

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ACCELIGHT TECHNOLOGIES, INC.,
Petitioner,

v.

APPLIED OPTOELECTRONICS, INC.
Patent Owner.

IPR2025-01566
U.S. Patent No. 10,042,116

PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

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TABLE OF EXHIBITS

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1001	U.S. Patent No. 10,042,116 to Ho et al. (“the ’116 patent”)
1002	Prosecution history of the ’116 patent
1003	Declaration of Michael Lebby, Ph.D.
1004	U.S. Patent Application Publication No. 2014/0183344 to Lee et al. (“Lee”)
1005	U.S. Patent Application Publication No. 2014/0169389 to Kim et al. (“Kim”)
1006	U.S. Patent Application Publication No. 2014/0341578 to Ho et al. (“Ho”)
1007	P. Bernasconi et al., <i>Design and Challenges in a 100 Gb/s Hybrid-Integrated Photonic Circuit</i> , 38TH EUROPEAN CONFERENCE AND EXHIBITION ON OPTICAL COMMUNICATIONS, Amsterdam, Netherlands, 2012, pp. 1-3, paper Tu.4.E.3. (“Bernasconi”)
1008	U.S. Patent No. 9,768,901 to Soldano et al. (“Soldano”)
1009	U.S. Patent Application Publication No. 2005/0286839 to Yoshikawa et al. (“Yoshikawa”)
1010	U.S. Patent Application Publication No. 2014/0161457 to Ho et al. (“Ho II”)
1011	U.S. Patent No. 5,351,327 to Lurie et al.
1012	Petitioner’s Search Disclosure Declaration (“SDD”)
1013	Joint Case Management Statement, <i>Applied Optoelectronics, Inc. v. Molex, LLC</i> , Case No. 4:23-cv-04787-JST (N.D. Cal.)
1014	Petitioner’s Opposition to Patent Owner’s Request for Discretionary Denial of Institution in IPR2025-00435 against U.S. 10,042,116

Exhibit	Description
1015	Time to Milestones for N.D. California, <i>Docket Navigator</i> , (accessed January 7, 2026)
1016	Petition for <i>Inter Partes</i> Review in IPR2025-01567, against U.S. 10,379,301, filed Sept. 26, 2025
1017	U.S. Patent No. 10,379,301 to Luo et al.
1018	U.S. Patent No. 9,509,433 to Ho et al.
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1020	Joint Administrative Motion to Stay Pending IPR Institution Decisions, <i>Applied Optoelectronics, Inc. v. Accelight Technologies, Inc.</i> , Case No. 4:24-cv-09041-HSG (N.D. Cal.), filed October 3, 2025
1021	Complaint for Patent Infringement, <i>Applied Optoelectronics, Inc. v. Accelight Technologies, Inc.</i> , Case No. 4:24-cv-09041-HSG (N.D. Cal.), filed December 13, 2024
1022	Declaration of William D. Sterling
1023	Deposition of Dr. Alan Willner, dated August 12, 2026

I. INTRODUCTION

The '116 patent claims well-known optical transceiver components— arrayed waveguide grating (AWG) chips, planar lightwave circuit (PLC), substrates, photodetectors—that were standard in the field of optoelectronics before the effective filing date of the '116 patent. Patent Owner's Response ("POR") fails to rebut the Petition's showing that the challenged claims are unpatentable over the prior art combinations presented in the Petition. Instead, Patent Owner (1) proposes an improperly narrow claim construction of "substrate" that is inconsistent with the claims and specification; (2) improperly narrows the term "exposed output interface region" beyond what the claims require; (3) asserts that the prior art does not disclose an AWG chip, while ignoring that Lee explicitly teaches an AWG demultiplexer as an application of PLC 110 (Ex. 1004, ¶[0009]); and (4) relies on the declaration of Dr. Alan Willner (Ex. 2010), whose testimony during his August 12, 2026 deposition (Ex. 1023) substantially undermines Patent Owner's positions.

As shown below, Patent Owner's arguments lack merit. Dr. Willner's deposition testimony confirms that the prior art discloses each element of the challenged claims, that a skilled artisan would have been motivated to combine the references, and that such a combination would have had a reasonable expectation of success. The Board should find claims 1–4, 10–13, 15, and 16 of the '116 patent unpatentable.

II. CLAIM CONSTRUCTION — “SUBSTRATE”

Patent Owner devotes a substantial portion of the POR to arguing that “substrate” should receive its “plain and ordinary meaning” and that Petitioner’s proposed construction is improper, yet Patent Owner never explains why the prior art combinations presented in the Petition fail to satisfy that plain and ordinary meaning. POR, 13–19. Moreover, Patent Owner’s own expert, Dr. Willner, confirmed at his deposition the very construction Petitioner proposed.

