

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD., SAMSUNG ELECTRONICS
AMERICA, INC., FOSSIL GROUP, INC., FOSSIL STORES I, INC., FOSSIL
PARTNERS, L.P., OURA HEALTH OY, AND ONEPLUS TECHNOLOGY
(SHENZHEN) CO., LTD.,

Petitioners,

v.

OMNI MEDSCI, INC.,
Patent Owner.

U.S. Patent No. 9,651,533

Case No. IPR2025-01250

PATENT OWNER'S PRELIMINARY RESPONSE

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LISTING OF EXHIBITS

Exhibit No.	Description
2001	Complaint, <i>Omni MedSci, Inc. v. Samsung Electronics Co. Ltd. et al.</i> , 2:24-cv-01070-JRG-RSP (E.D. Tex.) (Dec. 20, 2024)
2002	Samsung, Fossil, and Oura's Invalidity Contentions Cover Document and Charts for the '533 Patent, <i>Omni MedSci, Inc. v. Samsung Electronics Co. Ltd. et al.</i> , 2:24-cv-01070-JRG-RSP (E.D. Tex.) (June 3, 2025)
2003	OnePlus's Invalidity Contentions Cover Document and Charts for the '533 Patent, <i>Omni MedSci, Inc. v. Samsung Electronics Co. Ltd. et al.</i> , 2:24-cv-01070-JRG-RSP (E.D. Tex.) (Sept. 30, 2025)
2004	Omni MedSci's Infringement Contentions Cover Document, <i>Omni MedSci, Inc. v. Samsung Electronics Co. Ltd. et al.</i> , 2:24-cv-01070-JRG-RSP (E.D. Tex.) (Mar. 12, 2025)
2005	Samsung, Fossil, and Oura's Motion to Stay, <i>Omni MedSci, Inc. v. Samsung Electronics Co. Ltd. et al.</i> , 2:24-cv-01070-JRG-RSP (E.D. Tex.) (Aug. 27, 2025)
2006	Order Denying Motion to Stay, <i>Omni MedSci, Inc. v. Samsung Electronics Co. Ltd. et al.</i> , 2:24-cv-01070-JRG-RSP (E.D. Tex.) (Aug. 29, 2025)
2007	Docket Navigator Statistics for District Judge James Rodney Gilstrap
2008	Lex Machina Statistics for District Judge James Rodney Gilstrap
2009	Model Order Focusing Patent Claims and Prior Art to Reduce Costs (E.D. Tex.)
2010	U.S. Patent No. 12,013,725

2011	Information Disclosure Statement for U.S. Patent No. 12,013,725 (Mar. 5, 2024)
2012	<i>Apple Inc. v. Omni MedSci, Inc.</i> , IPR2019-00913, Paper 14 (PTAB Oct. 16, 2019)
2013	<i>Samsung Elecs. Co., Ltd. v. Headwater Rsch. LLC</i> , IPR2025-00482, Paper 13 (PTAB May 28, 2025)
2014	Complaint, <i>Omni MedSci, Inc. v. Apple Inc.</i> , 2:18-cv-00134 (E.D. Tex.) (Apr. 6, 2018)
2015-2030	Reserved
2031	Declaration of Prof. Igor Efimov, Ph.D
2032	<i>Curriculum vitae</i> of Prof. Igor Efimov, Ph.D
2033	Omni MedSci Inc.'s P.R. 4-2 Disclosure of Preliminary Claim Constructions and Extrinsic Evidence
2034	Samsung Electronics, Co. Ltd., Samsung Electronics America, Inc., Fossil Group, Inc., Fossil Stores I, Inc., and Fossil Partners, L.P., and Oura Health Oy's P.R. 4-2 Disclosure of Preliminary Claim Constructions and Extrinsic Evidence

Omni MedSci, Inc. ("Patent Owner") submits this Preliminary Response under 37 C.F.R. § 42.107 to the Petition for *Inter Partes* Review ("Petition") of U.S. Patent No. 9,651,533 ("the '533 Patent"), filed by Samsung Electronics Co. Ltd., Samsung Electronics America Inc., Fossil Group, Inc., Fossil Stores I, Inc., Fossil Partners, L.P., Oura Health Oy, and OnePlus Technology (Shenzhen) Co., Ltd. ("Petitioners").

I. INTRODUCTION

Patent Owner respectfully requests that the Director deny institution because Petitioners have not shown that any challenged claim of the '533 Patent is unpatentable in relation to any ground raised in the Petition.

In Ground 1, Petitioners argue that claims 6, 12, and 14 of the '533 Patent are obvious over Lisogurski, but Petitioners failed to meet their burden because Lisogurski does not disclose certain limitations in these claims. For claims 6 and 14, Petitioners failed to show that Lisogurski expressly or inherently discloses a bandwidth between 20 nm to 40 nm, nor did they show that Lisogurski renders such a bandwidth obvious. For claim 12, Lisogurski does not disclose that an output signal is generated in part by comparing signals. The alleged "processed signal" in Lisogurski that Petitioners rely on to meet the "output signal" limitation is not generated by comparing signals as required in claim 12. To the extent Lisogurski performs the claimed comparison, this happens after the alleged "processed signal"

was already generated.

In Ground 2, Petitioners argue that claims 6, 11-12, 14, and 18 of the '533 Patent are obvious over Lisogurski in view of Carlson. Petitioners failed to meet because Lisogurski does not disclose certain limitations, as explained above, and Petitioners do not rely on Carlson to supply those limitations. Petitioners also fail to meet their burden for Ground 2 because their alleged motivation to combine is conclusory: Lisogurski already discloses solutions for the problems it describes, which Carlson does not, because Carlson describes solutions for problems different from those described in Lisogurski.

In Ground 3, Petitioners argue that claims 6 and 14 of the '533 Patent are obvious over Lisogurski in view of Tam. Petitioners failed to meet their burden because Tam does not support Petitioners' motivation to combine and because a person of skill in the art would not be motivated to combine Tam with Lisogurski.

In Ground 4, Petitioners argue that claims 6 and 14 of the '533 Patent are obvious over Lisogurski in view of Carlson and in further view of Tam. Petitioners failed to meet their burden because, as explained above, Tam does not support Petitioners' motivation to combine and a person of skill in the art would not be motivated to combine Tam with Lisogurski. Also, Petitioners do not rely on Carlson to supply any claim limitations.

II. OVERVIEW OF THE '533 PATENT

The '533 Patent discloses systems for non-invasive physiological measurements. EX1001, 8:29-34, 3:66-4:32; EX2031, ¶54. The '533 Patent describes using spectroscopy to inspect a bodily sample “by comparing different features, such as wavelength (or frequency), spatial location, transmission, absorption, reflectivity, scattering, fluorescence, refractive index, or opacity.” EX1001, 8:29-34; EX2031, ¶54.

An exemplary physiological measurement system is depicted in Figure 24:

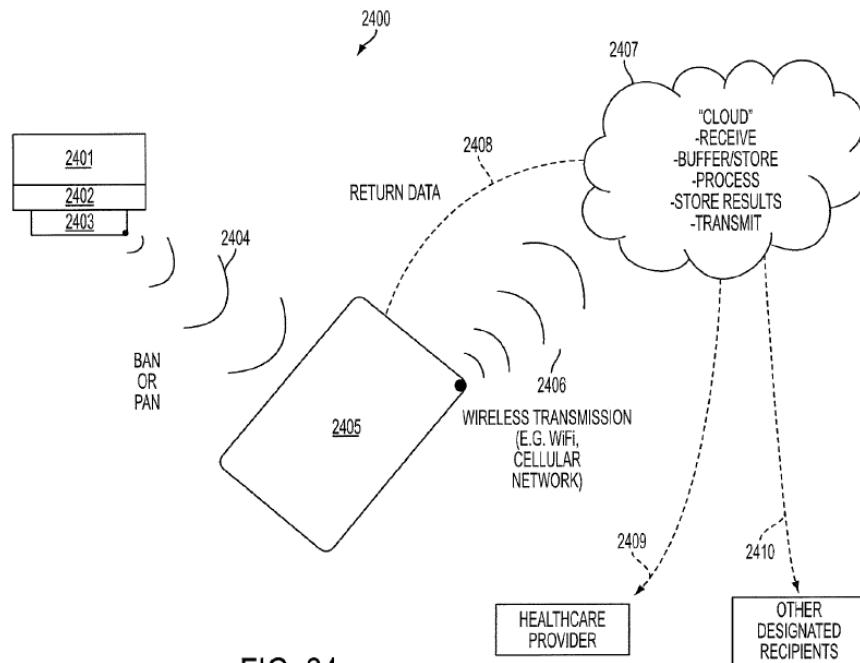


FIG. 24

EX1001, FIG. 24

EX2031, ¶55. The system includes a wearable measurement device 2401, a personal device 2405, and a cloud server 2407. EX1001, 26:49-27:20; EX2031, ¶55.

The wearable measurement device includes a light source which includes light emitting diodes (“LEDs”) that emit light of particular wavelengths and a detection system for detecting the light. EX1001, 19:23-30, 10:18-22; EX2031, ¶56. The specification teaches that there are at least two types of LEDs: (1) those that “emit a wavelength band that is ... between about 20 nm to 40 nm” and (2) “so-called super-luminescent LEDs that may even emit over a much wider wavelength range.” EX1001, 20:2-9; EX2031, ¶56.

