

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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EOPTOLINK TECHNOLOGY USA INC.,

*Petitioner,*

v.

APPLIED OPTOELECTRONICS, INC.,

*Patent Owner.*

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Case IPR2026-00123  
Patent No. 11,177,887

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**PATENT OWNER'S PRELIMINARY RESPONSE**

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**EXHIBITS**

| Exhibit No. | Description                        |
|-------------|------------------------------------|
| 2001        | Declaration of Dr. Alan E. Willner |

## **I. INTRODUCTION**

Patent Owner Applied Optoelectronics, Inc. (“AOI”) submits this Preliminary Response to the Petition of Eoptolink Technology USA Inc. (“Petitioner”) challenging the patentability of claims 1–3 and 8–12 (the “Challenged Claims”) of U.S. Patent No. 11,177,887 (the “’887 Patent”) (Exhibit 1001). The Director should deny institution because Petitioner has not established a reasonable likelihood that it will prevail on any claim in any Ground raised in the Petition.

In the Petition, Petitioner challenges claims 1–3 and 8–12 of the ’887 Patent. Petitioner asserts three grounds of invalidity, including: (1) Claims 1–3 are anticipated by Kuhara (U.S. Patent No. 7,366,367, Ex. 1004); (2) Claims 8, 10, and 12 are obvious over Kuhara; and (3) Claims 8–12 are obvious over U.S. Patent No. 10,509,184 to Ho (Ex. 1005) in view of Kuhara.

As set forth below and in the attached Declaration of Dr. Alan E. Willner (Exhibit 2001), Petitioner fails to show that the prior art references anticipate or render obvious any of the Challenged Claims. Thus, Petitioner has not established a reasonable likelihood that it will prevail on any claim on any Ground raised in

the Petition. Accordingly, AOI respectfully requests that the Director decline to institute *inter partes* review.

## **II. BACKGROUND**

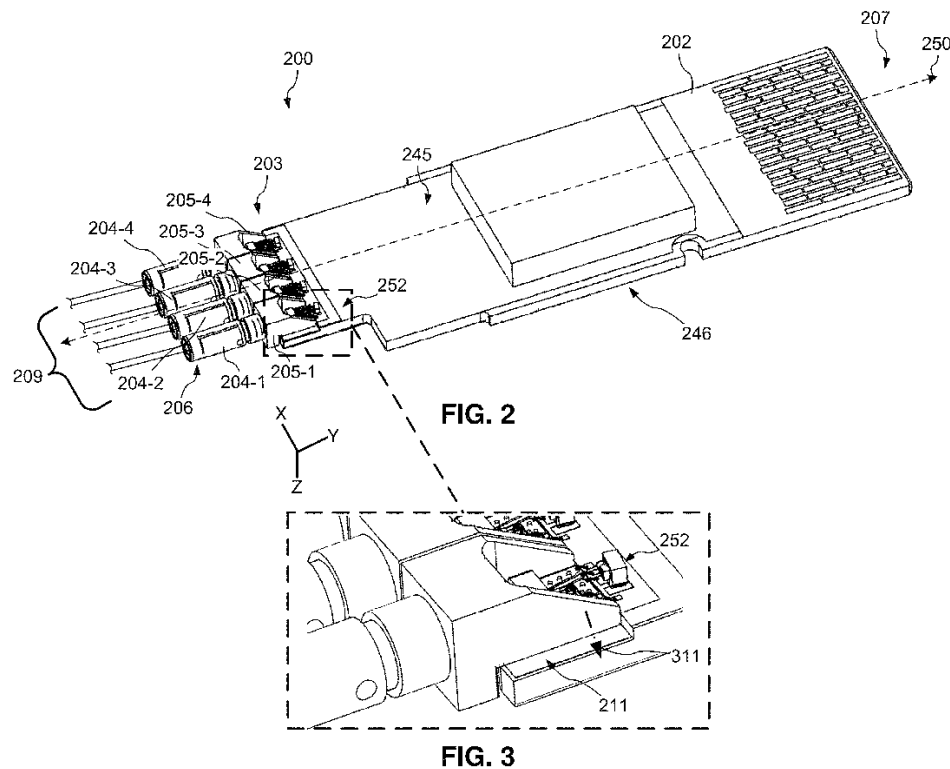
### **A. '887 Patent**

The '887 Patent is generally directed to optical communication devices, and more particularly, to a substrate with a stepped profile for simplifying mounting and alignment of transmitter optical subassemblies (TOSA) modules, e.g., via edge mounting. The stepped profile enables mounting TOSA modules to the substrate in a recessed orientation to reduce the overall distance between terminals of the substrate and associated components of the TOSA, e.g., RF terminals of the substrate and an LDD of the TOSA. The stepped profile further simplifies mounting and optical alignment of TOSA modules by providing at least one mechanical stop to engage surfaces of the TOSA modules and limit travel by the same along one or more axes. *See* Exhibit 1001 at Abstract; *see also* Exhibit 2001 at ¶ 57.