As an initial matter, Patent Owner’s expert, Dr. Willner, agreed in his deposition that “substrate,” in the context of the ’116 patent, means a “supporting base,” and that this meaning is consistent with the plain and ordinary meaning of the term. Ex. 1023, 29:14-25; *see also id.* at 30:1-31:1. And when pressed on what types of supporting bases are not substrates, Dr. Willner could not identify any. *Id.* at 31:9-32:12.

Patent Owner’s principal objection to Petitioner’s construction of “substrate”—“a supporting base that is part of the AWG chip and on which the planar lightwave circuit (PLC) is mounted”—is that the “supporting base” must be a part of the AWG chip. POR, 14–15. But Patent Owner offers no technical argument against this construction; instead, Patent Owner merely alleges that Petitioner’s construction improperly redefines the preamble and the term “comprising.” *Id.* That argument fails. It cannot reasonably be disputed that the substrate is part of the AWG

chip. Patent Owner's own expert, Dr. Willner, agreed at his deposition that "'comprising' can often be thought of as the word 'including,'" and that the "AWG chip would therefore include a substrate." Ex. 1023, 31:2-8; *see also id.* at 24:10-19. Dr. Willner further testified that "part of" means "it's included in," confirming that the "substrate" is "[i]ncluded as part of the ... AWG chip." *Id.* at 24:23-25:11. Thus, even Patent Owner's own expert agrees that "substrate," read in the context of claim 1, requires a supporting base that is included as part of the AWG chip. Patent Owner's contrary position is driven by litigation strategy, not by the specification or the claim language.

Patent Owner's additional argument—that Petitioner's construction improperly reads the PLC limitation into "substrate"—is meritless. POR, 15–17. Petitioner's construction merely defines the substrate's relationship to the AWG chip: it is part of the AWG chip and supports the PLC, which is consistent with the claims and specification. *See* Ex. 1001, 3:35-38, 8:31-38, 12:4-11.

Patent Owner's complaint about "mounted" versus "disposed" is a distinction without a difference. Patent Owner's expert, Dr. Willner, himself testified that "disposed on" means "located on the substrate." Ex. 1023, 37:21-38:4. Thus, there is no meaningful difference between "mounted on" and "disposed on" in the context of the claims—both mean that the PLC is located on the "substrate."

Accordingly, Dr. Willner's own testimony supports Petitioner's construction that "substrate" means "a supporting base that is part of the AWG chip and on which the PLC is mounted." Patent Owner's arguments that this construction improperly narrows the claim are belied by its own expert's admissions.

Nevertheless, the proposed obviousness combinations render claim 1 obvious under either construction—Petitioner's construction, as set forth in the Petition, or Patent Owner's plain and ordinary meaning of "substrate," which Patent Owner's own expert agrees means a "supporting base."