Additionally, filters may be used in front of one or more detectors in the detection system to select the wavelengths of light to be detected. EX1001, 17:50-54; EX2031, ¶56. The detection system generates a signal in response to the detected light, which may be generated by comparing signals at different wavelengths of light. EX1001, 5:18-21, 8:29-34; EX2031, ¶56. The signal-to-noise ratio of the signal may be improved by the wearable measurement device via the various techniques disclosed in the '533 Patent. EX1001, 16:54-17:6; EX2031, ¶56. This results in an improvement of the accuracy of the physiological measurements, despite interference from spectral artifacts. EX1001, 3:59-4:32; EX2031, ¶56.

III. LEVEL OF SKILL IN THE ART

Petitioners propose the following definition for a POSITA in relation to the '533 Patent:

on or before the claimed priority date of 12/31/2012, a person of ordinary skill in the art (“POSITA”) “would have [had] a good working knowledge of optical sensing techniques and their applications, and familiarity with optical system design and signal processing techniques.” ... A POSITA would have obtained such knowledge through “an undergraduate education in engineering (electrical, mechanical, biomedical, or optical) or a related field of study, along with relevant experience studying or developing physiological monitoring devices...in industry or academia.”

Pet., 15-16. For purposes of this Preliminary Response, Patent Owner adopts Petitioners’ proposed level of skill in the art. EX2031, ¶51-52.

IV. SUMMARY OF REFERENCES IN THE PETITION

Petitioners challenge claims 6, 11, 12, 14, and 18 of the ’533 Patent as allegedly obvious in Grounds 1-4, which involve various combinations of the following references: Lisogurski, Carlson, and Tam. Pet., 6-7.

A. Lisogurski (EX1025) (Grounds 1-4)

Lisogurski describes a non-invasive system for measuring parameters related to a subject’s blood. EX1025, 3:61-4:5; EX2031, ¶80. The system is illustrated in Figures 3 and 1:

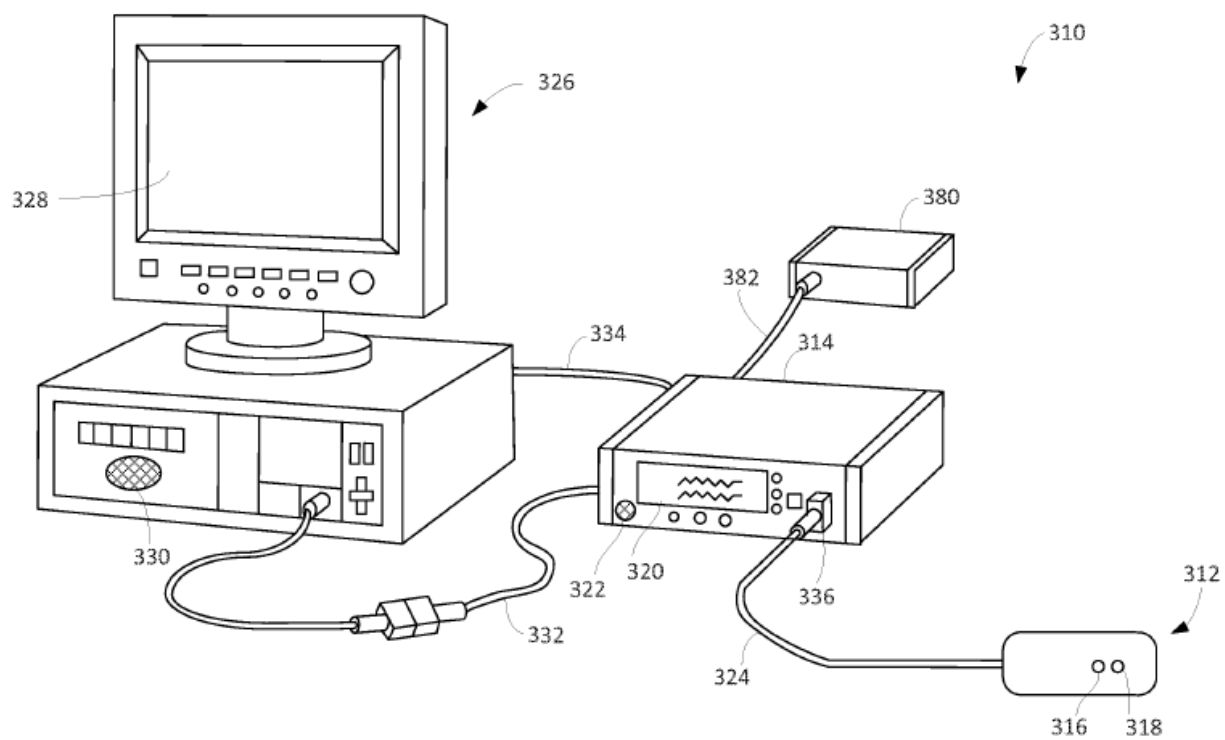


FIG. 3

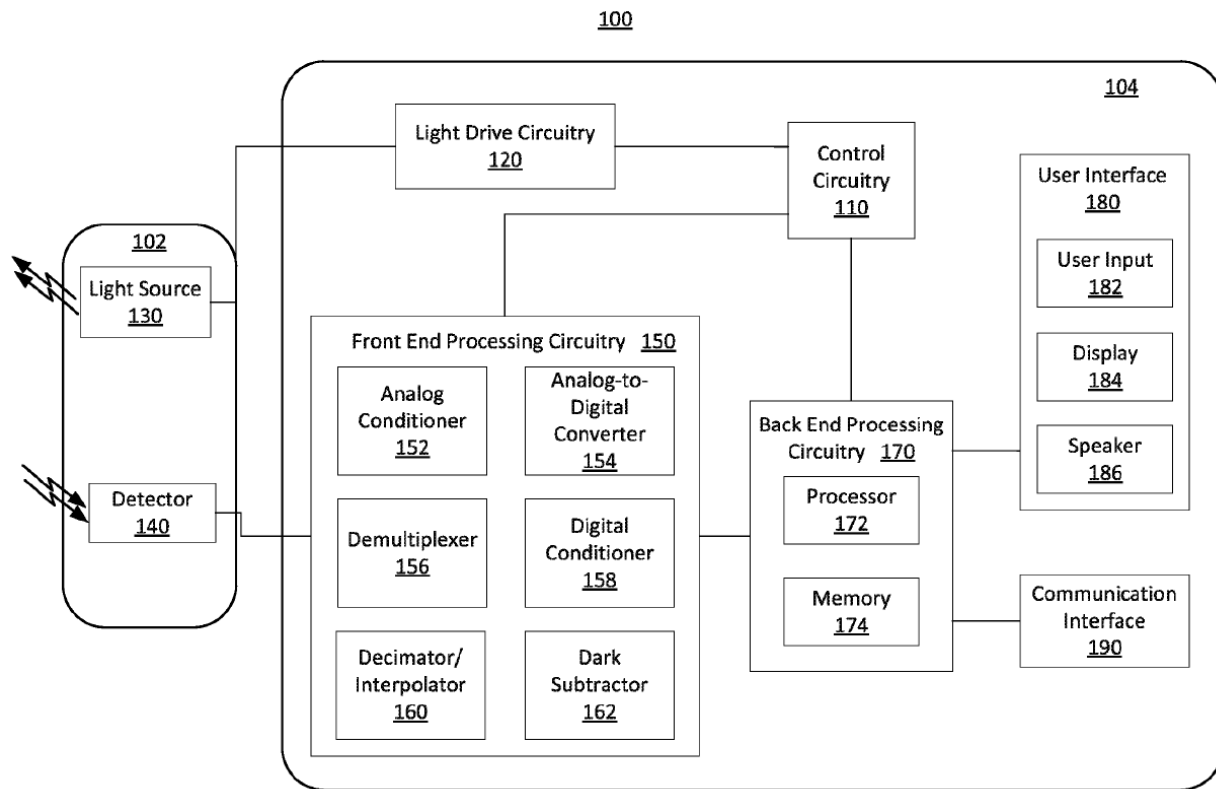


FIG. 1

EX1025, FIGS. 3, 1; EX2031, ¶80. A subject wears sensor unit 312, while the other components in the system are included for system calibration, data processing, and displaying information. EX1025, 17:54-18:15, 18:32-67; EX2031, ¶80. The sensor unit 312 includes light emitting diodes for directing light of different wavelengths to the subject's tissue and a detector that detects the light reflected from the tissue and converts it into an electrical signal. EX1025, 4:42-62, 10:48-64; EX2031, ¶80. Front end processing circuitry 150 processes that signal. EX1025, 12:42-49; EX2031, ¶80. Then, "[p]rocessor 172 may receive and process physiological signals received from front end processing circuitry 150. For example, processor 172 may determine one

or more physiological parameters based on the received physiological signals.”

EX1025, 14:60-64; EX2031, ¶80. The system compares the signals to determine parameters such as blood oxygen saturation. EX1025, 24:58-25:5; EX2031, ¶80.

