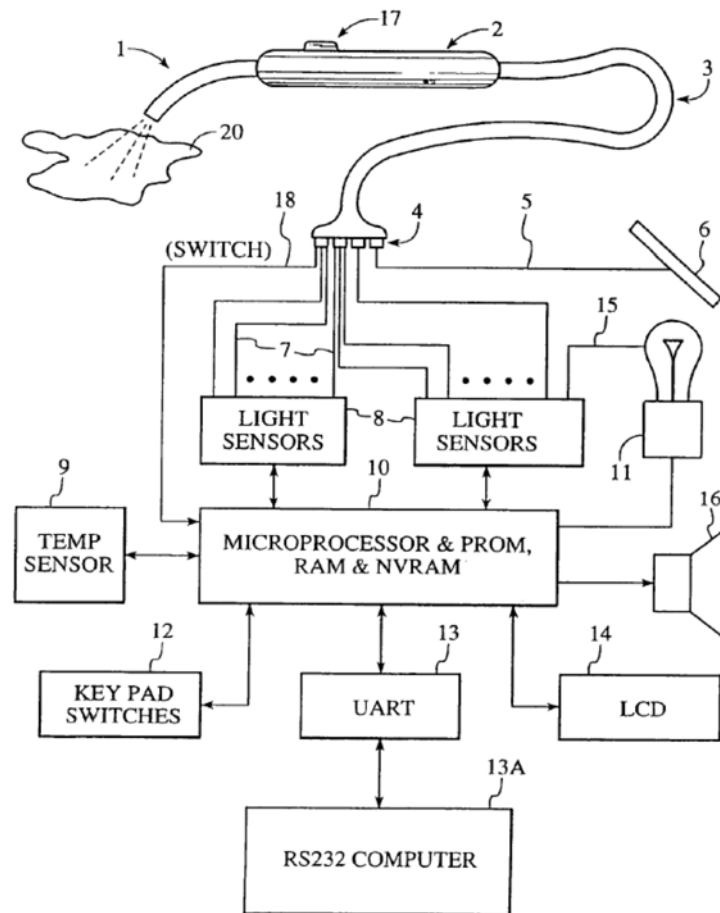


FIG. 1

Figure 1 depicts a “color/optical characteristic measuring system” having probe tip 1, which encloses a plurality of optical fibers including a single light source fiber optic and multiple light receiver fiber optics. *Id.* at 5:43–51. The fiber optics within probe tip 1 optically extend through probe body 2 and through fiber optic cable 3 to splicing connector 4. *Id.* at 5:61–64, 6:8–9. From splicing connector 4, light passes to smaller fiber optics 7 and on to light sensors 8, which are coupled to microprocessor 10. *Id.* at 5:61–64, 6:30–34. Light reflected from object 20 enters the fiber optics at the forward end of probe tip 1, and it is presented to sensors 8 for

color/optical measurements and angle/height determination, etc. *Id.* at 6:30–41.

Figure 3 of the '541 patent is reproduced below.