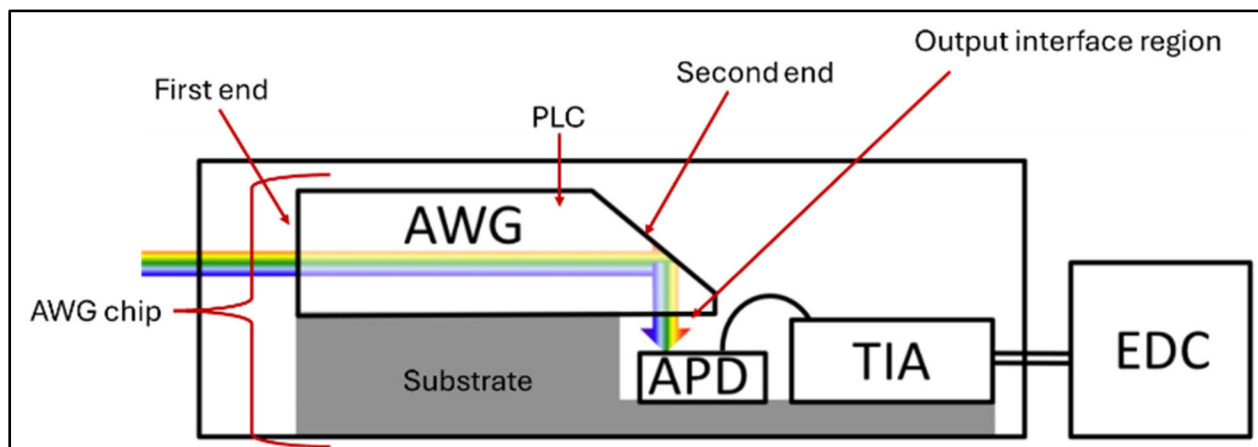
III. GROUND 3: BERNASCONI IN VIEW OF SOLDANO RENDERS CLAIMS 1–4, 10, 11 OBVIOUS

A. Bernasconi Discloses an "Exposed Output Interface Region" as Required by Claim 1

Regarding independent claim 1, Patent Owner's sole argument under Ground 3 is that Bernasconi in view of Soldano fails to disclose limitation [1e], because "[n]either Bernasconi nor Soldano disclose an 'exposed output interface region' as required by Claim 1." POR, 31–32; Ex. 1023, 38:23-40:8 (Patent Owner's expert, Dr. Willner, confirming he identified no other deficiency in Ground 3). The Petition and Dr. Willner's own deposition testimony directly contradict that position.

Critically, Dr. Willner admitted that "an exposed output interface region of the AWG chip" simply means the "output interface region is exposed. It's uncovered. It doesn't have things there." Ex. 1023, 38:5-15. The Petition shows

exactly this in Bernasconi: light received by the second end of the AWG chip “is reflected towards an exposed output interface region of the AWG chip,” which “emits the received light from the AWG chip on the same side as the substrate without passing the received light through the substrate.” Pet., 63–64 (citing Bernasconi’s Figure 2(b)).



Pet., 64 (showing annotated Figure 2(b) of Bernasconi (Ex. 1007))

Dr. Willner further admitted that Bernasconi’s Figure 2(b) “doesn’t identify anything between the AWG box ... and the APD black box[.]” Ex. 1023, 48:17-49:6; *see also id.* at 49:23-51:4 (after reviewing Bernasconi, testifying he found nothing “placed between the box that’s -- has the AWG label and -- between that box and the box that’s labeled APD.”). This confirms both that the AWG’s output interface region is exposed, i.e., “it’s uncovered,” and that nothing sits between the AWG and the APD array. Ex. 1023, 38:5-15, 48:17-49:6, 49:23-51:4.

Patent Owner’s fallback argument—that Bernasconi and Soldano fail to disclose “removing a portion of the alleged substrate in order to form an output interface region”—is both legally and factually wrong.

First, claim 1 imposes no such requirement. The ’116 patent describes substrate removal as one example of how the exposed region may be formed (“Formation of the AWG chip 503 can include removing a portion of the substrate ... to expose the output interface region 517,” Ex. 1001, 9:46–49), but the claim itself recites no particular manufacturing approach.

Second, Patent Owner improperly imports a manufacturing step into an apparatus claim. Claim 1 is directed to an apparatus—an AWG chip—not to a method of making the apparatus. Such apparatus claims are properly defined by their structural features, such as “an exposed output interface region,” and not by the process used to produce those features. Bernasconi’s Figure 2(b) shows light reflecting off the AWG’s inclined surface and exiting on the same side as the substrate without passing through it. That structural disclosure satisfies limitation [1e] regardless of how the region was formed. *See Enzo Biochem, Inc. v. Applera Corp.*, 599 F. 3d 1325, 1340 (Fed. Cir. 2010) (citing *In re Thorpe*, 777 F.2d 695, 697 (Fed. Cir. 1985) (“The patentability of a product does not depend on its method of production.”)).

Dr. Willner's deposition attempt to raise a new theory—that Bernasconi's AWG chip may itself include a substrate—fares no better. The argument was not in the Patent Owner Response, and therefore should be deemed forfeited or not given any weight. *See, e.g.*, Paper 13 (Scheduling Order) (Apr. 8, 2026) at 9 ("Patent Owner is cautioned that any arguments for patentability not raised in the response may be deemed forfeited."); *In re NuVasive*, 842 F.3d 1376, 1380-81 (Fed. Cir. 2016) (upholding PTAB's finding that patent owner waived argument because it was not included in Patent Owner's Response). Dr. Willner's belated argument is also unsupported: Dr. Willner conceded he could not identify an explicit disclosure of a substrate within Bernasconi's AWG, Ex. 1023, 58:6-60:4, and his claim that the AWG "may very likely include its own substrate" was hedged throughout with "could," "may," and "very likely." *See id.* at 48:1-49:6, 53:11-54:15, 58:6-60:4. Such unsupported speculation cannot substitute for evidence. And even assuming *arguendo* that the AWG includes its own substrate layer—which Bernasconi does not disclose—claim 1 requires the demultiplexed light to exit on the same side as the substrate of the AWG chip, not merely the AWG, which is only a portion of the AWG chip. *Id.* at 67:7-69:19 (Dr. Willner distinguishing the AWG chip from the AWG itself, explaining that the AWG chip incorporates an AWG "as part of" the chip).