B. Carlson (EX1028) (Grounds 2 and 4)

Carlson describes a non-invasive optical pulse oximeter. EX1028, ¶[0002]; EX2031, ¶81. The oximeter is designed to be clipped onto a user's ear. EX1028, ¶¶[0048]-[0049]; EX2031, ¶81. This is illustrated in Figures 1 and 2:

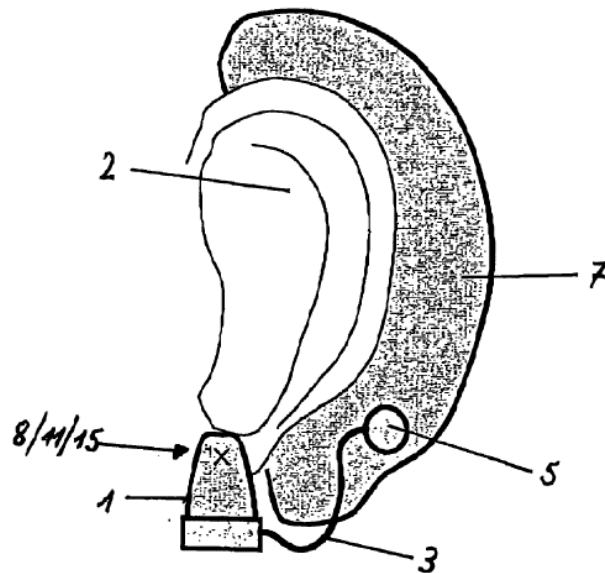


Figure 1

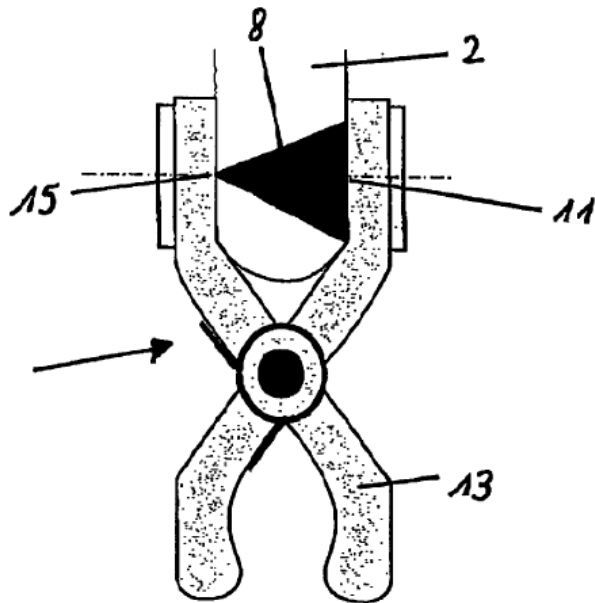


Figure 2

EX1028, FIGS. 1-2; EX2031, ¶81. The oximeter relies on various techniques, including beam shaping optical elements, for improving the signal-to-noise ratio and signal-to-background ratio of the signal generated by its photo detecting element when it detects light that has been reflected from bodily tissue. EX1028, ¶¶[0010],

[0013]-[0014], [0062]; EX2031, ¶81. Carlson also relies on “optical wavelength filters” which filter the light detected by the photo detecting element to a particular range of wavelengths before it is detected by the photo detecting element. EX1028, ¶¶[0026], [0062]; EX2031, ¶81.

C. Tam (EX1030) (Grounds 3 and 4)

Tam describes a co-oximeter which includes LEDs emitting light directed to a blood sample in order to measure and analyze its hemoglobin derivatives. EX1030, 1:48-65; EX2031, ¶82. The LEDs emit light with bandwidths between 7 to 100 nm. EX1030, 13:45-52; EX2031, ¶82. The light travels through the blood sample and is absorbed by photodetectors for analysis. EX1030, 13:2-5; EX2031, ¶82. The co-oximeter's processor then analyzes the detected light to determine information about the blood sample. EX1030, 11:22-41; EX2031, ¶82.

V. CLAIM CONSTRUCTION

Petitioners note that certain terms in the '533 Patent have been construed in prior Board or district court proceedings but otherwise contend that the remaining terms or phrases in the challenged claims of the '533 Patent do not require construction and can be afforded their plain and ordinary meanings. Pet., 16-18. Petitioners also state that they do not believe that the terms from the prior Board or district court proceedings need to be construed here. *Id.* at 16-17.

Patent Owner agrees that claim construction is not necessary at this time for

the Board to find that Petitioners did not meet their burden for institution. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). Patent Owner reserves the right to seek constructions in litigation or if institution is granted, and to further respond to any constructions that Petitioners propose.

A. The Petition Does Not Comply with the Board's Claim Construction Rules

The Board's rules require that the petition sets forth "[h]ow the challenged claim is to be construed." 37 C.F.R. § 42.104(b)(3). "[W]hen a petitioner takes alternative positions before the Board and a district court, that petitioner should, at a minimum, explain why alternative position are warranted." *Revvo Techs., Inc. v. Cerebrum Sensor Techs., Inc.*, IPR2025-00632, Paper 20 at 3-4 (PTAB Nov. 3, 2025) (precedential). This rule "ensure[s] that the Board correctly construes claim terms and to minimize inconsistency in claim construction between forums." *Id.* at 4. In this case, Petitioners' claim construction positions in the Petition and the Texas Case are inconsistent in at least two material respects, which warrants denial of the Petition.

First, Petitioners acknowledge that "[i]n the Texas Case, Defendants identified certain limitations of the '533 [Patent] as potentially indefinite." Pet., 16 n.4 (citing EX1023, 230-231). Specifically, Petitioners assert that the following

terms or phrases are indefinite in district court:

- “the light emitting diodes configured to generate an output optical beam with one or more optical wavelengths” (claim 5);
- “the processed output signal” (claim 5);
- “one of more detectors” (claim 11);
- “to select a fraction of the one or more optical wavelengths” (claim 11).

EX1023, 231. Despite this, Petitioners apply the plain and ordinary meaning for each of these terms in the Petition. Pet., 16-18.

Petitioners' only explanation for it taking inconsistent positions in the Petition and the district court is that “the prior art discloses and renders obvious the indisputable scope of these limitations.” Pet., 16 n.4 (citing EX1003, ¶¶68-69, 117-18, 132-133, 189-90). Dr. Anthony similarly fails to explain the inconsistency and merely repeats the same conclusory assertions from the Petition. EX1003, ¶¶68-69, 117-18, 132-133, 189-90. The Board should deny institution because Petitioners fail to justify their inconsistent positions. *Tesla, Inc. v. Intellectual Ventures II LLC*, IPR2025-00340, Paper 18 at 3-5 (PTAB Nov. 5, 2025) (informative) (denying institution where petitioner argued that claim term was indefinite in district court but adopted patent owner's plain and ordinary meaning construction in its petition).

Second, Petitioners take inconsistent positions on the proper constructions for two claim terms in the Petition and the district court, specifically, the term “one or

more filters” in claims 11 and 18 the term “beam” in claim 12. For “one or more filters,” the parties have proposed the following constructions in the Texas Case:

Term/Phrase	Petitioner's Construction	Patent Owner's Construction
one or more filters	one or more physical components or coatings configured in the device to selectively pass light of a particular wavelength or range(s) of wavelengths	Plain and ordinary meaning

EX2033, Appx.A at 3; EX2034, Ex.A at 6. For the term “beam,” the parties have proposed the same construction in the Texas Case: “photons or light transmitted to a particular location in space.” EX2033, Appx.A at 2; EX2034, Ex.A at 1.

In contrast to their positions in the Texas Case, Petitioners propose plain and ordinary meaning for both of these terms for this IPR. Pet., 16-18. Petitioners and Dr. Anthony do not apply their claim construction from the Texas Case in their analysis of the challenged claims. Pet., 16-18; EX1003, ¶¶25-29. Because Petitioners offer no explanation or justification for their inconsistent treatment of these terms in different forums, the Board should deny institution. *Revvo Techs.*, Paper 20 at 3-4.

B. Prior Constructions by the Board

As noted in the Petition, the Board construed the following terms in the prior IPR concerning the '533 Patent:

Term/Phrase	Board's Construction
personal device	a computer or microprocessor-based device having a wireless receiver, a wireless transmitter, a display, a microphone, a speaker, one or more buttons or knobs, a microprocessor, and a touch screen (EX1008, 10)
a light source comprising a plurality of semiconductor sources that are light emitting diodes ... configured to increase signal-to-noise ratio by ... increasing a pulse rate of at least one of the plurality of semiconductor sources	a light source containing two or more light emitting diodes (semiconductor sources), wherein at least one of the light emitting diodes is capable of having its pulse rate increased to increase a signal-to-noise ratio (EX1008, 10-12)

Patent Owner applies these constructions in its analysis below. EX2031, ¶70-72.

VI. PETITIONERS FAILED TO MEET THEIR BURDEN

The Director should deny institution because Petitioners have not met their burden of showing a reasonable likelihood that any claim of the '533 Patent is unpatentable for any of the four grounds in the Petition.

A. Ground 1: Alleged Obviousness Based on Lisogurski (Claims 6, 12, and 14)

In Ground 1, Petitioners argue that claims 6, 12, and 14 of the '533 Patent are obvious over Lisogurski. Pet., 21-45. For at least the reasons discussed below, Petitioners failed to meet their burden.

