

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.; AND
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

OURARING, INC.,
Patent Owner

Case IPR2024-00928
U.S. Patent No. 9,582,034

PATENT OWNER'S SUR-REPLY

Mail Stop **Patent Board**
Patent Trial and Appeal Board
U.S. Patent and Trademark Office
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TABLE OF EXHIBITS

Exhibit No.	Description
2001	Article titled “The Best Smart Rings to Rule Them All”
2002	Article titled “‘Best Consumer Wellness Company’ award from the UCSF Digital Health Awards and Time magazine's ‘100 Best Inventions of 2020’”
2003	Article titled “Why the Oura Ring Gen 3 was our wearable of the year – Wearable 2022”
2004	Article titled “On the Heels of 1 Million Rings Sold, Oura Now Valued at \$2.55 Billion”
2005	Non-Final Office Action from Application No. 16/224,686, dated October 2, 2019
2006	Response to Non-Final Office Action from Application No. 16/224,686, dated April 1, 2020
2007	Non-Final Office Action from Application No. 15/444,208, dated February 27, 2017
2008	Article titled, “How are PCBs made? A Beginner’s Guide to the PCB Manufacturing Process”
2009	Web capture of OVD Kinegram Website, “KINEGRAM – The Superior DOVID for Highly Secure Passports and IDs”
2010	RESERVED
2011	RESERVED
2012	RESERVED
2013	RESERVED
2014	Article titled, “How are PCBs made? A Beginner’s Guide to the PCB Manufacturing Process”
2015	RESERVED
2016	RESERVED

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2017	RESERVED
2018	RESERVED
2019	RESERVED
2020	Deposition Transcript of Dr. Brian Anthony, Volume I, dated February 25, 2025
2021	Deposition Transcript of Dr. Brian Anthony, Volume II, dated February 25, 2025
2022	RESERVED
2023	Wikipedia - Printed Circuit Board (Dr. Anthony Depo. Ex. 4)

I. INTRODUCTION

Samsung's reply fails to meaningfully rebut any of Ouraring's arguments presented in its Patent Owner Response and offers no sound argument that its references invalidate U.S. Patent No. 9,582,034 under a proper reading of the claims.

Samsung's Reply confirms rather than refutes the fundamental deficiencies identified in Oura's Patent Owner Response ("POR") that the Petition fails to show that Claims 11-13 are unpatentable over Schröder alone or Schröder in view of Yuen. Unable to point to the expressly-claimed structures in Schröder or to articulate a coherent rationale for grafting Yuen's wrist-mounted electronics onto a finger-ring, Petitioner simply supports its theories by misconstruing Dr. Mercier's testimony from another proceeding. Nothing in the Reply cures the defects in the prior art as to Claims 11-13.

Schröder's inlay 12 is not a flexible printed circuit board. At most it is a passive carrier foil. Ex-1081 at 69:18-71:17, 80:8-81:10, 79:17-80:7. Schröder never "seals" any PCB and "at least one component" between internal and external housing portions, because Schröder's chip module 10 protrudes through the ring wall for replacement and service. Ex-1081 at 111:25-112:17. Schröder's window is a discrete insert, not "substantially transparent external potting." "Potting" is an encapsulant that encloses space; it is not a window. *See* Ex-1001, 17:4-25, 18:61-63.

Additionally, Yuen's flat planar, wrist-sized electronics cannot simply be "scaled down" and wrapped around a finger without wholesale redesign, and unacceptable power trade-offs. Petitioner's proffered reasons to modify Schröder with Yuen amount to nothing more than impermissible hindsight.

For these reasons and for the reasons stated in the Patent Owner's Response, Petitioner still has not shown, by a preponderance of the evidence, that its references invalidate U.S. Patent No. 9,582,034.

II. GROUND 1/2: SCHRÖDER ALONE OR SCHRÖDER IN VIEW OF YUEN DOES NOT RENDER CLAIMS 11-13 UNPATENTABLE

A. Petitioner repeatedly twists Dr. Mercier's testimony to falsely assert that Schröder discloses "a flexible printed circuit board arranged around a portion of a circumference of an interior surface of the internal housing" of claim 11.