In short, Bernasconi's Figure 2(b) shows light reflecting off the AWG's tapered region and traveling through free space to the APD array mounted on the

ceramic base (substrate). The output interface region through which light exits the AWG is thus exposed—nothing covers it—and light exits on the same side as the substrate without passing through it. This meets claim limitation [1e].

For the reasons discussed above and in the Petition, independent claim 1 is rendered obvious by Bernasconi in view of Soldano.

B. Dependent Claims 2–4, 10, and 11

Patent Owner’s challenge to dependent claims 2–4, 10, and 11 under Ground 3 rests entirely on the same alleged deficiency asserted against limitation [1e]. *See* POR, 33. As shown above, that deficiency does not exist—Bernasconi in view of Soldano discloses every limitation of claim 1. Because Patent Owner raises no separate argument for the dependent claims, Bernasconi in view of Soldano likewise renders claims 2–4, 10, and 11 obvious.

IV. GROUND 4: HO IN VIEW OF BERNASCONI AND SOLDANO AND FURTHER IN VIEW OF YOSHIKAWA RENDERS CLAIM 13 OBVIOUS

Patent Owner raises no challenge to the Petition’s showing for independent claim 12 or dependent claims 15 and 16 under Ground 4. Patent Owner’s sole argument is that the prior art fails to disclose an “output interface region” that is an “exposed region,” as required by claim 13. POR, 33–34. For the reasons discussed above, Bernasconi in view of Soldano discloses an “exposed output interface region.” The Petition also shows that this exposed region is “adjacent an air gap,”

and that the air gap separates the output interface region from the array of photodetectors (APDs). Pet., 81; Ex. 1003, ¶173. Patent Owner's expert further confirmed in deposition that the output interface region of the AWG is exposed—"it's uncovered"—and that nothing sits between the AWG and the APD array, meaning an air gap separates the AWG output region from the APD array. Ex. 1023, 38:5-15, 48:17-49:6, 49:23-51:4.

Adding Ho and Yoshikawa to the combination introduces no new deficiency. Patent Owner's challenge to claim 13 under Ground 4 therefore fails. The Board should also find the Petition's un rebutted showing sufficient to establish the unpatentability of claims 12, 15, and 16 under Ground 4.

V. GROUND 1: LEE IN VIEW OF KIM RENDERS CLAIMS 1–4, 10, AND 11 OBVIOUS

A. The Lee-Kim Combination Discloses Every Limitation of Claim 1

1. Lee and Kim Each Disclose an AWG Chip

Patent Owner argues that Lee in view of Kim does not disclose an AWG chip, as required by the preamble of claim 1, because "an AWG is mentioned only in the Background of Lee, whereas [Lee's] PLC 100 is described as a generic planar lightwave circuit." POR, 19–20. This argument is meritless. Lee explicitly discloses at paragraph [0009] that one application of the PLC is a demultiplexer comprising an arrayed waveguide grating (AWG). Ex. 1004, ¶[0009]. There is no rule that a

disclosure in the background section of a patent is any less of a disclosure. *See In re Heck*, 699 F.2d 1331, 1332-33 (Fed. Cir. 1983) (“The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain.”) (citation and quotation marks omitted).

As the Petition clearly states, Kim also discloses an AWG demultiplexer chip. Pet., 19–20 (citing Ex. 1005, ¶¶[0022]-[0024]). And one skilled in the art would have been motivated, with a reasonable expectation of success, to modify Lee’s PLC 110 in view of Kim to “have AWG structure and functionality.” Pet., 20; Ex. 1023, 91:13-92:9, 94:6-22 (Patent Owner’s expert, Dr. Willner, agreeing in deposition that the Petition states that Lee’s PLC 110 would have been modified in view of Kim to have AWG demultiplexer structure); *see also* Pet., 17–19 (providing motivation to combine Lee and Kim).

Moreover, Dr. Willner conceded in deposition that Lee’s paragraph [0009] “mentions specifically, ... the PLC can be used as a DMUX, and then, in the case of a double PLC, it says that such is -- an arrayed waveguide grating can be used as a DMUX, in the context of a double PLC.” Ex. 1023, 72:18-73:14; *see also id.* at 75:1-79:7 (Dr. Willner agreeing that a double PLC is “in the universe of PLC.”).