1. Dependent Claims 6 and 14: Lisogurski Does Not Disclose or Render Obvious a Bandwidth Between 20 nm to 40 nm

Claims 6 and 14 depend on independent claims 5 and 13, respectively, which recite, among other things, “a light source comprising a plurality of semiconductor sources that are light emitting diodes.” EX1001, 29:44-45, 30:11; 30:48-50, 31:21; EX2031, ¶86-87. Claims 6 and 14 further recite: “wherein at least one of the light emitting diodes emits light with a bandwidth between [approximately] 20 nanometers to [approximately] 40 nanometers.” EX1001, 30:11-13, 31:21-24 (the term “approximately” is recited in claim 14, but not claim 6); EX2031, ¶86-87. Petitioners failed to show that this limitation is expressly or inherently disclosed in Lisogurski or rendered obvious in view of Lisogurski alone.

a) Lisogurski Does Not Disclose LEDs with a Bandwidth Between 20 nm to 40 nm

Petitioners argue that “Lisogurski discloses, or at minimum renders obvious, that at least one of its ‘LEDs’ emits light with a bandwidth between 20 nanometers to 40 nanometers.” Pet., 41, 45. Petitioners’ only citation to Lisogurski for this assertion is reproduced in full below:

Sensor 102 of physiological monitoring system 100 may include light source 130 and detector 140. Light source 130 may be configured to emit photonic signals having one or more wavelengths of light (e.g., Red and IR) into a subject's tissue. For example, light source 130 may include a Red light emitting light source and an IR light emitting light source, e.g., Red and IR light emitting diodes (LEDs), for emitting light into the tissue of a subject to generate physiological signals.

EX1025, 10:48-56; *see also* EX1003, ¶142 (citing same).

Lisogurski does not expressly disclose a bandwidth for these LEDs, let alone a bandwidth between 20 nanometers to 40 nanometers as recited in claims 6 and 14 of the '533 Patent. EX1025, 10:48-56; EX2031, ¶91. At most, Lisogurski discloses LEDs that emit light of particular wavelengths—red light and infrared light. EX1025, 10:52-58; EX2031, ¶91. Petitioners offer no explanation for Lisogurski allegedly disclosing an LED with a bandwidth between 20 nm to 40 nm. Pet., 41-42.

A POSITA would understand that a “bandwidth” describes the range of the wavelengths of light that are emitted by the LED. *See, e.g.*, EX1001, 7:44-46, 19:24-35, 20:2-9, 20:36-47; EX2031, ¶92. A larger range of wavelengths (i.e., the difference between the maximum and minimum), leads to a larger bandwidth. *Id.* Lisogurski discloses that “the Red wavelength may be between about 600 nm and about 700 nm and the IR wavelength may be between about 800 nm and about 1000 nm.” *Id.*, 10:52-58; EX2031, ¶91. Based on this description, a POSITA would

understand that the red LED has a bandwidth of about 100 nm (i.e., the difference between 600 nm and 700 nm) and the IR LED has a bandwidth of about 200 nm (i.e., the difference between 800 nm and 1000 nm). EX2031, ¶¶91-92. Both of these values are well outside the claimed range of 20 nm to 40 nm. *Id.*

b) Lisogurski Does Not Inherently Disclose LEDs With a Bandwidth Between 20 nm to 40 nm

The Petition does not contend that Lisogurski inherently discloses LEDs with a bandwidth between 20 nm to 40 nm. Pet., 41-42. The Petition cites to paragraphs 138-143 of the Anthony Declaration, which alleges that Lisogurski inherently discloses this claim limitation. Specifically, Dr. Anthony asserts that “[s]tandard commercial LEDs designed for medical and physiological monitoring applications, such as those described by Lisogurski, *inherently* exhibit these bandwidth characteristics.” EX1003, ¶143. There are three problems with this assertion.

First, this assertion is not in the Petition, so this amounts to an improper incorporation by reference. *Cisco Sys., Inc. v. C-Cation Techs., LLC*, IPR2014-00454, Paper 12 at 9 (PTAB Aug. 29, 2014) (“the practice of citing the Declaration to support conclusory statements that are not otherwise supported in the Petition ... amounts to [improper] incorporation by reference”) (informative); 37 C.F.R. § 42.6(a)(3).

Second, Dr. Anthony cites no evidence for his assertion. EX1003, ¶143.

Accordingly, the Board should afford it no weight. *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15-17 (PTAB Aug. 24, 2022) (precedential) (denying institution because “declaration testimony is conclusory and unsupported, adds little to the conclusory assertion for which it is offered to support, and is entitled to little weight”); 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight”).

Third, Petitioners have not shown that LEDs with a bandwidth between 20 nm and 40 nm are inherently disclosed in Lisogurski. EX2031, ¶94. To establish inherency, Petitioners must show that Lisogurski ***necessarily*** discloses the claimed bandwidth – not that this is merely possible or even probable. *See, e.g., PAR Pharm., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1195–96 (Fed. Cir. 2014) (inherency requires a showing that the limitation is “necessarily present” or “the natural result of the combination of elements explicitly disclosed by” the prior art); *PersonalWeb Techs., LLC v. Apple, Inc.*, 917 F.3d 1376 (Fed. Cir. 2019) (possibilities cannot establish inherency).

As discussed in Section VI.A.1.a, nothing in Lisogurski suggests that its LEDs ***necessarily*** have a bandwidth between 20 nm and 40 nm. EX2031, ¶94. The ’533 Patent teaches that there are at least two types of LEDs: (1) those that “emit a wavelength band that is ... between about 20 nm to 40 nm” and (2) “so-called super-

luminescent LEDs that may even emit over a much wider wavelength range.” EX1001, 20:2-9. Given the wavelength ranges described in Lisogurski, a POSITA would understand that it is at least plausible that Lisogurski's LEDs are super-luminescent LEDs, which do *not* have a bandwidth between 20 nm and 40 nm. EX2031, ¶93.

Petitioners' own evidence shows that Lisogurski's LEDs do not necessarily have a bandwidth within the claimed range. For example, Tam describes “LEDs having bandwidths from about 7 to 100 nm.” EX1030, 13:45-48; EX2031, ¶101. As another example, The Biomedical Engineering Handbook, describes LEDs with a bandwidth up to 50 nm as “typical[,],” which is outside the claimed range. EX1038, 63; EX2031, ¶101. In short, there is no evidence to support Dr. Anthony's assertion that the claimed bandwidth range is inherent in Lisogurski.

c) Lisogurski Does Not Render Obvious a Bandwidth Range of 20 nm to 40 nm

Petitioners also argue that Lisogurski alone “renders obvious” the claimed bandwidth range. Pet., 41. This alternative obviousness theory fails for several reasons.

First, Petitioners argue that its theory “is further supported by the '533 [Patent], which states that ‘LED[s] are solid state components that emit a wavelength band that is of moderate width, typically between about 20 nm to 40 nm.’” Pet., 42

(quoting EX1001, 20:1-11). To the extent Petitioners are relying on the teachings in the '533 Patent as alleged applicant admitted prior art ("AAPA") to fill in the gaps in Lisogurski, this is improper. *See* Memorandum entitled "Enforcement and Non-Waiver of 37 C.F.R. § 42.104(B)(4) and Permissible Uses of General Knowledge in *Inter Partes* Reviews" (Jul. 31, 2025) (explaining that AAPA "may not be used to supply a missing claim limitation"); *see also Qualcomm Inc. v. Apple Inc.*, 24 F.4th 1367, 1373-77 (Fed. Cir 2022); *Qualcomm Inc. v. Apple Inc.*, 134 F.4th 1355, 1364-65 (Fed. Cir. 2025).

Second, Petitioners argue that "[i]t was well known in the art that LEDs typically have bandwidth range of 20 to 40 nm." Pet., 42 (citing EX1030, 9:57-60; EX1071, 2:22-24). However, Petitioners provide zero explanation for why it allegedly would have been obvious to modify Lisogurski to use LEDs with a bandwidth range between 20 nm and 40 nm. *Id.* This conclusory assertion is insufficient. *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1361 (Fed. Cir. 2016) (holding that obviousness theories based on a single reference require "reasoned analysis and evidentiary support"); *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (holding that "obviousness grounds cannot be sustained by mere conclusory statements").

To the extent Petitioners refer the Board to Dr. Anthony's declaration (EX1003, ¶¶142-43) for details on its alternative obviousness theory, this is yet

another improper incorporation by reference that should be disregarded. *Cisco Sys.*, Paper 12 at 9; 37 C.F.R. § 42.6(a)(3). In any event, even if considered, Dr. Anthony's testimony is similarly conclusory. Dr. Anthony asserts that a POSITA would have understood that Lisogurski uses LEDs with a bandwidth range of 20 to 40 nm "to increase compatibility with standard, off-the-shelf LEDs and simplify design and integration process, and reduce overall system complexity and cost." EX1003, ¶142. He also asserts that "[a] person of ordinary skill in the art would also appreciate that using standard LEDs would reduce development risk, simplify procurement, lower system cost, and improve reliability due to well-established and widely accepted specifications and performance criteria." EX1003, ¶143.

Dr. Anthony does not explain why using LEDs with a bandwidth between 20 nm and 40 nm would achieve these purported benefits compared to the LEDs in Lisogurski, which do not have the claimed bandwidth range. EX1003, ¶¶142-43; EX2031, ¶100. Nor does Dr. Anthony explain why a POSITA would select a range between 20 nm and 40 nm when (1) The Biomedical Engineering Handbook (EX1038), states that "commonly available" LEDs "typically" have bandwidths in a range up to 50 nm (EX1038, 63) and (2) Tam describes "LEDs having bandwidths from about 7 to 100 nm" for co-oximeters (EX1030, 13:45-48). EX2031, ¶101.