Petitioner's Reply lifts Dr. Mercier's testimony out of context in the related PGR2024-00030 and PGR2024-00039 proceedings as the main retort to analysis set forth in Patent Owner's Response. Patent Owner demonstrated that Schröder fails to teach the limitation of element 11[b] for at least three independent reasons: (i) the reference never shows or describes a flexible printed circuit board "around a portion of a circumference" of the ring's interior surface of the internal housing; (POR at 20-21); (ii) the only component that might be thought of as a board, the replaceable chip module of Figure 3, is flat and indisputably sits outside the recess, protruding

through the exterior housing; (POR at 20-22) and (iii) the antenna-supporting carrier foil of Figures 3-10 is not a PCB (POR at 22-23).

Petitioner's Reply does not repair any of these fatal deficiencies; instead it argues that Dr. Mercier somehow supported the existence in Schröder of a flexible printed circuit board disposed along the interior circumference of the ring housing. That cannot withstand even casual scrutiny. When Dr. Mercier's testimony is read in full and in context, it is plain that:

1. Dr. Mercier never identified **any** structure in Schröder that a person of ordinary skill in the art ("POSITA") would recognize as a flexible printed circuit board;
2. Schröder discloses a ring comprised of two equal "bagel" halves, **not** a ring comprised of internal and external housing portions; and
3. Dr. Mercier repeatedly explains that Schröder is extremely ambiguous and that Figure 7, at best, is an ambiguous partial cross-section that does **not** reveal internal and external housing portions or a flexible PCB positioned between those portions.

1. **Dr. Mercier's testimony was unequivocal: Schröder fails to show a flexible PCB, and fails to place any board in the claimed location.**

During cross-examination Petitioner's counsel repeatedly attempted to coax Dr. Mercier into admitting that inlay 12 is a PCB. Instead, Dr. Mercier explained that a POSITA would require, at minimum, etched or printed conductive traces,

multiple layers, and mounted components before calling a structure a “printed circuit board.” Ex-1081 at 69:18-71:17. When asked whether inlay 12 could be a PCB, Dr. Mercier responded that while Kapton and PET are materials sometimes used in flexible PCBs, that does not necessarily make it circuit board:

- Q. PET, Kapton, et cetera, are carrier materials that would have been understood as materials that are used for a printed circuit board, correct?
- A. They could be, but not necessarily so. Printed -- flexible printed circuit boards often use polyimide and other materials as well. But despite that, you know, there's things like Kapton tape that I've used in my own work that I don't use for printed circuit boards but just as thin, you know, substrates on which to place for items or stick things together, for example.
- Q. Okay. But you don't disagree that PET and Kapton are materials that could be used for printed circuit boards, correct?
- A. That's right. They could be used.

Id. at 80:8-81:10. In other words, the mere use of Kapton or PET does not convert a passive foil into a multilayer printed wiring board.

The Wikipedia excerpt on which Petitioner relies specifies that a PCB is a “laminated sandwich structure of conductive and insulating layers, each with a pattern of traces . . . etched from one or more sheet layers of copper.” Ex-1081 at 43:12-19. Schröder’s inlay lacks every one of those elements. It is a single-layer strip

carrying nothing but an antenna coil, and contacts for a removable chip and perhaps contacts for a battery at the top of the ring indicated by figure 3. Ex. 1081 at 79:17-80:7 (“Q. . . . It’s possible to connect chip module 10 to the contacts of inlay 12 . . . A. . . . in the paragraph in which he’s describing figure 3, he says that. Yes”); *Id.* at 97:15-22 (“[I]f the battery were located on the carrier, it would be located in a similar position to where figure 3 indicates where the chip module would be, simply because a batter of sufficient size to, you know, power the device in question here would be too large to fit on a 100-micro-thick carrier.”).

Schröder’s chip module likewise is not a flexible printed circuit board arranged around a portion of a circumference of an interior surface of the internal housing. Even if the chip module of Figure 3 was treated as a flexible PCB, it protrudes through the exterior surface and is topped by a hinged cover. As Dr. Mercier explained, “if the intention of Schröder was to make it such that the devices would be kind of even with the rest of the surface of the carrier foil, I didn’t see . . . how that was possible.” Ex-1081 at 111:25-112:17. Petitioner’s Reply provides no mechanism by which this protruding module could be repositioned between the ring halves or bent into an arcuate shape conforming to the interior circumference because Schröder’s inlay is too narrow to host a the chip module. Ex-1081 at 99:15-100:17 (“Schröder already shows that the chip module is too large to reside inside

the housing . . . it needs to protrude from the top . . . a POSITA reading this would understand to locate that battery on the top of the ring, perhaps on top or next to the chip module, just as all the prior art in smart rings had done up until this time”); *Id.* at 89:17-18. (“[F]igure 3 is the only one that actually shows the chip module . . .”)