Patent Owner’s argument that Lee discloses a “fiber array” rather than an AWG is also meritless. Lee discloses multiple embodiments: that some

embodiments show fiber arrays does not negate Lee's explicit disclosure that the PLC can also be an AWG. *See* Ex. 1004, ¶[0009]. Kim further confirms this, explicitly disclosing that "demultiplexer 120 may have an arrayed waveguide grating structure." Ex. 1005, ¶[0024]. Dr. Willner conceded this point in deposition. Ex. 1023, 91:7-12.

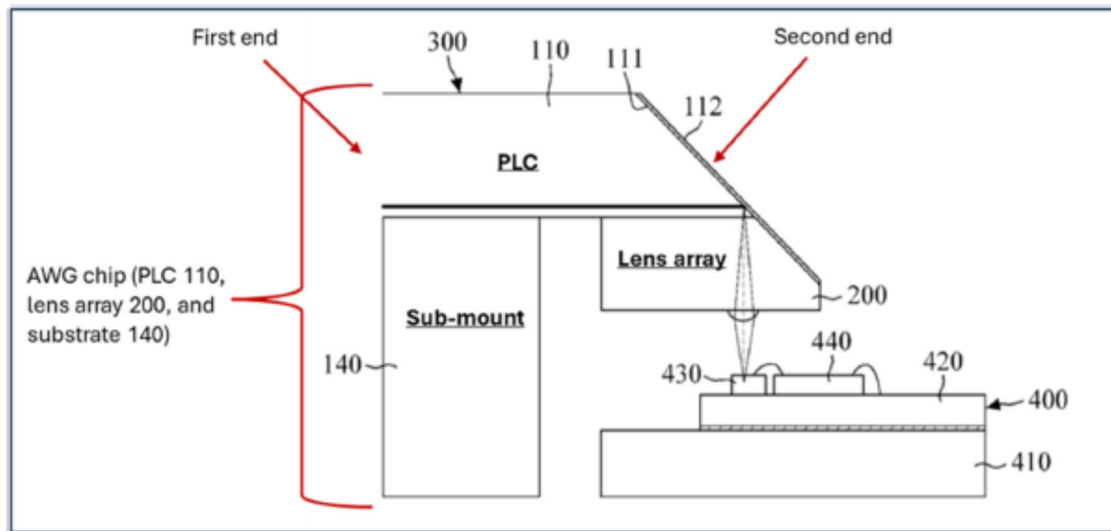
Lastly, Patent Owner argues that "[i]f Lee and Kim are combined, the AWG of Kim would be located upstream from Lee's optical waveguide(s) and would not change any of the claimed elements of Lee," and that this defeats any motivation to combine. POR, 21. This is incorrect. The Petition modifies Lee's PLC 110 in view of Kim's AWG demultiplexer. *See* Pet., 20. The Petition never proposes physically connecting Lee's PLC downstream, in tandem, to Kim's AWG. And it is well settled that an obviousness combination requires no physical or bodily incorporation of one reference into another. *Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC*, 825 F.3d 1373, 1381 (Fed. Cir. 2016) ("The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference[.]" (quoting *In re Keller*, 642 F.2d 413, 425 (C.C.P.A. 1981))). Instead, the question is whether "a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention[.]" *Id.* (quoting *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007)); *see also In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012) ("It is well-

established that a determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements.”).

Accordingly, Lee in view of Kim discloses an AWG chip, and a skilled artisan would have been motivated to combine the teachings of Lee and Kim.

2. Lee in View of Kim Discloses a “Substrate” as Required by Limitation 1[b] and “a Planar Lightwave Circuit (PLC) Disposed on the Substrate” as Required by Limitation 1[c]

Patent Owner argues that Lee’s sub-mount 140 is not a “substrate.” POR, 22. But Dr. Willner admitted in deposition that “substrate” means “a supporting base” in the context of the ’116 patent. Ex. 1023, 29:14-25; *see also id.* at 30:1-31:1. He further agreed that Lee’s PLC 110 is mounted on sub-mount 140 and that sub-mount 140 “supports” the PLC. *Id.* at 84:12-18; *see also id.* at 82:20-83:2. Thus, even under Patent Owner’s construction of “substrate” as a “supporting base,” Lee’s sub-mount 140 qualifies as the “substrate” of the AWG chip. As the Petition explains, Lee’s sub-mount 140 also qualifies as a “substrate” under Petitioner’s construction, because it is a supporting base that is part of the AWG chip and PLC 110 is mounted on it. Pet., 23; Ex. 1004, Fig. 2.