In the '887 Patent, “each of the plurality of TOSA modules 205-1 to 205-4 mount, e.g., edge mount, to the first end 203 of the substrate. The transceiver substrate 202 further includes a stepped profile, with the stepped profile being at

least partially defined by a step/shoulder 211 proximate the first end 203.” *See id.* at Col. 6:16–21; *see also* Exhibit 2001 at ¶ 58.

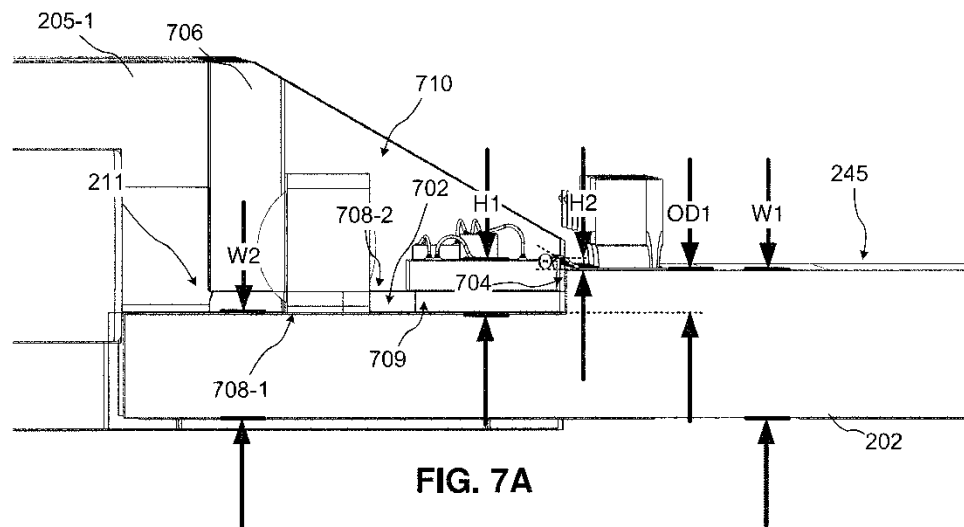
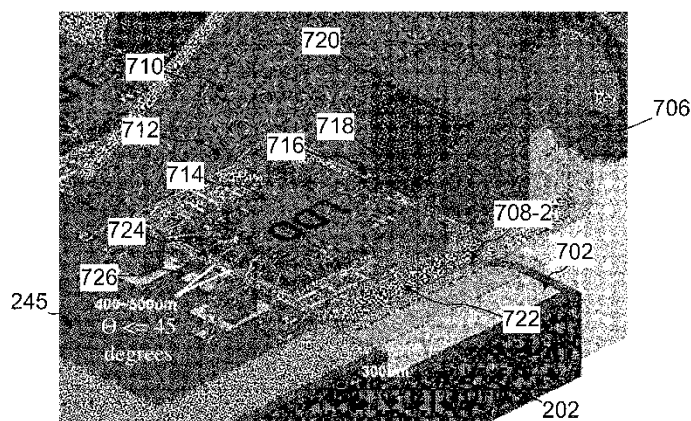
This is shown in Figures 2 and 3 of the ’887 Patent; *see also* Exhibit 2001 at ¶ 59.



Each of the TOSA modules 205-1 to 205-4 can include a base with a plurality of sidewalls that define a generally L-shaped profile that corresponds with the step 211. The profile of the base may therefore advantageously align along at least two axes, e.g., the X and Z axis, by simply engaging and bottoming out against surfaces of the step 211 that operate as an alignment guide by providing

mechanical stops and limits to limit travel along at least one axis. Alignment along the remaining axis, e.g., the Y axis, may therefore be performed relatively simply by lateral movement (e.g., along the X axis) of each TOSA module 205-1 to 205-4. *See id.* at Col. 6:21-34; *see also* Exhibit 2001 at ¶ 60.