Petitioner offers no evidence that a POSITA in 2013 would have called the antenna inlay a printed circuit board and offers no evidence that the chip module could be located around a portion of a circumference of an interior surface of the internal housing.

2. Dr. Mercier clearly testifies that Schröder’s ring is comprised of two “bagel” shaped ring halves, not unequal internal and external housing portions.

Petitioner fails to show that Schröder is comprised of internal and external housing portions. To rectify this, Petitioner falsely implies Dr. Mercier’s testimony about Schröder having two lateral ring halves to support the notion that Schröder teaches an internal and external housing. Reply at 2-3 (“The two ring halves 16 and 18 respectively have a recess into which the inlay 12 is inserted.’ . . . This point does not appear to be meaningfully disputed, with **PO’s expert agreeing** that ‘inlay 12, with chip module 10 and various other components on it, is inserted into a recess between ring halves 16 and 18 in Schröder,’ Ex-1081, 82:10:12.”) Dr. Mercier explicitly rejected the notion that Schröder teaches an internal and external housing

structure many times during his deposition including **the next question** of his testimony where he explains that Schröder, teaches a ring comprised of two equal “bagel” shaped halves:

Q: And in the figure 4 embodiment, back up a little bit further in column 12, the structure is made of ring halves 16 and 18, respectively, that have a recess into which the inlay 12 is inserted. Do you see that?

A: Yes.

Q: And so inlay 12, with chip module 10 and various other components on it, is inserted into a recess between ring halves 16 and 18 in Schröder, right?

A: Yes

Q: And if you look at figure 4, you see the space for inlay 12. You see ring half 18. You see an inner ring which isn't labeled, but that inner ring, you would agree corresponds to inner half 16, right?

A: **I don't agree with that actually.**

Q: Okay. That inner ring, what, in your opinion, does it correspond to?

A: So the word ‘half,’ I think, means something here. And half of something should be, you know, half of it. And so my opinion and my interpretation of reading Schröder – which, again I should emphasize is, at best, unclear – is that figure 4 is showing one half of the ring sliced down the middle.

And a good analogy for this would be thinking like a bagel. **The normal dimension that you would cut a bagel is in half. . . .**

To complete the analogy, maybe you'd use your finger and dig a little trench into one half of the bagel or possibly both sides of the bagel, put some cream cheese in here, which would correspond in this analogy to the inlay, and then take those two halves and bring them back together.

That's my interpretation of figure 4.

Q: I think that's what's shown here in figure 5. This is kind of the bagel interpretation.

A: Exactly . . . And I should note that **figure 5 corresponds to figure 4 as discussed in the paragraph that introduces figure 4 and figure 5.**

Ex-1081 82:4-83:23; *See* Ex-1007 at 27:27-40 ("List of Reference Signs . . . **16 Ring half 18 Ring half**"); *Id.* at 3:35-42 (Fig.4 shows a longitudinal section through a finger-ring as an example of a security unit. Fig. 5 shows a cross section, corresponding to FIG. 4 of the finger-ring.); *Id.* at 12:4-9 ("The finger-ring 2 consists of two ring halves 16 and 18. The two ring halves 16 and 18 respectively have a recess into which the inlay 12 is inserted.") *Id.* at Fig. 4, 5.

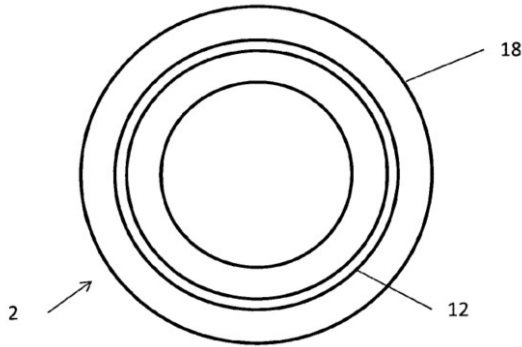


Fig. 4

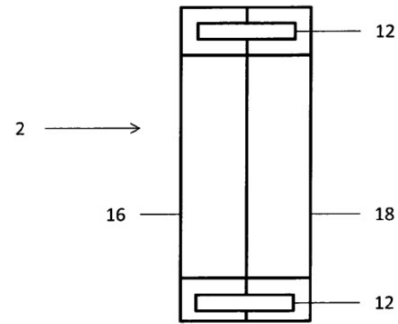


Fig. 5

Petitioner attempts to reconcile this by confusingly labeling portions of solid housing Ring half 18 as the internal and external housing portion.