To the extent a POSITA would have been motivated to reduce costs as Dr. Anthony suggests, a POSITA would not have been motivated to replace Lisogurski's

LEDs with LEDs with a bandwidth between 20 nm and 40 nm. EX2031, ¶97. Tam teaches that “LEDs are available in tighter bandwidths by selection at a premium price.” EX1030, 9:61-62; EX2031, ¶97. A POSITA would have understood that selecting LEDs with a narrower bandwidth (e.g., between 20 nm to 40 nm) over LEDs with a greater bandwidth like the LEDs in Lisogurski (i.e., between 100 nm to 200 nm) would *increase* the system cost. EX2031, ¶97. *Arctic Cat Inc. v. Polaris Indus., Inc.*, 795 F. App’x 827, 833 (Fed. Cir. 2019) (“[t]he Board must weigh the benefits and drawbacks of the modification against each other, to determine whether there would be a motivation to combine”); *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004) (“the prior art as a whole must ‘suggest the desirability’ of the combination”).

2. Dependent Claim 12

Claim 12 depends on independent claim 5, which recites, among other things, “light emitting diodes configured to generate an output optical beam with one or more optical wavelengths” and “a receiver configured ... to generate an output signal.” EX1001, 29:44-50, 29:59-62, 30:42; EX2031, ¶102. Claim 12 further recites: “wherein the output optical beam comprises a plurality of optical wavelengths, and the output signal is generated in part by comparing signals at different optical wavelengths.” EX1001, 30:42-45; EX2031, ¶102.

For claim 12, Petitioners argue that the claimed “output signal” is disclosed

by Lisogurski's "processed signals" and rely on the previous final written decision concerning the '533 Patent. Pet., 43. The term "output signal" is recited in claim 5, which the Board addressed in its prior decision. EX1008, 51; EX2031, ¶104. For that term, the Board stated that "[t]he receiver [of Lisogurski] generates an output signal because front end processing circuitry 150 'receive[s] a detection signal from detector 140 and provide[s] one or more processed signals to back end processing circuitry 170.'" EX1008, 39; EX2031, ¶104. The Board further annotated in gold the "output signal" on a modified version of Figure 1 of Lisogurski:

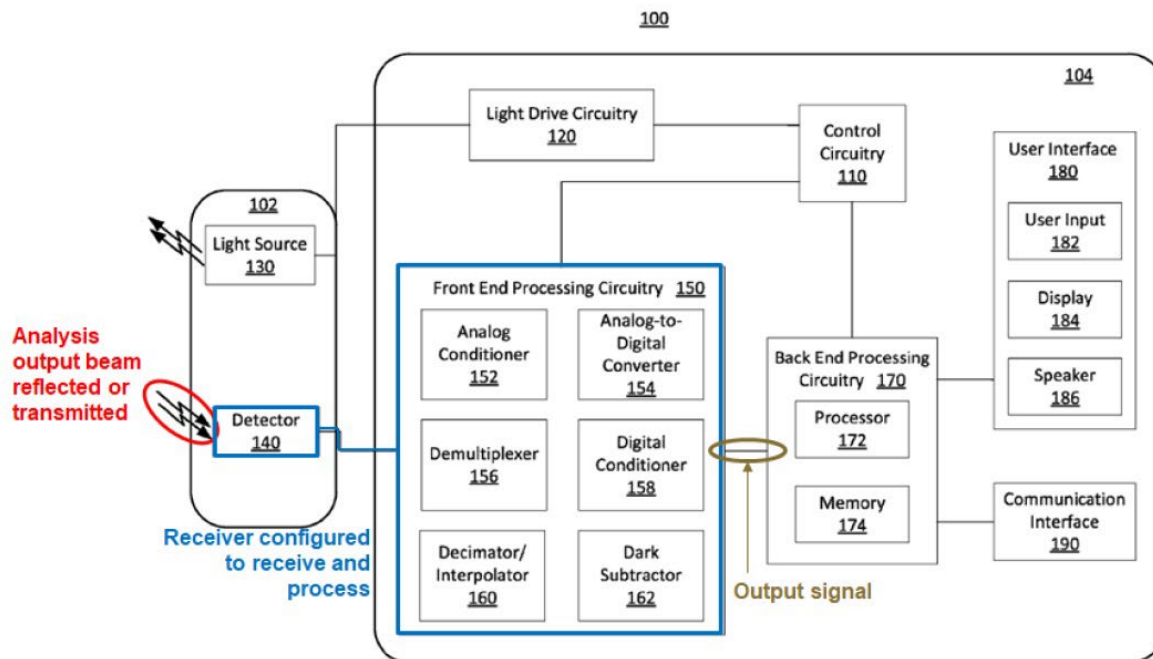


FIG. 1

EX1008, 38 (annotating EX1025, FIG. 1); EX2031, ¶104. The Board found that the "output signal" limitation is disclosed by the "processed signals" of Lisogurski, which are provided by the "front end processing circuitry 150" to the "back end

processing circuitry 170.” EX1008, 38-39; EX2031, ¶104. However, the Board did not address whether the “processed signal” of Lisogurski is “generated in part by comparing signals at different optical wavelengths” as recited in claim 12. EX1008, 38-39; EX2031, ¶104.

To this point, Petitioners argue that the “processed signal” in Lisogurski is “generated in part by comparing signals at different optical wavelengths,” as required in claim 12, based on Lisogurski’s disclosure that “[b]y comparing the intensities of two wavelengths at different points in the pulse cycle, it is possible to estimate the blood oxygen saturation of hemoglobin in arterial blood.” Pet., 43-44. However, Lisogurski does not specify that the comparison of the intensities of two wavelengths is part of generating the output signal. EX1025, 4:42-56; EX2031, ¶106.

Petitioners assert that the processed signals “are generated in part by comparing the intensities of two different wavelengths (e.g., Red and IR) to determine physiological parameters.” Pet., 44 (citing EX1025, 4:42-56, 14:60-62). However, the cited portions of Lisogurski do not support this contention. EX2031, ¶106. For example, Lisogurski states that the “[p]rocessor 172 may receive and process physiological signals received from front end processing circuitry.” EX1025, 14:60-62; EX2031, ¶106. The processor 172 receives the “processed signal” (output signal) *after* it has already been generated by the detector 140 and

front end processing circuitry 150. EX2031, ¶106. This is depicted in the modified version of Figure 1 from Lisogurski, which has been annotated (green) to show the direction the “processed signal” travels in to reach the processor 172:

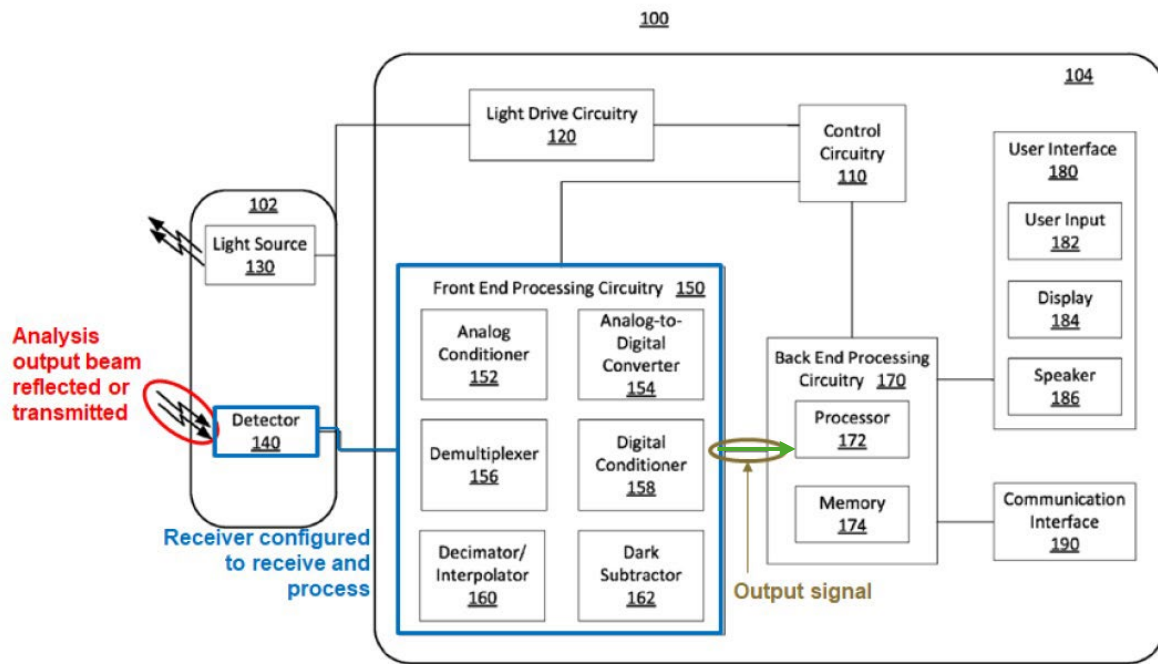


FIG. 1

EX1008, 38 (annotating EX1025, FIG. 1).

Lisogurski “compar[es] the intensities of two wavelengths” in the back end processing circuitry 170, which includes the processor 172. EX1025, 4:48-51; EX2031, ¶107. The “[p]rocessor 172 may receive and process physiological signals received from front end processing circuitry 150. For example, processor 172 may determine one or more physiological parameters based on the received physiological signals.” EX1025, 14:60-64; EX2031, ¶107. One such physiological parameter is “blood oxygen saturation.” EX1025, 1:22-25. Thus, the processor 172 receives

output signals and then compares them to determine blood oxygen saturation. EX1025, FIG. 1, 1:22-25, 14:60-64; EX2031, ¶107.