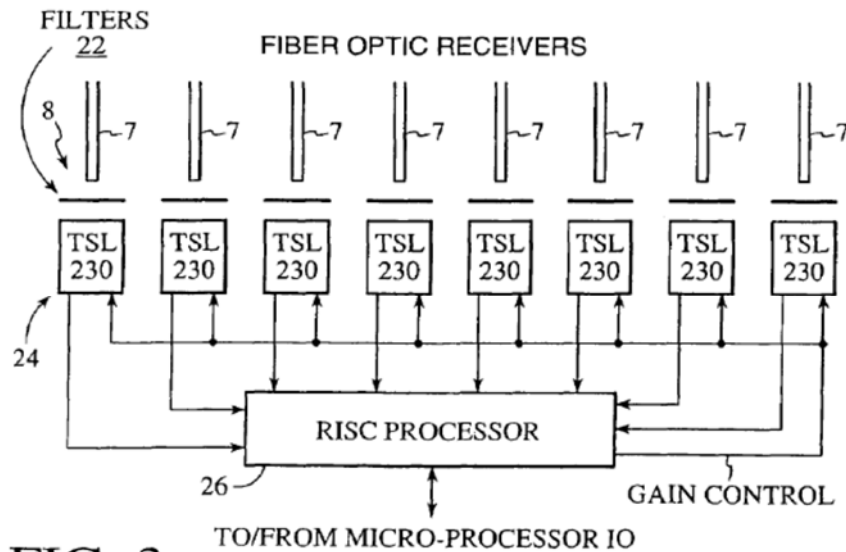


Figure 3 depicts light receiver fiber optics and sensors as described in the '541 patent. *Id.* at 9:5–7. Fibers 7 transmit light thorough color filters 22 to sensing elements 24. *Id.* at 6:21–24, 9:16–18. Sensing elements 24 include light-to-frequency converters and output a signal with a frequency proportional to the intensity of the incident light. *Id.* at 9:18–30.

Figures 4B and 4C of the '541 patent are reproduced below.

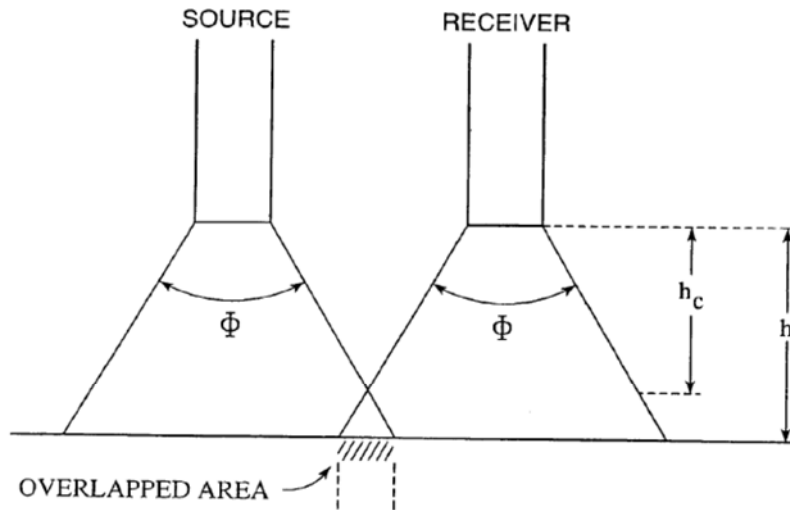


FIG. 4B

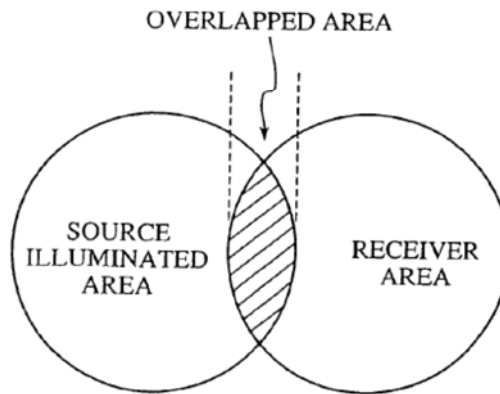


FIG. 4C

Figure 4B depicts parallel source and receiver fiber optics held at a height h above a surface. *Id.* at 12:50–56. The source fiber optic emits a cone of light that illuminates a circular area on the surface, as depicted in Figure 4C. *Id.* at 12:56–58. The receiver fiber optic will only accept and propagate light from within a cone that corresponds to a circular area on the surface, as is also depicted in Figure 4C. *Id.* at 12:44–47, 12:58–60. If the only light available is that emitted by the source fiber optic, then the only light that can be accepted by the receiver fiber optic is the light that strikes the surface at

the intersection of the two circles (i.e., the “overlapped area”), as illustrated in Figure 4C. *Id.* at 12:60–64. Moving the fibers away from the surface increases the size of the overlapped area, whereas moving the fibers toward the surface decreases the size of the overlapped area. *Id.* at 12:64–13:2. “If the fiber optics are held too close to the surface, the circular areas will no longer intersect and no light emitted from the source fiber optic will be received by the receiver fiber optic.” *Id.* at 13:2–5.