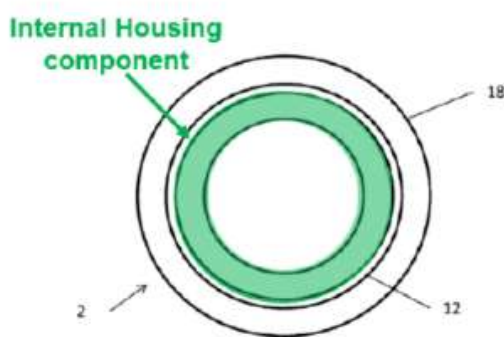


Fig. 4

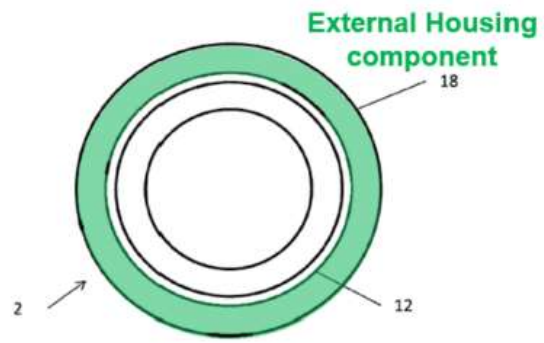
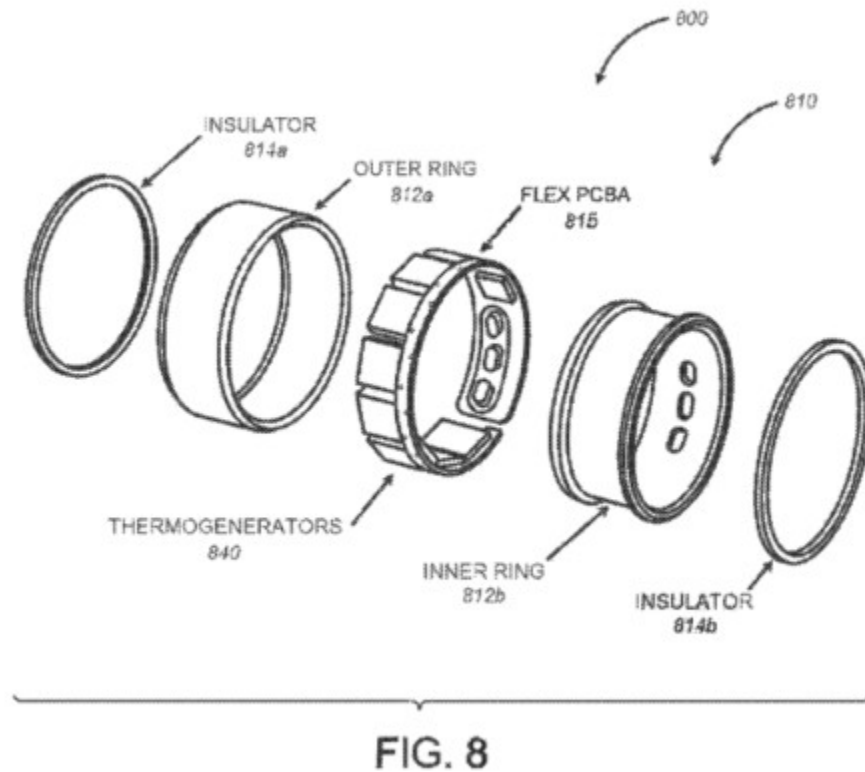


Fig. 4

Petition at 21,23 (labeling portions of Ring half 18 as an internal housing component and an external housing component).

This is not consistent with the internal and external housing portions of the '034 Patent. The external and internal housing portions are depicted as two separate components that are not equal in size or function. Ex. 1001 at Fig. 8



Schröder repeatedly defines elements 16 and 18 as equal in form and function. “The finger-ring 2 consists of two ring halves **16** and **18**.” Ex. 1007 at 12:7-9; *See also* 12:10-22; 27:37-39. Petitioner never explains how two identical ring halves are internal and external housing portions.

3. **Dr. Mercier never “admitted” that Figure 7 depicts a conventional 90-degree cross-section revealing an internal PCB.**

Later in Petitioner’s reply, Petitioner again twists Dr. Mercier’s testimony on what Figure 7 of Schröder teaches. Pet. at 4 (citing EX-1081, 83:20-85:2). Dr.