By contrast, claim 12 requires that the “processed signal” of Lisogurski be “generated in part by comparing signals at different optical wavelengths.” In other words, in the claim, the comparing occurs as part of generating the “processed signal.” EX2031, ¶107. Lisogurski’s “output signals” (i.e., “processed signals”) are not “generated in part by comparing signals at different optical wavelengths.” EX2031, ¶107. Instead, Lisogurski discloses comparing the intensities of two wavelengths *after* output signals have already been generated. EX2031, ¶¶106-07. Because Petitioners identify a comparison that occurs after the alleged “processed signal” is already generated, Petitioners have not shown how Lisogurski’s alleged “processed signal” is generated by comparing signals at different optical wavelengths. *3shape a/s v. Align Tech., Inc.*, IPR2021-01241, Paper 16 at 15-16 (PTAB Jan. 26, 2022) (Petitioner did not show that a reference disclosed a claim element where the temporal relationship between the claim elements as identified in the reference was the reverse of that required by the claim). Accordingly, Petitioners fail to meet their burden for Ground 1 and claim 12 of the ’533 Patent.

B. Ground 2: Alleged Obviousness Based on Lisogurski in view of Carlson (Claims 6, 11-12, 14, and 18)

In Ground 2, Petitioners argue that claims 6, 11-12, 14, and 18 of the ’533

Patent are obvious over Lisogurski in view of Carlson. Pet., 45-62. For at least the reasons discussed below, Petitioners fail to meet their burden.

1. Dependent Claims 6 and 14

Petitioners argue that claims 6 and 14 are rendered obvious by Lisogurski in view of Carlson for the reasons discussed for Ground 1. Pet., 56. Petitioners do not provide any additional explanation for claims 6 and 14 or attempt to rely on Carlson for the “bandwidth” limitation. Pet., 56-57. Accordingly, Petitioners failed to meet their burden for claims 6 and 14 in Ground 2 for at least the same reasons as Ground 1. *Supra*, §VI.A.1; EX2031, ¶110.

2. Dependent Claim 12

Petitioners argue that claim 12 is obvious over Lisogurski in view of Carlson for the reasons discussed for Ground 1. Pet., 56-57, 42-44. Petitioners do not provide any additional explanation, nor do they cite to or discuss Carlson for Ground 2 with respect to claim 12. Pet., 56-57. They also do not discuss any of the limitations exclusive to claim 12 in view of Carlson. Pet., 56-57. Accordingly, Petitioners fail to meet their burden for Ground 2 for at least the same reasons they fail to meet their burden for Ground 1 that Lisogurski alone discloses and renders obvious claim 12. *Supra*, § VI.A.2; EX2031, ¶111.

3. Dependent Claims 11 and 18

Claims 11 and 18 depend on independent claims 5 and 13, respectively, which

recite, among other things, “light emitting diodes configured to generate an output optical beam with one or more optical wavelengths” and “a receiver configured to receive and process at least a portion of the analysis output beam reflected or transmitted from the sample.” EX1001, 29:44-47, 29:56-62, 30:38, 30:50-52, 30:64-67, 32:19; EX2031, ¶¶112-13. Claim 11 and 18 further recite: “wherein the receiver further comprises one or more filters in front of one of more detectors to select a fraction of the one or more optical wavelengths.” EX1001, 30:38-41, 32:19-22; EX2031, ¶¶112-13.

Petitioners argue that “Lisogurski in view of Carlson renders obvious claims 11 and 18.” Pet., 57-62. However, Petitioners’ alleged motivation to combine is problematic for at least the following reasons.

a) Petitioners’ Motivation to Combine Is Conclusory

Petitioners argue that “a POSITA would have been motivated to apply Carlson’s filter teachings to Lisogurski’s wireless sensor to advantageously filter out unwanted background noise and ambient light before they reach the detector(s) in Lisogurski’s sensor.” Pet., 62; *see also id.*, 48, 52-53. This assertion is unsupported. EX2031, ¶¶115-117. While Petitioners cite Dr. Anthony, his declaration is similarly unsupported. Pet., 52-53 (citing EX1003, ¶170); EX2031, ¶117. For example, Dr. Anthony does not support his assertions with evidence from Lisogurski and Carlson or otherwise, including that Lisogurski suffers from “interference from

ambient and stray light” or “detectors measur[ing] ... light ... originating from the environment” or that Carlson’s “filter teachings” would “significantly reduce” such “interference” or “ensure[] that detectors measure primarily relevant and accurately conditioned light.” EX1003, ¶170; EX2031, ¶117. The Board has held that such testimony is entitled to little or no weight. *Xerox Corp.*, Paper 9 at 15-17 (testimony restating “the petitioner’s arguments without any additional supporting evidence or reasoning” is accorded “little weight”); 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight”).

b) Carlson Does Not Address the Problem Described in Lisogurski

Petitioners argue that “Lisogurski and Carlson both recognize the desirability of removing background noise” and that Carlson’s filter allegedly “addresses this problem.” *See* Pet., 52-53 (citing EX1025, 6:7-31, 14:46-55, 12:42-49, 11:9-27; EX1028, ¶¶[0059], [0062], [0063], [0026]). However, contrary to Petitioners’ suggestions, Lisogurski and Carlson concern *different* problems, so the problems described in Lisogurski would not be addressed by Carlson’s filter teachings.

With respect to Carlson, a POSITA would have understood that it describes a desire to *limit* the light received by a detector *to a particular range of wavelengths*, which Carlson accomplishes with a “[wavelength] filter[.]” EX1028, ¶¶[0059],

[0062], [0063] (explaining that a wavelength filter only transmits “light in the range of approximately 660 nm and in the range of approximately 890 nm”); *see also id.* ¶[0038], FIG. 5C; EX2031, ¶119.

With respect to Lisogurski, however, a POSITA would have understood that it describes a desire to *remove background noise* (e.g., based on ambient light) from the detection signal *across a range of wavelengths*, with no discussion regarding limiting the received light to a particular range of wavelengths to begin with, as in Carlson. EX1025, 6:7-31 (“The system may measure the ambient light detected by the detector during the ‘dark’ period and then subtract this ambient contribution from the signals received during the ... ‘on’ periods”—i.e., as further explained at 13:60-14:10, “determine a subtraction amount from the dark signal portion of the detection signal and subtract it from the peak portion of the detection signal ... to reduce the effect of the dark signal on the peak” and “generate adjusted Red and IR signals”), 14:46-55 (reducing the effect of ambient light on the detection signal), 12:42-49, 11:9-27; EX2031, ¶120.

As depicted in the annotated figures below, a POSITA would have understood that Carlson addresses excluding light (blue) outside of a *particular range of wavelengths* (red), whereas Lisogurski addresses adjusting the detected signal *across a range of wavelengths* (red) by removing a portion of the detected signal

attributable to background/ambient noise (green). EX1025, 6:7-31; EX1028, ¶[0062]; EX2031, ¶121.