The ’541 patent states the following about the interplay of received light intensity and the size of the overlapped area:

[T]he intensity of the light in the circular area illuminated by the source fiber increases as the fiber is lowered to the surface. The intersection of the two cones, however, decreases as the fiber optic pair is lowered. Thus, as the fiber optic pair is lowered to a surface, the total intensity of light received by the receiver fiber optic increases to a maximal value, and then decreases sharply as the fiber optic pair is lowered still further to the surface. Eventually, the intensity will decrease essentially to zero (assuming the object being measured is not translucent, as described more fully herein), and will remain essentially zero until the fiber optic pair is in contact with the surface. Thus, as a source-receiver pair of fiber optics as described above are positioned near a surface and as their height is varied, the intensity of light received by the receiver fiber optic reaches a maximal value at a peaking or “critical height” h_c .

Id. at 13:6–21. These relationships are further described with reference to Figures 5A and 5B, which are reproduced below.

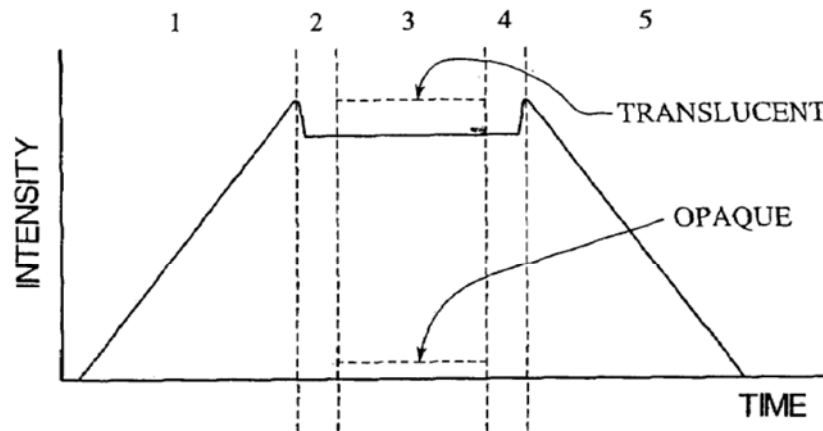


FIG. 5A

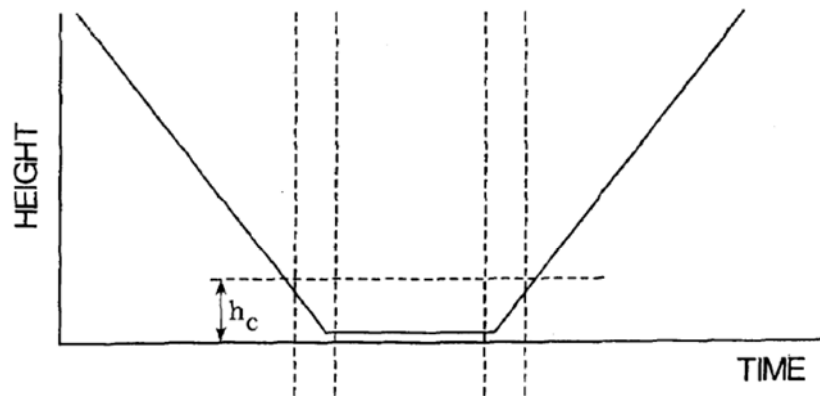


FIG. 5B

In a scenario where a fiber optic source-receiver pair is moved down to and away from a surface, Figure 5A illustrates the intensity of received light as a function of time, whereas Figure 5B illustrates the height of the fiber optic pair from the surface of the object being measured. *Id.* at 13:58–63. The '541 patent describes this scenario as follows:

In region 1, the probe is moved towards the surface of the object being measured, which causes the received light intensity to increase. In region 2, the probe is moved past the critical height [h_c], and the received light intensity peaks and then falls off sharply. In region 3, the probe essentially is in contact with the surface of the object being measured. As illustrated, the received

intensity in region 3 will vary depending upon the translucence of the object being measured. If the object is opaque, the received light intensity will be very low, or almost zero (perhaps out of range of the sensing circuitry). If the object is translucent, however, the light intensity will be quite high, but in general should be less than the peak value. In region 4, the probe is lifted and the light intensity rises sharply to a maximum value. In region 5, the probe is lifted further away from the object, and the light intensity decreases again.

Id. at 14:10–25.

C. Illustrative Claim

Claim 1 is independent. Claims 3 and 11 depend from claim 1.

Claim 1 is illustrative of the challenged claims and recites:

1. A method for determining optical characteristics of an object, comprising the steps of:

providing light to the object from one or more light sources, and receiving light from the object through one or more light receivers, wherein the one or more light sources and one or more light receivers define at least one minimal height, wherein below the minimal height light that is reflected from a surface of the object is not propagated by the one or more light receivers, wherein the light is provided to the object and received from the object through a protective barrier having a thickness, wherein the thickness is less than the minimal height;

measuring the intensity of light received and propagated by one of the one or more light receivers;

determining the optical characteristics of the object based in response to one or more intensity measurements.

Id. at 27:42–57.

D. Prior Art

Petitioner relies on the following prior art:

U.S. Patent No. 4,653,905 to Farrar et al., filed Aug. 21, 1985, issued Mar. 31, 1987 (Ex. 1004, “Farrar”);

U.S. Patent No. 5,402,508 to O’Rourke et al., filed May 4, 1993, issued Mar. 28, 1995 (Ex. 1005, “O’Rourke”);

Japanese Patent Application Publication No. H01-276028, published Nov. 6, 1989 (Ex. 1006, “JP ’028”); and

U.S. Patent No. 4,515,275 to Mills et al., filed Sept. 30, 1982, issued May 7, 1985 (Ex. 1007, “Mills”).

E. The Asserted Grounds

Petitioner challenges claims 1, 3, and 11 of the ’541 patent on the following grounds (Pet. 3):

Reference(s)	Basis	Claims Challenged
Farrar and O’Rourke	35 U.S.C. § 103(a)	1, 3, and 11
JP ’028	35 U.S.C. § 103(a)	1, 3, and 11
Mills	35 U.S.C. § 103(a)	1, 3, and 11

F. Claim Interpretation

The Board interprets claims of unexpired patents using the “broadest reasonable construction in light of the specification of the patent in which [they] appear[.]” 37 C.F.R. § 42.100(b); *see Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016). Both parties agree, however, that the ’541 patent has expired. *See* Pet. 8; Prelim. Resp. 11. Accordingly, our interpretation of the claims is similar to that of a district court. *See* 37 C.F.R. § 42.100(b); *In re Rambus Inc.*, 694 F.3d 42, 46 (Fed. Cir. 2012).

Under the standard applied by district courts, claim terms are generally given their plain and ordinary meaning as would be understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc). “There are only two exceptions to this general rule: 1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of a claim term either in the specification or during prosecution.” *Thorner v. Sony Computer Entm’t Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012). We apply the district court standard to the claims of the expired ’541 patent.

II. ANALYSIS

We now consider Petitioner’s asserted grounds and Patent Owner’s arguments in its Preliminary Response to determine whether Petitioner has met the “reasonable likelihood” threshold standard for institution under 35 U.S.C. § 314(a). Our determination turns on Petitioner’s failure to proffer a construction of the following “minimal height” limitation in claim 1: “wherein the one or more light sources and one or more light receivers define at least one minimal height, wherein below the minimal height light that is reflected from a surface of the object is not propagated by the one or more light receivers.”