Additional aspects of the stepped profile are shown below in figures 7A-7B. *See also* Exhibit 2001 at ¶ 61.



As further shown in FIG. 7A, the first TOSA module 205-1 includes a body 706 (or base) configured to securely mount, e.g., edge mount, to the second mounting region of the substrate 202. The body 706 includes a plurality of sidewalls that provide a substrate mating surface 708-1 and a component mounting surface 708-2. *See id.* at Col. 11:28–55; *see also* Exhibit 2001 at ¶ 62.

### **B. Relevant File History**

Application no. 16/737,438 for the '887 Patent was filed on January 8, 2020 with two independent claims, claims 1 and 12. *See* "'887 Patent File History," Exhibit 1002; *see also* Exhibit 2001 at ¶¶ 63-66.

In a final office action dated February 19, 2021, the examiner rejected independent claims 1 and 12 under 35 U.S.C. 103 as being unpatentable over Wu *et al.* (U.S. Patent Application Publication No: 2014/0105612 A1) in view of Pezeshki *et al.* (U.S. Patent Application Publication No: 2019/0278035 A1). In the office action, the examiner noted, "Wu differs from the claimed invention in that Wu does not specifically disclose the second mounting region at the optical coupling end of the substrate is configured to edge mount to the at least one TOSA module such that a portion of the at least one TOSA module extends from the optical coupling end of the substrate when the at least one TOSA module is coupled thereto. However, positioning of a TOSA module, for example, edge

mounting of TOSA module, such that a portion of TOSA module extends from the optical coupling end of a substrate, is merely a matter of design choice and a specific system requirement.” *Id.* at p. 52-53.

In response, the applicant argued: “Independent claim 1 includes, *inter alia*, ‘wherein the second mounting region at the optical coupling end of the substrate is configured to edge mount to the at least one TOSA module.’ Independent claim 12 includes, *inter alia*, ‘at least one TOSA module edge mounted to the optical coupling end of the transceiver substrate.’ The Office Action correctly notes that Wu fails to teach at least the above-recited features.” Applicant further argued, “an obviousness rejection based on a ‘rearrangement of parts’ is only applicable to reject the claims when the change does not modify the operation of the device.... to edge mount the laser diodes/optoelectronic device 12 of Wu would certainly change the operation, complicate optical alignment, *and likely prevent the use of the MT connector that Wu aims to utilize.*” Applicant also amended independent claims 1 and 12 to include, *inter alia*, “wherein the vertical surface provides a mechanical stop to engage a surface of the at least one TOSA module and limit travel of the at least one TOSA module along one or more axis.” *Id.* at p. 39 (all emphasis in original).

In response, the examiner issued a Notice of Allowance on August 9, 2021. *Id.* at pp. 8–12. The '887 Patent issued on November 16, 2021 with 13 claims, including two independent claim 1 and 12. *See* '887 Patent (Exhibit 1001).

**C. The Litigation Between AOI and Petitioner**

On November 19, 2024, AOI filed a lawsuit against Eoptolink for patent infringement entitled *Applied Optoelectronics, Inc. v. Eoptolink Technology USA Inc.*, case no. 5:24-cv-08165-NW (N.D. CA) (the “Eoptolink Litigation”). The complaint alleges that Petitioner infringes six of AOI’s patents, including the '887 Patent. In the Eoptolink Litigation, Petitioner alleges that each of the six patents-in-suit is invalid. Petitioner has filed petitions for IPR of four of the six patents.

On June 13, 2025, AOI served its infringement contentions, stating that Petitioner infringes claims 1–3 and 10 of the '887 Patent. On August 18, 2025, Petitioner served its invalidity contentions. Petitioner contends that claims 1–3 and 10 are invalid under either § 102 or § 103 on three grounds based on four different references.

**D. The Petition for *Inter Partes* Review**

On December 1, 2025, over one year after AOI filed its complaint in the Eoptolink Litigation, Petitioner filed its Petition for IPR of the '887 Patent.

In the Petition, Petitioner challenges claims 1–3 and 8-12 of the '887 Patent. Petitioner asserts three grounds of invalidity, including: (1) Claims 1–3 are anticipated by Kuhara (U.S. Patent No. 7,366,367, Ex. 1004); (2) Claims 8, 10, and 12 are obvious over Kuhara; and (3) Claims 8–12 are obvious over U.S. Patent No. 10,509,184 to Ho (Ex. 1005) in view of Kuhara.