Mercier clearly states that Figure 7 depicts the bagel configuration from a different viewing angle:

Q. Okay. Would you agree, looking down at figure 7, that this is a slightly different slice of the bagel? There is an outer half, 18, and an inner half, 16 which are a little bit different that what's shown in figure 5?

A: . . . I should note that Schröder does specifically refer to the components in figure 7 as components 18 and 16, which are two ring halves. Figure 4 shows one ring half. . . . But Schröder does specifically say it's elements 18 and 16 that come together, and he does explicitly show elements 16 and 18 in figure 5 as being two halves of the ring in a bagel-cut configuration. . . . **[My interpretation of figure 7 is . . . [that] figure 7 might be an angled cross section. So we still have the two ring halves coming together, but in between them, we have the inlay 12.**

Ex-1081, 83:20-84:20; *see also* Ex-1081, 86:12-22, 87:10-23, 89:22-90:8, 93:8-94:14.

In short, Petitioner's narrative is built on assertions that find no support in either the plain text of the reference or expert testimony. The Board should find that element 11[b] is not taught by Schröder alone.

B. Schröder and Yuen are not analogous and Petitioner fails to articulate a plausible motivation to combine

Petitioner's Reply continues to treat Schröder's security-oriented, antenna-centric finger ring and Yuen's wrist-borne fitness monitor as if they were interchangeable. The record demonstrates the opposite. *See* POR at 17-20. The references address different problems, employ incompatible structures, and offer no teaching that would have prompted a person of ordinary skill in the art to merge them in the manner proposed.

First, the two references are not in the same field of endeavor and are not pertinent to one another's problem. Schröder is directed to overcoming range limitations in RFID smart-card applications by embedding an antenna coil and a replaceable chip module in a rigid metal or plastic ring. Its focus is authentication, not physiological sensing. POR at 10-11. Yuen, by contrast, is an activity tracker in the form of a wrist band. POR at 12. There is only one reference to other forms such as a "toe band" or "earring" in Yuen. Ex-1006 at 24:35-41. This reference is unsupported by any structural detail and never suggested a miniaturized ring implementation. Ex-1081 at 160:17-161:8, 162:3-17. Dr. Mercier confirmed that a

POSITA, reading Yuen in 2013, would have understood the described electronics package to be far too large and planar to reside inside the thin form contemplated by Schröder, and that nothing in Yuen teaches how to achieve the substantial miniaturization and power reductions that would be required implement Yuen in Schröder. Ex-1081 at 157:2-164:23.

Second, even assuming that Yuen's flexible PCB could be scaled down, Petitioner offers no reason why a POSITA would have transplanted a Yuen's planar board into Schröder's ring. Petitioner cites only generic statements about the desirability of "smaller and more comfortable wearable devices" and a generalized industry trend toward miniaturization. The Reply never explains how the wholesale redesign necessary to bend Yuen's large system into Schröder's narrow form could be accomplished without undue experimentation. Dr. Mercier testified that integrating Yuen's optical system would require solving numerous issues. Ex-1081 at 163:1-164:23. Petitioner ignores all of these obstacles.

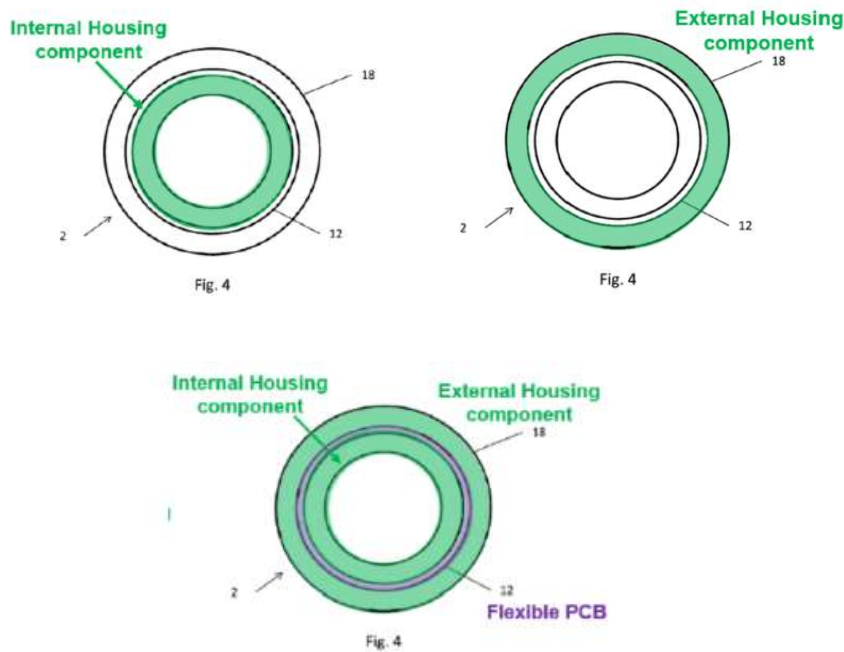
Petitioner's proposed combination is, at best, an attempt to start the design again from scratch using the '034 Patent as a roadmap, exactly the hindsight reconstruction a obviousness inquiry forbids.