In its Petition, Petitioner was required to “[p]rovide a statement of the precise relief requested for each claim challenged” including an identification of “[h]ow the challenged claim is to be construed” and “[h]ow the construed claim is unpatentable” under the asserted grounds of

unpatentability.² 37 C.F.R. § 42.104(b)(3)–(b)(4). Notwithstanding, Petitioner contends “the Board need not consider any claim terms for purposes of [unpatentability].” Pet. 8. Patent Owner cites the district court’s conclusion in the underlying litigation that “no construction was necessary for ‘minimal height,’ and that the term is ‘defined by the surrounding claim language.’” Prelim. Resp. 12 (quoting Ex. 2001, 28–31). Patent Owner agrees with this conclusion and contends that “no further construction is necessary.”³ *Id.*

According to the “minimal height” limitation in claim 1, the one or more light sources and the one or more light receivers define the minimal height. The minimal height is where “light that is reflected from a surface of the object is not propagated by the . . . light receiver[.]” We cannot discern from the Petition whether Petitioner reads the claim as requiring *absolutely zero* light propagation or *essentially zero* light propagation. Regarding the former case, the Specification does not support a reading where absolutely zero light is propagated. As shown in Figure 5A, region 3 is where the probe is moved to be “essentially in contact with the surface of the object being measured.” Ex. 1001, 14:14–16. If the object being measured is

² We do not hold that a petitioner must proffer constructions for every word in a patent claim and, in effect, produce a glossary. In this case, however, the literal language of a key term of the challenged claims is potentially at odds with the ’541 patent’s written description, as we explain below. Petitioner’s application of this term to the prior art provides no clarity as to how Petitioner reads this term or how it supports such a reading. Rule 42.104(b) puts the onus on Petitioner to address this type of situation in the Petition or risk failure to meet its burden under 35 U.S.C. § 314(a).

³ We observe that Patent Owner is not required to proffer claim constructions in its Preliminary Response. See 37 C.F.R. § 42.107.

translucent, “the light intensity will be *quite high*.” *Id.* at 14:20–21 (emphasis added). And, even in the case where an opaque object is being observed, the intensity shown in Figure 5A is still nonzero. *See id.* at Fig. 5A. This situation also is described in the Specification as “the received light intensity will be *very low*, or *almost zero*,” or, alternatively, the intensity “decrease[s] *essentially* to zero” and “remain[s] *essentially* zero.”⁴ *Id.* at 13:13–17, 14:19–21 (emphases added). As such, the Specification does not describe a minimal height below which *absolutely zero* light is propagated by the receiving fiber optic.

We now consider a construction of the “minimal height” limitation where *essentially zero* light is propagated by the receiving fiber optic. As shown above, the notion of essentially zero light being propagated is supported by the very small intensity of light received from an opaque object in region 3 of Figure 5A. Nevertheless, the language of claim 1 does not include a qualifier like *essentially* or *substantially* to describe the amount of light that is not propagated. And, even if we were to construe the “minimal height” limitation as being associated with *essentially zero* light, then the

⁴ With reference to Figures 4A–4C, the Specification describes “certain principles underlying” the use of fiber optics, including the concepts of an emission cone and a reception cone. Ex. 1001, 11:62–12:4, 12:29–30, 12:56–60. This description states that, “[i]f the fiber optics are held too close to the surface, the circular areas will no longer intersect and no light emitted from the source fiber optic will be received by the receiver fiber optic.” *Id.* at 13:2–5. Yet this hypothetical scenario is not “bound by theory,” and it expressly states that only light emitted from the source fiber optic is not received. *Id.* at 12:1–4, 13:2–5. In contrast, claim 1’s light that is not propagated is not limited to “light emitted from the source fiber optic.” As such, this description does not further clarify the “minimal height” limitation.