On December 3, 2025, the PTAB issued its Notice of Filing Date Accorded to Petition and Time for Filing Patent Owner Preliminary Response (Paper 3).

### **III. DEFINITION OF A PERSON OF ORDINARY SKILL IN THE ART**

For the purposes of this Preliminary Response only, AOI applies Petitioner's proposed level of skill in the art: A person of ordinary skill in the art ("POSITA") knowledgeable of the technical field of the '887 Patent would have had "(1) a Bachelor's degree in electrical or electronic engineering or an equivalent degree, and (2) 2-4 years of work experience in optoelectronics, optical networking, optical communications, or a closely-related field." Exhibit 1003 at ¶39; *see also* Exhibit 2001 at ¶¶ 37-41.

AOI reserves the right to further address Petitioner's formulation of a POSITA if trial is instituted.

#### **IV. CLAIM CONSTRUCTION**

Petitioner asserts “[n]o claim terms of the ’887 patent require claim construction to resolve any disputes in this forum.” Petition at p. 13.

#### **V. PETITIONER HAS NOT ESTABLISHED A REASONABLE LIKELIHOOD OF PREVAILING FOR ANY CHALLENGED CLAIM**

Petitioner bears the burden on institution of “demonstrating a reasonable likelihood that it will prevail in showing the unpatentability of at least one claim.” *SMIC, Ams. v. Innovative Foundry Techs., LLC*, IPR2020-00837, Paper 13, 13–14 (PTAB Oct. 9, 2020) (citing 35 U.S.C. §§ 314(a) and 312(a)(3)). In making this showing, Petitioner must identify “the evidence that supports the grounds for the challenge to each claim.” *Id.* Petitioner has not met that burden here.

Here, Petitioner has not shown a reasonable likelihood of success for any challenged claim under any ground of unpatentability. The Director should thus deny institution.

#### **VI. GROUND 1: PETITIONER HAS NOT SHOWN A REASONABLE LIKELIHOOD THAT CLAIMS 1–3 ARE ANTICIPATED BY KUHARA**

##### **A. Overview of Kuhara (Exhibit 1004)**

Kuhara discloses an “optical data link that includes a circuit board and an optical module component. The circuit board includes first and second mounting

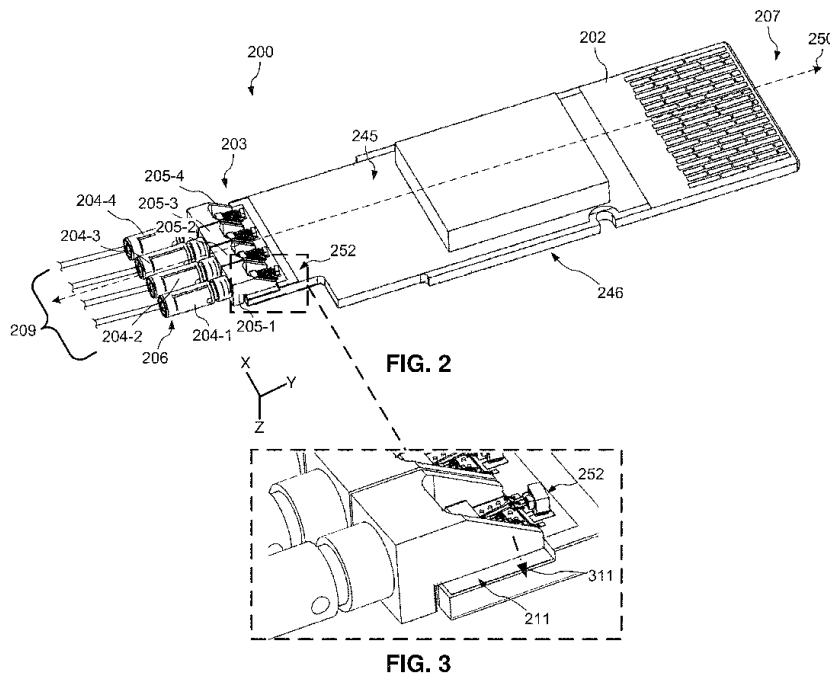
sections. A step is formed between the first mounting section and the second mounting section. The first mounting section has the optical module component, and the second mounting section has an electron device. The optical module component includes a mounting component, a semiconductor optical device, and an optical transmission medium. The semiconductor optical device of the optical module component is electrically connected to the electron device, and is mounted on a first region of the mounting component. The optical transmission medium is supported by a second region of the mounting component, and is optically coupled with the semiconductor optical device.” *See* Exhibit 1004 at Abstract; *see also* Exhibit 2001 at ¶¶ 67-68.