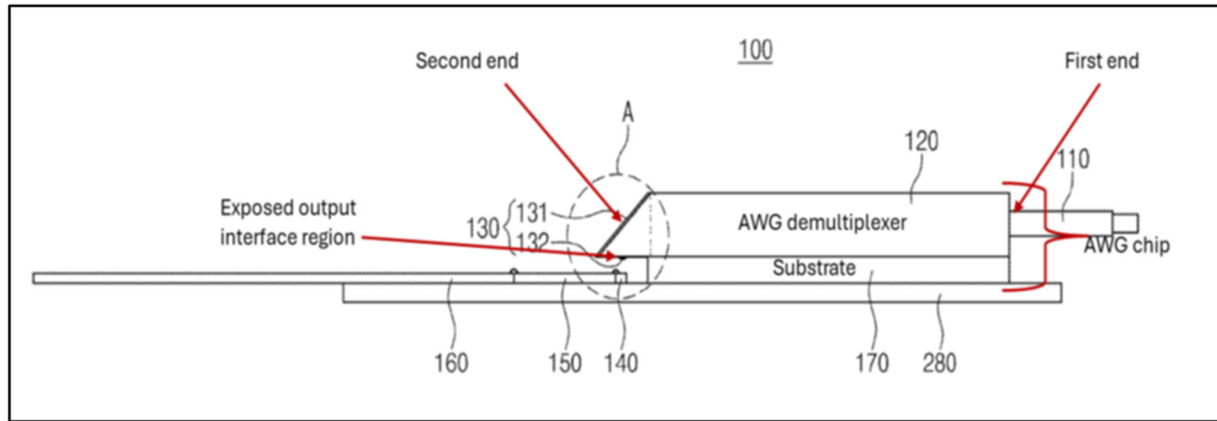
Pet., 21 (showing annotated Figure 2 of Lee (Ex. 1004))

Patent Owner argues that Lee’s own language reserves the term “substrate” for component 420 of the electrical unit, not the sub-mount. POR, 22. This argument conflates Lee’s use of “substrate” for a different component in a different context—the electrical unit—with the claimed “substrate” of the AWG chip. Moreover, Lee need not disclose a “substrate” *ipsis verbis*; Lee’s express disclosure of a sub-mount 140, which a skilled artisan would have understood functions as the supporting base—i.e., the “substrate”—of the AWG chip, is sufficient to establish obviousness. Ex. 1003, ¶80.

Kim’s supporting part 170 similarly functions as a “substrate” for Kim’s AWG chip. Pet., 28–29. Patent Owner’s argument that Kim uses “substrate” in connection with “lens array” and “detector array” does not negate the fact that

supporting part 170 functions as a supporting base for the AWG demultiplexer.

Contra POR, 22–23.



Pet., 29 (showing annotated Fig. 3 of Kim (Ex. 1005))

The Petition shows that PLC 110 of Lee is disposed on sub-mount 140. Pet., 23–24; Ex. 1003, ¶81. Lee explicitly discloses at paragraph [0042] that PLC 110 is “mounted on a separate sub-mount 140.” Ex. 1004, ¶[0042]; *see also id.* at Fig. 2. Patent Owner’s argument that “Petitioner does not identify where Lee discloses a planar lightwave circuit disposed on a substrate” ignores the Petition’s actual showing and the prior art disclosure. Dr. Willner himself conceded that Lee discloses PLC 110 is mounted on sub-mount 140, which serves as the “substrate” of the AWG chip. Ex. 1023, 81:16-82:1.

3. Lee in View of Kim Discloses the “Output Waveguides” as Required by Limitation 1[d]

Lee discloses cores 113 in PLC 110, which are optical waveguides through which light travels. Pet., 24 (citing Ex. 1008, 9:56-58; Ex. 1003, ¶85). As stated in

the Petition, it would have been obvious to a skilled artisan that in the AWG chip of Lee-Kim, the demultiplexed light from PLC 110 would have passed along separate optical waveguide paths (i.e., cores 113) corresponding to each channel wavelength. *Id.* The disclosure in Soldano further supports the Lee-Kim combination and shows that the PLC-based AWG demultiplexer of Lee in view of Kim would have output waveguides (cores 113) to pass demultiplexed light along separate waveguides towards a second end of the AWG chip to mitigate signal losses and crosstalk amongst the demultiplexed channels. Pet., 24–26.