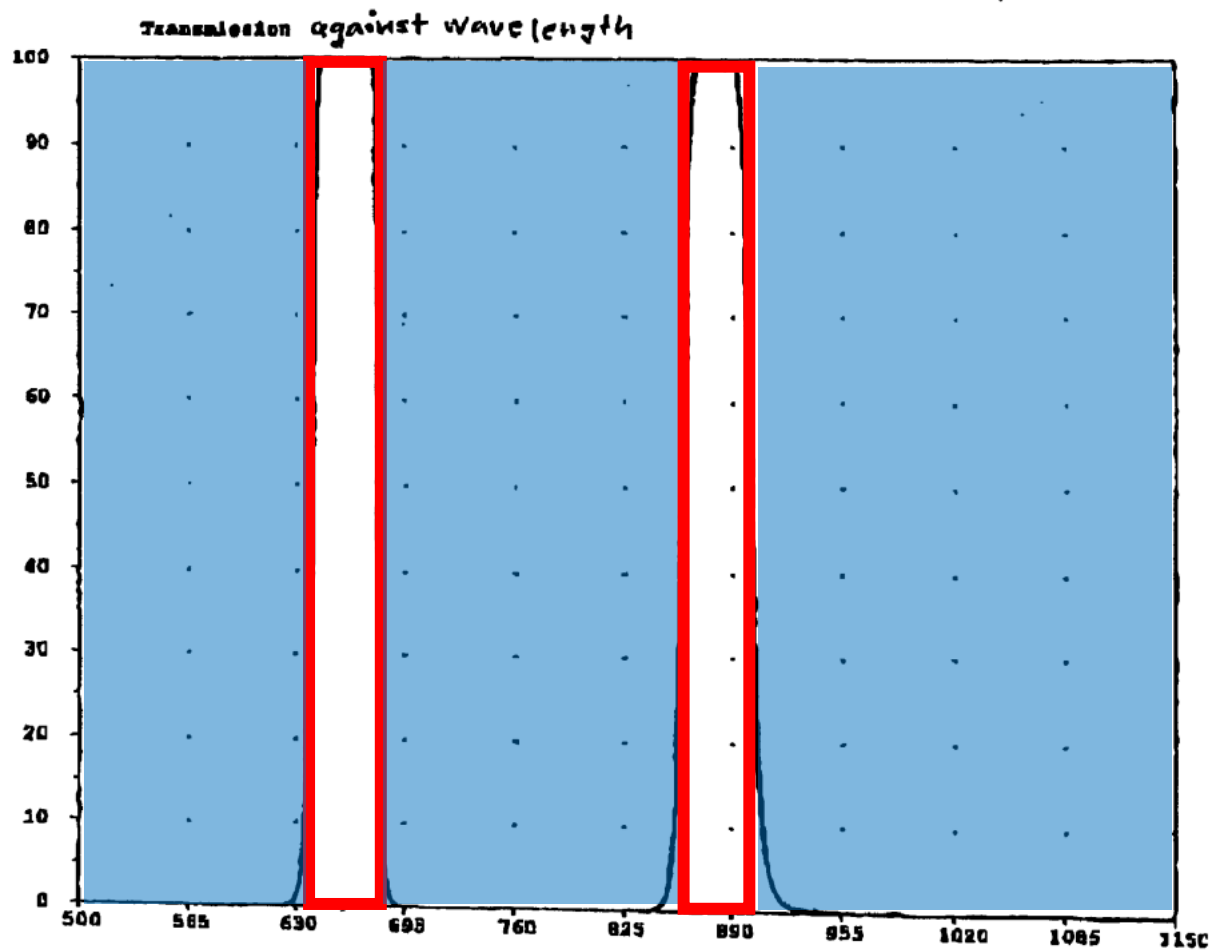


Figure 5c

EX1028, FIG. 5C (annotated); *see* EX1028, ¶¶[0038], [0056].

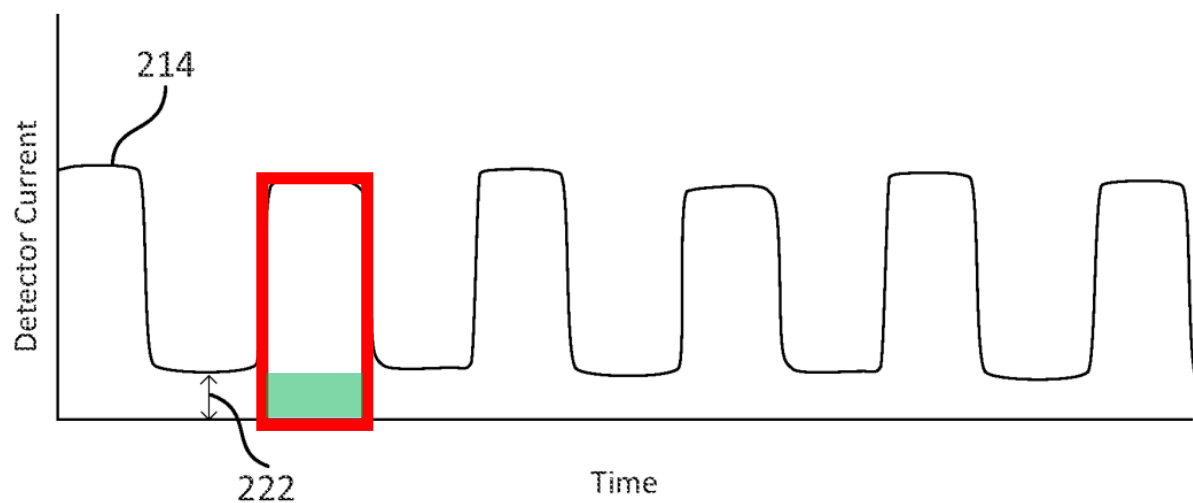


FIG. 2B

EX1025, FIG. 2B (annotated); *see* EX1025, 2:17-19, 12:42-13:6, 13:60-14:10.

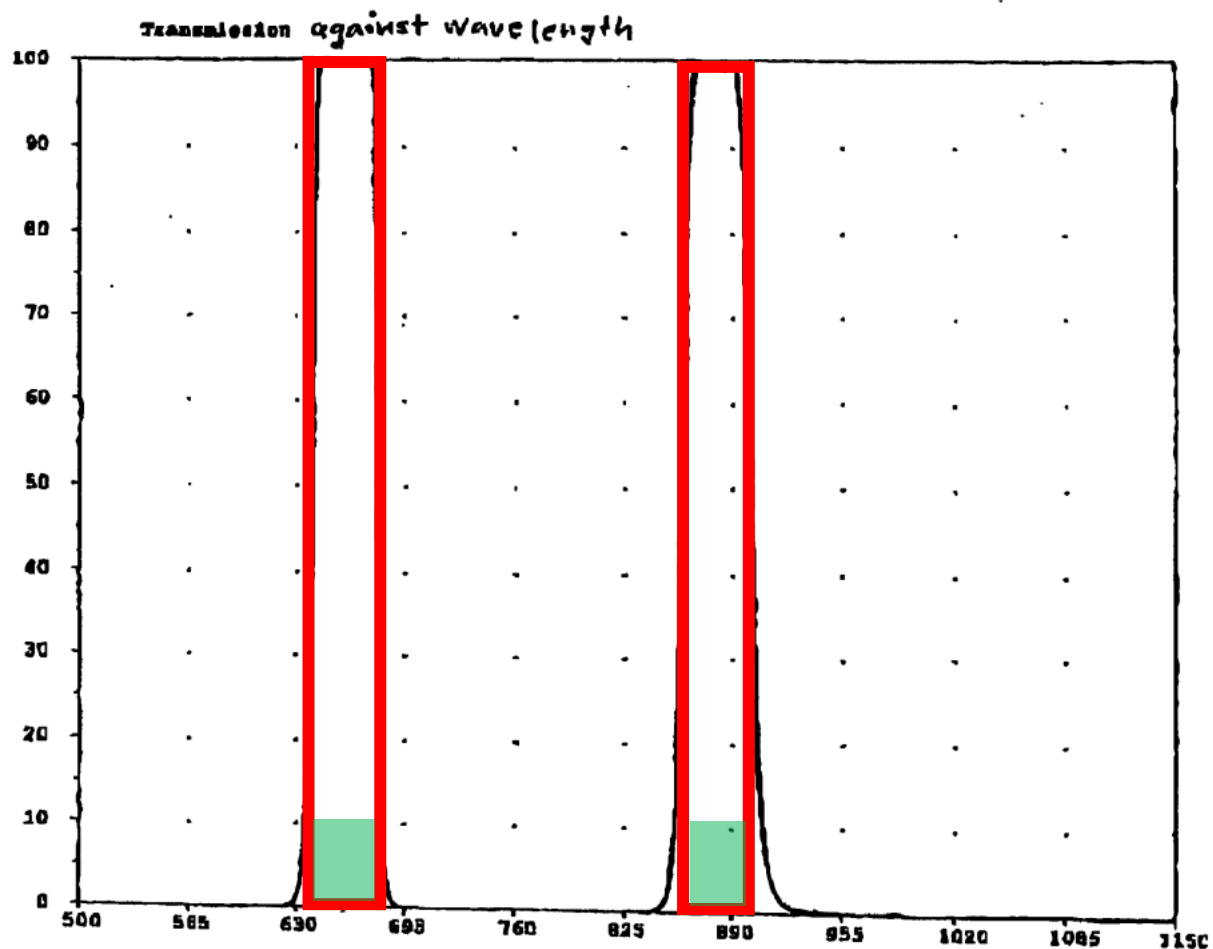


Figure 5c

EX1028, FIG. 5C (annotated).

Petitioners conflate and oversimplify the two different problems described in Lisogurski and Carlson as allegedly “removing background noise” and inaccurately argue that Carlson’s filter teachings would address the problems described in Lisogurski. Pet., 52-53 (quoting EX1028, ¶[0026]); EX2031, ¶121. *Nichia Corp. v. Everlight Americas, Inc.*, 855 F.3d 1328, 1339 (Fed. Cir. 2017) (“[N]o motivation

to modify Nitta in light of Waitl ... [because] the references disclose different structures, resolve dissimilar problems, and propose dissimilar solutions.”)

c) Lisogurski Already Teaches Numerous Solutions for the Problem It Describes

As depicted in the annotated figures above, a POSITA would have understood that Carlson's optical wavelength filter would not address the problem described in Lisogurski because Carlson's filter can only limit the detected light to a particular range of wavelengths and cannot remove the background noise detected across that range of wavelengths. EX1028, ¶¶[0026], [0062]; EX1025, 6:7-31; EX2031, ¶¶121-122. Thus, a POSITA would not have been motivated to combine Carlson's optical wavelength filter with Lisogurski's system. EX2031, ¶¶121-122.

Instead, a POSITA would have relied on Lisogurski's electronic signal processing techniques for removing such background noise. *See* EX1025, 6:7-31 (disclosing “a technique to remove ambient and background signals,” i.e., Lisogurski's dark subtraction process), 14:46-55 (disclosing that “filtering or signal modification techniques may be employed to reduce the effect of ambient light,” referring to Lisogurski's teachings of filtering or signal modification, for example, by components 152, 156, 158, 160, and 162 disclosed at 13:13-20, 13:31-14:10), 12:42-49 (disclosing that Lisogurski's “[f]ront end processing circuitry 150 may

perform various analog and digital processing of the detector signal”); EX2031, ¶¶122-124.