This is shown in Figures 1A, 1B, and 2 of Kuhara.



As discussed, in the '887 Patent, each of the plurality of TOSA modules (205-1 to 205-4) edge mount to the first end 203 of the substrate 202. The transceiver substrate 202 further includes a stepped profile, with the stepped profile being at least partially defined by a step/shoulder 211 proximate to the first end 203. *See* Exhibit 1001 at Col. 6:16-21. Each of the TOSA modules 205-1 to 205-4 can include a base with a plurality of sidewalls that define a generally L-shaped profile that corresponds with the step 211. The profile of the base may therefore advantageously align along at least two axes, e.g., the X and Z axis, by simply engaging and bottoming out against surfaces of the step 211 that operate as an alignment guide by providing mechanical stops and limits to limit travel along at least one axis. Alignment along the remaining axis, e.g., the Y axis, may therefore be performed by relatively simply lateral movement (e.g., along the X axis) of each TOSA module 205-1 to 205-4. *See id.* at Col. 6:21-34; *see also* Exhibit 2001 at ¶ 71.

This shown in Figures 2 and 3 of the '887 Patent. *See* Exhibit 2001 at ¶ 72.



In contrast, in Kuhara, the optical module component 5 (the asserted TOSA module as identified by Petitioner and Dr. Lebby) is not edge mounted to the circuit board 3 (the asserted substrate as identified by Petitioner and Dr. Lebby) as disclosed and claimed in the '887 Patent. Instead, the optical module component 5 is mounted on the top surface 29 of the second mounting section of the circuit board 3 from Kuhara. This is shown in Figures 1A, 1B, and 2 of Kuhara (Exhibit 1004) with annotations added. See Exhibit 2001 at ¶ 73.

FIG. 2

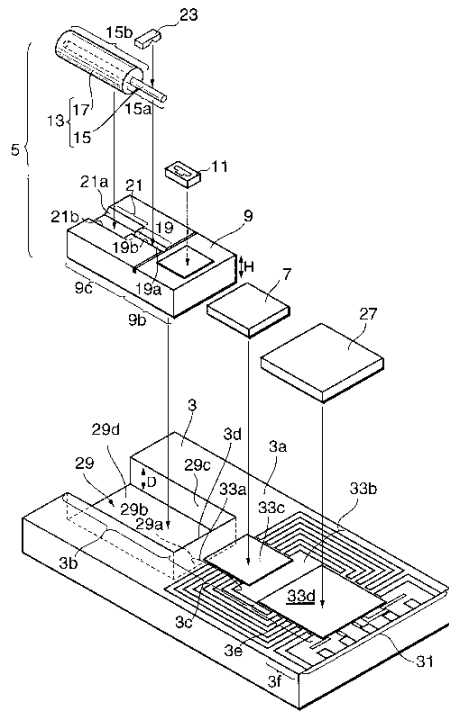


FIG. 1 (A)

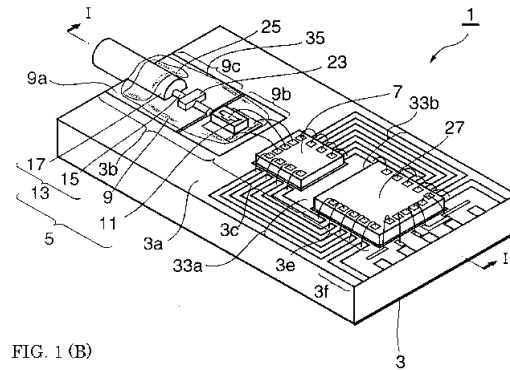
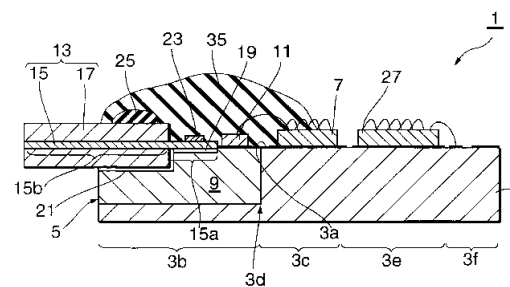


FIG. 1 (B)



Finally, Petitioner and Dr. Lebbby only conclusory assert without further support or explanation that “[a]s further shown in Figures 1A, 1B, and 2 of Kuhara, the TOSA module 5 is edge mounted to the concave portion 29 (second mounting region) at the optical coupling end 3b of circuit board 3.” See Petition at p. 29; Exhibit 1003 at ¶ 68. Petitioner and Dr. Lebbby do not explain why they argue, or believe, that mounting on the top surface 29 is edge mounting even though it does not match the edge mounting disclosed and claimed in the ’887 Patent.