Tellingly, Patent Owner’s expert, Dr. Willner, admitted that cores 113 “are meant for light to be transmitted through them,” that “PLC 110 in [Lee’s] Figure 6 seems to show multiple cores 113,” and that cores 113 “seem to be waveguides.” Ex. 1023, 87:19-88:14. Dr. Willner further conceded that in the Lee-Kim combination, the AWG demultiplexing would be “upstream from waveguides of Lee,” and that “at some point, light will get into the waveguides of Lee[.]” Ex. 1023 97:22-99:11. This confirms that the demultiplexed output signals from the AWG would travel through the optical waveguides (cores 113). *Id.*

In short, when Lee’s PLC 110 is modified in view of Kim to function as an AWG demultiplexer, cores 113 serve as the AWG’s output waveguides, carrying the demultiplexed signals. Pet., 24–27.

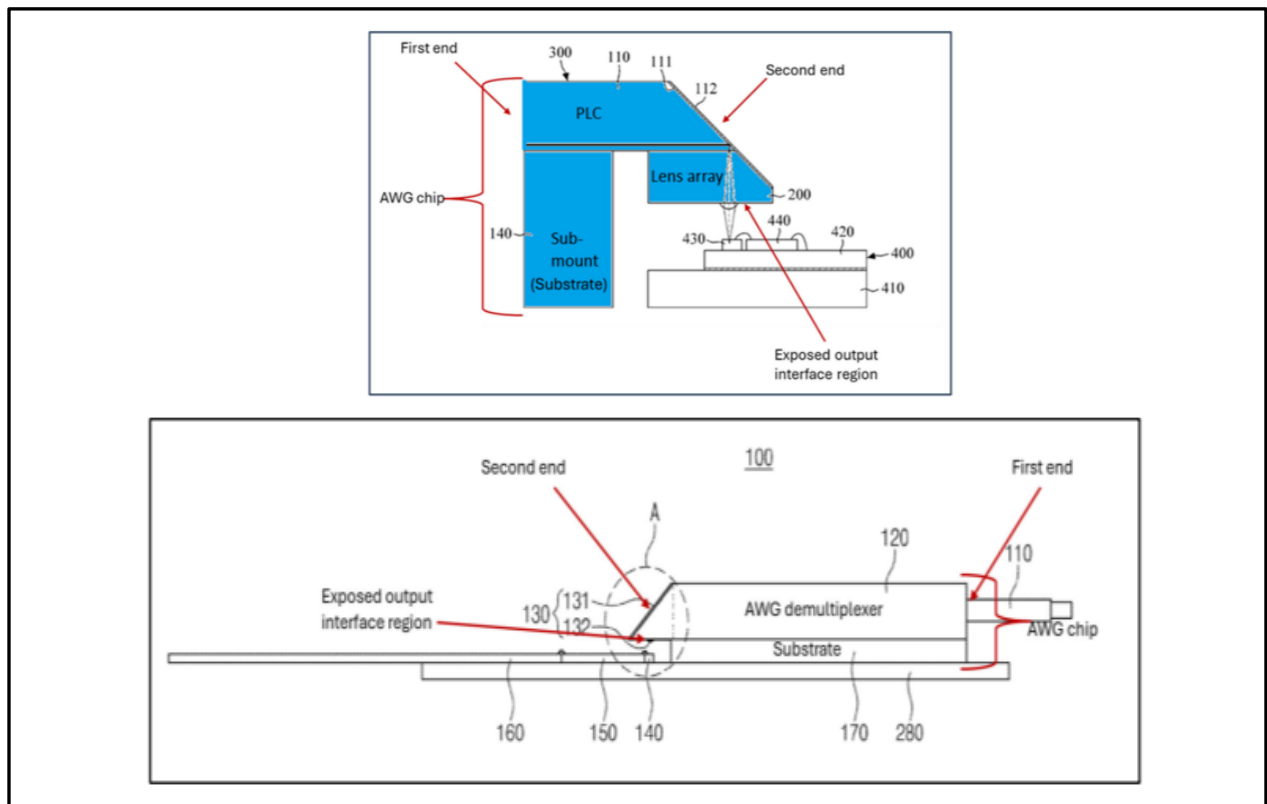
4. Lee in View of Kim Discloses an “Exposed Output Interface Region” as Required by Limitation 1[e]

Patent Owner argues that Lee in view of Kim fails to disclose limitation 1[e], because neither reference discloses “(a) an exposed output interface region and (b) emitting light towards the same side as the substrate without passing through the substrate.” POR, 26–27. Patent Owner bases this argument on two flawed premises: an incorrect construction of “exposed output interface region” as meaning only “a region that has been uncovered,” and the meritless assertion that the references fail to disclose the “claimed substrate.” POR, 27–28.