C. The combination of Schröder and Yuen does not disclose or suggest "the external/internal housing portion configured to seal the at least one component and the printed circuit board in an

**internal space defined by the interior surface of the
internal/external housing” of claim 11.**

Petitioners’ Reply ignores Patent Owner’s argument that Schröder teaches that the chip module is not sealed but rather accessible through a hinged covering. POR at 26-28. Instead, Petitioner argues that the Patent discloses two different embodiments. Petitioner ignores Figure 3, and focuses on Figures 4-10. Reply at 16-18.

Even assuming the Board accepts Petitioner’s theory that Figures 4-10 do not have a hinged covering, Schröder still does not disclose an “external housing portion configured to seal the at least one component and the printed circuit board in an internal space defined by the interior surface of the internal housing.” Rather, according to Petitioner, Figures 4-10 disclose a ring half that has external and internal housing portions. Two ring halves (**16 and 18**) are joined together to form an enclosed space. If the Board were to accept Petitioner’s labeling, Schröder, at best, would disclose two ring halves where each ring half simultaneously 1) is configured to “seal the at least one component and the printed circuit board in an internal space” and 2) defines “the interior surface of the internal housing.



Petition at 21, 23,24 (labeling a portion of Ring half 18 as an internal housing component and a portion of Ring half 18 as an external housing component). This is contrary to the claim 11 of the '034 Patent which requires one structure (the internal housing portion) to define the internal space and one structure (the external housing portion) to be configured to seal the printed circuit board.

For this reason and the reasons stated in the POR, the Board should find Schröder does not disclose “external housing portion configured to seal the at least one component and the printed circuit board in an internal space defined by the interior surface of the housing portion.”

D. The combination of Schröder and Yuen does not show the “external housing portion compris[ed] [of] a substantially

transparent external potting” of claim 12 or “at least one LED configured to emit at least one of a visible light, infrared radiation, and ultraviolet radiation through the external potting” of claim 13.

Petitioner’s Reply (Paper 19 at 19-22) continues to rely on mis-readings of the challenged claims. Neither Schröder’s security “window” nor Yuen’s optical “window” is a “substantially transparent external potting,” and the Reply offers no coherent theory by which a POSITA could have transformed those discrete windows into the very different potting structure required by independent claim 12.

The Reply collapses the critical distinction the ’034 Patent draws between (i) a external housing portion comprised of a “substantially transparent external potting” that encapsulates the internal electronics (Ex-1001, 17:4-29; 18:61-63) and (ii) an aperture or window a localized opening in an external housing. Ex-1001, 17:30-35 “. . . light, external to the housing can pass through the external housing 1214 . . . **without the need for a window**. Nothing in Schröder or Yuen suggests that their windows serve an encapsulating function.

For this reason and for those set forth in Patent Owner’s Response, Petitioner has not met its burden to show that the combination of Schröder and Yuen discloses, or would have rendered obvious, “a substantially transparent external potting” or “at least one LED configured to emit at least one of a visible light, infrared radiation, and ultraviolet radiation through the external potting.”

III. CONCLUSION

For at least the reasons set forth in Patent Owner's Response and herein, the Board should conform patentability of Claims 1-5, 11-13, and 16-18.

Dated: August 26, 2025

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CERTIFICATE OF WORD COUNT UNDER 37 C.F.R. § 42.24(d)

I hereby certify that the foregoing Patent Owner's Sur-Reply contains 3,263 words as measured by the word-processing software used to prepare the document, in compliance with 37 C.F.R. § 42.24(d).

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Patent Owner Sur-Reply

CERTIFICATE OF SERVICE

I hereby certify that, on August 26, 2025, I caused a true and correct copy of Patent Owner's Sur-Reply Pursuant to 37 C.F.R. §42.107 to be served via email to the following counsel for Petitioner:

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