determination of the minimal height would become impossible; Petitioner does not identify an objective standard by which an ordinarily skilled artisan would judge when the intensity of light propagated was low enough to constitute the minimal height. *See Liberty Ammunition, Inc. v. United States*, 835 F.3d 1388, 1395–96 (Fed. Cir. 2016) (explaining that “[t]erms of degree are problematic if their baseline is unclear to those of ordinary skill in the art,” i.e., if they fail to provide a “standard” or “objective boundar[y] for those of skill in the art when read in light of the specification and prosecution history”) (internal citations and quotations omitted).

The problems arising from Petitioner’s failure to propound a construction are further evidenced by Petitioner’s inconsistent mapping of elements from the prior art to the “minimal height” limitation of claim 1. For the JP ’028 ground, Petitioner’s analysis for this limitation relies on an *essentially zero* construction. *See* Pet. 31 (“When the surface of object 40 is at a distance less than L (a first ‘minimal height’), *at least some light* emitted by from light source 1 along optical path 43 and reflected off object 40 *is not received* by the sensor 12 in sample monitor 7 via optical fiber 53.” (emphasis added)). For the other two grounds, Petitioner’s analysis appears to rely on an *absolutely zero* construction. *See* Pet. 16 (alleging an ordinarily skilled artisan would have understood from Farrar and O’Rourke that, below a certain height, “light from Farrar’s light transmitting fiber 26 reflected off object surface 13 *is not received or carried* by light receiving fiber 15.” (emphasis added)), 46 (alleging that, below a certain height, “light from [Mills’s] lamp 56 . . . *will not be reflected off the upper fruit surface or received and propagated* by the cylindrical housing to diodes D0-D15.” (emphasis added)).

Another claim construction issue Petitioner leaves unaddressed regarding the “minimal height” limitation is whether or not the “light that is reflected from a surface of the object” must be provided by a particular “light source[]” in claim 1. We observe that the plain meaning of “light that is reflected” does not appear to be limited to light coming from any particular source, and could include all light sources, including ambient light, for example.⁵ Such a broad construction of “light that is reflected” is supported by the Specification insofar as there is at least some light being detected in region 3 of Figure 5A, as discussed above. Yet the analysis for each of the three asserted obviousness grounds ties the “light that . . . is not propagated” to light emanating from only one particular light source, which further clouds a proper construction of the “minimal height” limitation. *See id.* at 16 (analysis tied to “light from [Farrar’s] light transmitting fiber 26”), 31 (analysis tied to “light emitted by . . . [JP ’028’s] light source 1”), 46 (analysis tied to “light from [Mills’s] lamp 56”).

For these reasons, Petitioner has neither complied with 37 C.F.R. § 42.104(b)(3) nor adequately proffered the “minimal height” limitation for construction in this proceeding. Moreover, Petitioner’s inconsistent treatment of the “minimal height” limitation in its analysis of the asserted grounds compounds this deficiency and contravenes Petitioner’s requirement to explain how the cited references teach or suggest the properly construed claim language. *See* 37 C.F.R. § 42.104(b)(4). For these reasons, and

⁵ We observe that claim 1 expressly recites “one or more light sources,” which supports the notion that ambient light (i.e., light from at least one other “light source”) could be part of the “light that is reflected from a surface of the object [that] is not propagated.”

because the “minimal height” limitation appears in all of the challenged claims, we determine Petitioner has not demonstrated a reasonable likelihood that it will prevail with respect to any of the claims.

III. CONCLUSION

Petitioner has not demonstrated a reasonable likelihood of prevailing with respect to at least one claim of the '541 patent challenged in the Petition. Therefore, we do not institute an *inter partes* review as to any of the challenged claims.

IV. ORDER

Accordingly, it is:

ORDERED that the Petition is denied as to all challenged claims of the '541 patent.

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