Petitioners simply ignore Lisogurski's teachings regarding how to address background noise and ambient light. *See* Pet., 52-53. For example, Lisogurski discloses a “drive cycle modulation technique” (EX1025, 6:7-31) with a dark subtractor (EX1025, 13:60-14:10), increasing the LED brightness (EX1025, 9:46-57), changing to a “constant light output” (EX1025, 9:57-60), and “passive or active filtering or signal modification techniques” (EX1025, 14:46-55). EX2031, ¶125. With the “drive cycle modulation technique,” the system “may measure the ambient light detected by the detector during the ‘dark’ period and then subtract this ambient contribution from the signals received during the first and second ‘on’ periods.” EX1025, 11:16-19; EX2031, ¶125. The dark subtractor “determine[s] a subtraction amount from the dark signal portion of the detection signal and subtract[s] it from the peak portion of the detection signal in order to reduce the effect of the dark signal on the peak.” EX1025, 13:63-65; FIG. 2A; EX2031, ¶125.

As another example, Lisogurski teaches increasing the LED brightness reduces noise because “the system may require increased signal amplitudes to differentiate between fiducial and other points of interest related to physiological parameters and those related to noise or motion.” EX1025, 9:50-57; EX2031, ¶126. Lisogurski's system can “change from a modulated light output to a constant light

output in response to noise, patient motion, or ambient light.” EX1025, 9:57-60; EX2031, ¶126. In addition, “passive or active filtering or signal modification techniques may be employed to reduce the effect of ambient light on the detection signal that is applied to analog-to-digital converter 154, and thereby reduce the contribution of the noise component to the converted digital signal.” EX1025, 14:51-55; EX2031, ¶126.

Petitioners do not argue that there would be any benefit in applying Carlson's “filter teachings” in addition to, or as a substitute for, any of Lisogurski's disclosed techniques for addressing background noise. Pet., 52-53. Petitioners rely on “Lisogurski's LEDs that emit light in the red wavelength range (between about 600 to 700 nm) and infrared wavelength range (between about 800 nm to 1000 nm).” Pet., 58 (citing EX1025, 10:48-63). Petitioners also rely on Lisogurski's disclosure regarding dark subtraction, which describes “measur[ing] the ambient light detected by the detector during [a] ‘dark’ period and then subtract[ing] this ambient contribution from the signals received during the [light ‘on’] periods.” Pet., 52 (citing EX1025, 6:7-31).

A POSITA would have understood that these two techniques would be used together—i.e., (1) measuring the detected light when the LEDs are “on,” including the red or infrared light emitted from the LEDs as well as any light outside of the red and infrared ranges of wavelengths, (2) measuring the detected light when the

LEDs are “off,” which again includes any light outside of the red and infrared ranges of wavelengths, and (3) subtracting the second measurement from the first measurement, which retains only the information from the red and infrared ranges of wavelengths and effectively excludes any light outside of those ranges. *See* EX1025, 10:48-64, 12:23-27; 6:7-31; EX2031, ¶¶128-129. In other words, Lisogurski discloses a method for limiting the detected light to a particular range of wavelengths (the problem described in Carlson) but without relying on the optical wavelength filter of Carlson. EX2031, ¶¶127-129.

Thus, a POSITA reviewing Lisogurski would have recognized that Carlson's optical wavelength filter would be redundant and unnecessary, and as such, a POSITA would not have been motivated to combine Lisogurski and Carlson. EX2031, ¶¶128-129. *South-Tek Sys., LLC v. Engineered Corrosion Sols., LLC*, 748 F. App'x 1003, 1006 (Fed. Cir. 2018) (finding no motivation “[g]iven the redundant functions” of primary and secondary reference elements); *In re Anova Hearing Labs, Inc.*, 809 F. App'x 840, 843 (Fed. Cir. 2020) (finding the Board “d[id] not explain why a [POSITA] would be motivated to modify Brown, which already includes vents”); *see also Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1369 (Fed. Cir. 2012) (“Because each device independently operates effectively, a [POSITA], who was merely seeking to create a better device ..., would have no

reason to combine the features of both devices into a single device”). Accordingly, Petitioners fail to meet their burden for Ground 2 and claims 11 and 18.

C. Ground 3: Alleged Obviousness Based on Lisogurski in view of Tam (Claims 6 and 14)

In Ground 3, Petitioners argue that claims 6 and 14 of the ’533 Patent are obvious over Lisogurski in view of Tam. Pet., 62-65. For at least the reasons discussed below, Petitioners failed to meet their burden.

As discussed above, Lisogurski does not expressly or inherently disclose LEDs with the claimed bandwidth range. *Supra*, §VII.A.1. In an attempt to address this deficiency, Petitioners argue that “Tam (Ex. 1030) discloses that at least one of the light emitting diodes emits light with a bandwidth between 20 nanometers to 40 nanometers.” Pet., 62 (citing EX1030, 9:57-60).

Petitioners argue that a POSITA would have been motivated to combine Tam with Lisogurski “in order to minimize manufacturing cost, while maintaining the accuracy of the measurement.” Pet., 63. This is incorrect. As discussed above, based on the wavelength ranges described in Lisogurski, a POSITA would understand that the red and IR LEDs have a bandwidth of 100 nm and 200 nm, respectively. *Supra*, §VII.A.1.a; EX2031, ¶¶91-92, 133. Petitioners correctly note that Tam teaches that using “LEDs with smaller bandwidth” results in “unnecessary ‘premium cost’” that a POSITA would seek to avoid. Pet., 63; EX1030, 9:61-62; EX2031, ¶134. Thus, a

POSITA considering Tam would not be motivated to modify Lisogurski to use LEDs within the claimed bandwidth range to cut costs because Tam teaches that this would *increase* costs. EX2031, ¶134. Petitioners' proposed motivation to combine is flawed because it incorrectly presupposes that Lisogurski's LEDs have a smaller bandwidth than 20 nm to 40 nm such that using Tam's LEDs would lead to cost savings.

Petitioners also argue that "the Examiner already found during prosecution" that "Figler (Ex. 1074) 'teaches that conventional LEDs have a bandwidth of approximately 30 nm, falling between 20nm to 40nm'" and that using such LEDs would have been obvious. Pet., 64 (quoting EX1002, 723). Petitioners also argue that the applicant "did not contest" this finding. Pet., 64. There are three problems with Petitioners' assertions. One, Fidler is not part of Ground 3. Two, the fact that the applicant "did not contest" the Examiner's statements does not amount to acquiescence or an admission. The applicant traversed the rejection by distinguishing the prior art from the independent claims, so there was no reason or incentive for the applicant to address the Examiner's assertions regarding these dependent claims. EX1002, 765-66. Three, Fidler and the Examiner's statements do not support Petitioners' only proffered rationale for combining Tam with Lisogurski, i.e., to save costs.

Finally, Petitioners state that “Tam discloses that light sources with high bandwidth (e.g., ~100nm) would not allow accurate measurements or even have the capability of distinction between hemoglobin derivatives, while bandwidth filters such as ‘a 40 nm bandwidth ‘filter’’ would improve the accuracy of the measurement device.” Pet., 63-64 (citing EX1030, 13:45-14:10). But, Petitioners misquote Tam, omitting that Tam states that “[i]t is clear that small optical components alone, such as LEDs having bandwidths from about 7 *to* 100 nm, would not allow accurate measurements or even have the capability of distinction between hemoglobin derivatives.” EX1030, 13:45-52 (emphasis added). Petitioners fail to explain why a POSITA would have been motivated to combine Tam with Lisogurski in view of this disclosure or what the relevance is of a “40 nm bandwidth filter” for claims 6 and 14.

D. Ground 4: Alleged Obviousness Based on Lisogurski in view of Carlson in Further view of Tam (Claims 6 and 14)

In Ground 4, Petitioners argue that claims 6 and 14 of the '533 Patent are obvious over Lisogurski in view of Carlson and Tam. Pet., 62-65. They argue that a POSITA would have been motivated to combine Tam's LEDs with Lisogurski's system in view of Carlson “in order to minimize manufacturing cost, while maintaining the accuracy of the measurement.” Pet., 63-65. They assert that the “motivation and reasonable expectation of success would remain the same for

Lisogurski's system alone [as in Ground 3] or in view of Carlson," but they do not provide any additional evidence from or citations to Carlson for Ground 4, nor do they explain their conclusory assertion. Pet., 64-65. Accordingly, Petitioners fail to meet their burden for Ground 4 for at least the same reasons as Ground 3. *Supra*, §VI.C; EX2031, ¶136.

VII. CONCLUSION

For at least the foregoing reasons, the Petition should be denied as to each of the requested grounds. For brevity, Patent Owner may not have addressed all characterizations of the applied references and the challenged claims and reserves the right to do so should institution be granted. The absence of a response by Patent Owner to any of the positions presented in the Petition or the associated expert declaration is not a concession to those positions. The fact that Patent Owner's Preliminary Response has focused on particular arguments is not a concession that there are no other arguments for patentability of the challenged claims.

Respectfully submitted,

Dated: November 7, 2025

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Lead Counsel for Patent Owner

CERTIFICATION OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the foregoing Patent Owner's Preliminary Response is produced using a 14-point Times New Roman font and contains approximately 7,438 words, which is less than the 14,000 total words permitted by the U.S. Patent Trial and Appeal Board rules. Counsel relies on the word count of the computer program used to prepare the response on November 7, 2025.

By: /s/ Jennifer Hayes

Lead Counsel for Patent Owner

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing **Patent Owner's Preliminary Response** was served on November 7, 2025, by email:

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