Thus, Petitioner has not shown that Kuhara discloses “wherein the second mounting region at the optical coupling end of the substrate is configured to edge

mount to the at least one TOSA module” as required by Claim 1 of the ’887 Patent.

See Exhibit 2001 at ¶ 74.

**VII. GROUND 2: PETITIONER HAS NOT SHOWN A REASONABLE  
LIKELIHOOD THAT CLAIMS 8, 10, AND 12 ARE OBVIOUS OVER  
KUHARA**

Claim 10 of the ’887 Patent requires, “at least one TOSA module edge mounted to the optical coupling end of the transceiver substrate.” As discussed above for Claim 1, Petitioner and Dr. Lebby have failed to show that Kuhara discloses “at least one TOSA module edge mounted to the optical coupling end of the transceiver substrate” as similarly required by Claim 10 of the ’887 Patent. See Exhibit 2001 at ¶ 75.

Claims 8 and 12 of the ’887 Patent depend from Claims 1 and 10, respectfully. Because Petitioner and Dr. Lebby have not shown that Kuhara anticipates Claim 1 and renders obvious Claim 10, Petitioner and Dr. Lebby have also have not shown that Kuhara renders obvious Claims 8 and 12. See Exhibit 2001 at ¶ 76.

**VIII. GROUND 3: PETITIONER HAS NOT SHOWN A REASONABLE  
LIKELIHOOD THAT CLAIMS 8–12 ARE OBVIOUS OVER HO IN  
VIEW OF KUHARA**

Claim 10 of the ’887 Patent requires, “at least one TOSA module edge mounted to the optical coupling end of the transceiver substrate.” As discussed

above for Claim 1, Petitioner and Dr. Lebby have failed to show that Kuhura discloses “at least one TOSA module edge mounted to the optical coupling end of the transceiver substrate” as similarly required by Claim 10 of the ’887 Patent. Petitioner and Dr. Lebby do not argue or assert that Ho discloses this limitation. See Exhibit 2001 at ¶ 77.

Claims 8–9 and 11–12 of the ’887 Patent depend from Claims 1 and 10, respectfully. Because Petitioner and Dr. Lebby have not shown that Kuhara anticipates Claim 1 and renders obvious Claim 10, Petitioner and Dr. Lebby have also have not shown that Kuhara renders obvious Claims 8–9 and 11–12. See Exhibit 2001 at ¶ 78.

## **IX. RESERVATION OF RIGHTS**

Should the Director decide to institute an *inter partes* review, AOI reserves all rights to make additional arguments in, and present claim constructions and evidence with, its Patent Owner Response. AOI’s silence on any particular claim or limitation at this time is not a concession that the Petition’s discussion of that claim or limitation is properly based. AOI also reserves the right to dispute the level of ordinary skill in the art if the Director decides to institute *inter partes* review. Accordingly, AOI reserves the right to submit additional or alternative arguments of patentability, and nothing in this Preliminary Response acts or should

be construed to act as an admission, acquiescence, or estoppel on the merits of the Petition.

**X. CONCLUSION**

For the reasons set forth above, AOI respectfully requests that the Director deny institution of the Petition for all Challenged Claims of the '887 Patent.

Dated: March 3, 2026

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**CERTIFICATE OF WORD COUNT**

Under the provisions of 37 C.F.R. § 42.24(d), the undersigned hereby certifies that the Microsoft Office word count including all footnotes for the foregoing Patent Owner's Preliminary Response, excluding the table of contents, table of authorities, certificate of word count, appendix and certificate of service, totals 2,762 words, which is less than the 14,000 words allowed under 37 C.F.R. § 42.24(b)(1).

Dated: March 3, 2026

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**CERTIFICATE OF SERVICE**

The undersigned hereby certifies service on the Petitioner, pursuant to 37 C.F.R. § 42.6(e) and by agreement of counsel, by electronic (e-mail) delivery of a true copy of the foregoing **PATENT OWNER'S PRELIMINARY RESPONSE**, which was served on March 3, 2026 to the following Counsel for Petitioner via e-mail:

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