Patent Owner’s argument misconstrues limitation 1[e] to require “removing a portion of the alleged substrate in order to form an output interface region.” Pet. 29. But as discussed regarding Bernasconi (Ground 3), above, nowhere does claim 1 recite removal of a portion of the substrate to expose the output interface region; instead, limitation 1[e] simply requires the AWG chip to have “an exposed output interface region” that receives demultiplexed light reflected by the “tapered region” of the AWG chip and emits the light “on the same side as the substrate without passing the received light through the substrate.” *See* Ex. 1001, claim 1; *see* Section III.A, above. That is, **claim 1 simply requires the AWG chip to have an “exposed output interface region”; it does not recite how the exposed region is formed.** Therefore, Patent Owner’s assertion that the Lee-Kim combination fails to disclose

limitation 1[e] is based on an unduly narrow interpretation of the limitation, which is not supported by the plain language of the claim.

Contrary to Patent Owner’s assertion, each of Lee and Kim discloses an AWG chip with a “substrate”—sub-mount 140 of Lee and supporting part 170 of Kim—and “an exposed output interface region” that emits light “on the same side as the substrate without passing the received light through the substrate.” *See* Pet., 27–29; *see* Section V.A.2, above. Limitation [1e] is therefore met.



Pet., 27–29 (citing Ex. 1004, Fig. 2 and Ex. 1005, Fig. 3) (showing AWG chips of Lee and Kim having “exposed output interface region” to emit light “on the same side as the substrate without passing the received light through the substrate”)

In sum, Lee in view of Kim discloses every limitation of claim 1 and thus renders the claim obvious.

B. Dependent Claims 2–4, 10, and 11

Patent Owner’s challenge to dependent claims 2–4, 10, and 11 under Ground 1 rests entirely on the same alleged deficiencies asserted against claim 1. *See* POR, 29–30. As shown above, the alleged deficiencies do not exist—Lee in view of Kim discloses every limitation of claim 1. Because Patent Owner raises no separate argument for the dependent claims, the Lee-Kim combination of Ground 1 likewise renders claims 2–4, 10, and 11 obvious.

VI. GROUND 2: HO IN VIEW OF LEE AND KIM AND FURTHER IN VIEW OF YOSHIKAWA RENDERS CLAIM 13 OBVIOUS

Patent Owner raises no challenge to the Petition’s showing for independent claim 12 or dependent claims 15 and 16 under Ground 2. Patent Owner’s sole argument for Ground 2 is that the prior art fails to disclose an “‘exposed output interface region’ or an ‘output interface region’ that is an ‘exposed region,’” as required by claim 13. POR, 30–31. For the reasons discussed above, Lee in view of Kim discloses an “exposed output interface region.” The Petition also shows that this exposed region is “adjacent an air gap”—with nothing in between Lee’s output interface region and the array of photodetectors (PDs) 430—and the air gap separates the output interface region from the array of photodetectors. Pet., 49; Ex. 1003, ¶118.

Adding Ho and Yoshikawa to the Lee-Kim combination introduces no new deficiency. Patent Owner's challenge to claim 13 under Ground 2 therefore fails. The Board should also find the Petition's un rebutted showing sufficient to establish the unpatentability of claims 12, 15, and 16 under Ground 2.

VII. CONCLUSION

For the foregoing reasons, Petitioner has demonstrated by a preponderance of the evidence that the challenged claims of the '116 patent are unpatentable. Patent Owner's Response fails to rebut the Petition's showing: Patent Owner's arguments disregard explicit disclosures in the prior art and are further undermined by its own expert's deposition testimony. Petitioner respectfully requests that the Board cancel claims 1–4, 10–13, 15, and 16 of the '116 patent.

Dated: September 1, 2026

Respectfully submitted,

/Arpita Bhattacharyya/

Arpita Bhattacharyya, Reg. No. 63,681
Counsel for Petitioner

CERTIFICATION UNDER 37 C.F.R. § 42.24(d)

Pursuant to 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the foregoing **PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE** contains 3,997 words, excluding the parts exempted under 37 C.F.R. § 42.24(c), as measured by the word-processing system used to prepare this paper.

/Arpita Bhattacharyya/

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), I certify that on September 1, 2026, a copy of **PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE and EXHIBIT 1023** was served upon the below-listed counsel by electronic mail:

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Dated: September 1, 2026

By: /Kate Rose/
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