

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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SAVANT TECHNOLOGIES LLC d/b/a GE LIGHTING and  
LEDVANCE LLC,  
Petitioners,

v.

FEIT ELECTRIC COMPANY, INC.,  
Patent Owner.

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Case IPR2024-01357  
U.S. Patent No. 8,604,678

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SAVANT TECHNOLOGIES LLC d/b/a GE LIGHTING,  
ELONG INTERNATIONAL USA INC., and  
XIAMEN LONGSTAR LIGHTING CO. LTD.,  
Petitioners,

v.

FEIT ELECTRIC COMPANY, INC.,  
Patent Owner.

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Case IPR2025-00260  
U.S. Patent No. 8,604,678

**PATENT OWNER'S SUR-REPLY IN SUPPORT OF ITS  
PATENT OWNER RESPONSE**

## TABLE OF CONTENTS

|      |                                                                                                                                                                                         |    |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| I.   | Introduction.....                                                                                                                                                                       | 1  |
| II.  | Argument .....                                                                                                                                                                          | 2  |
| A.   | Petitioners’ attempt to unfairly add new grounds to the<br>Petition is in direct violation of the Board’s rules and<br>should be denied.....                                            | 2  |
| B.   | Petitioners’ arguments continue to lack a credible<br>motivation to combine the cited references .....                                                                                  | 5  |
| 1.   | Patent Owner’s statements regarding motivation to<br>combine are directly responsive to the Board’s<br>guidance .....                                                                   | 5  |
| 2.   | Patent Owner’s new arguments regarding “UV-<br>pumped” versus “blue-pumped” LEDs fail to show<br>that one of skill would have been motivated to<br>combine the asserted references..... | 6  |
| 3.   | Stokes does not express a simple preference of one<br>structure over another—it <i>teaches away</i> from the<br>claimed invention .....                                                 | 8  |
| 4.   | Petitioners do not respond to Patent Owner’s<br>arguments regarding different LED packaging<br>techniques.....                                                                          | 10 |
| C.   | Petitioners’ arguments regarding the blue LED emission<br>spectrum mischaracterize the issue and Dr. Schubert’s<br>testimony .....                                                      | 11 |
| D.   | Secondary considerations demonstrate non-obviousness .....                                                                                                                              | 12 |
| E.   | Professor Doolittle’s testimony speaks for itself.....                                                                                                                                  | 14 |
| III. | Conclusion .....                                                                                                                                                                        | 15 |

## TABLE OF AUTHORITIES

### Cases

|                                                                                                                                |       |
|--------------------------------------------------------------------------------------------------------------------------------|-------|
| <i>Apple Inc. v. Samsung Elecs. Co., Ltd.</i> ,<br>839 F.3d 1034 (Fed. Cir. 2016).....                                         | 14    |
| <i>Depuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.</i> ,<br>567 F.3d 1314 (Fed. Cir. 2009).....                             | 11    |
| <i>Elbit Sys. of Am., LLC v. Thales Visionix, Inc.</i> ,<br>881 F.3d 1354 (Fed. Cir. 2018).....                                | 8     |
| <i>Fox Factory, Inc. v. SRAM, LLC</i> ,<br>944 F.3d 1366 (Fed. Cir. 2019).....                                                 | 15    |
| <i>Icon Health &amp; Fitness, Inc. v. Strava, Inc.</i> ,<br>849 F.3d 1034 (Fed. Cir. 2017).....                                | 8     |
| <i>In re Cyclobenzaprine Hydrochloride Extended-Release Capsule<br/>Patent Litig.</i> ,<br>676 F.3d 1063 (Fed. Cir. 2012)..... | 9, 15 |
| <i>Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.</i> ,<br>821 F.3d 1359 (Fed. Cir. 2016).....                          | 7     |
| <i>Stratoflex, Inc. v. Aeroquip Corp.</i> ,<br>713 F.2d 1530 (Fed Cir. 1983).....                                              | 15    |
| <i>Tennent Co. v. Oxygenator Water Techs., Inc.</i> ,<br>IPR2021-00625, Paper 9 (P.T.A.B. Aug. 20, 2021) .....                 | 12    |

### Regulations

|                            |   |
|----------------------------|---|
| 37 C.F.R. § 42.104(b)..... | 4 |
|----------------------------|---|

**PATENT OWNER’S EXHIBIT LIST**

| <b>Exhibit</b> | <b>Description</b>                                                                                                                                                                                                                                                                                                       |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2001           | Declaration of E. Fred Schubert, Ph.D.                                                                                                                                                                                                                                                                                   |
| 2002           | <i>Curriculum vitae</i> for E. Fred Schubert, Ph.D.                                                                                                                                                                                                                                                                      |
| 2003           | U.S. Patent Publication 2002/0180351 (“McNulty”)                                                                                                                                                                                                                                                                         |
| 2004           | U.S. Patent Publication 2001/0000622 (“Reeh”)                                                                                                                                                                                                                                                                            |
| 2005           | Scheduling Order (Dkt. 37), <i>Feit Electric Co., Inc. v. Elong International USA Inc.</i> , No. 3:24-cv-1089 (N.D. Tex.)                                                                                                                                                                                                |
| 2006           | June 2024 United States District Courts — Federal Court Management Statistics for N.D. Tex., E.D. Ky., and N.D. Ohio ( <a href="https://www.uscourts.gov/statistics-reports/federal-courtmanagement-statistics-june-2024">https://www.uscourts.gov/statistics-reports/federal-courtmanagement-statistics-june-2024</a> ) |
| 2007           | Case Management Order (Dkt. 19), <i>Feit Electric Co., Inc. v. Savant Technologies LLC d/b/a GE Lighting</i> , No. 1:24-cv-473 (N.D. Ohio)                                                                                                                                                                               |
| 2008           | Scheduling Order (Dkt. 33), <i>Feit Electric Co., Inc. v. Ledvance, LLC</i> , No. 5:24-cv-31 (E.D. Ky.)                                                                                                                                                                                                                  |
| 2009           | Savant’s Initial Invalidity and Unenforceability Contentions, <i>Feit Electric Co., Inc. v. Savant Technologies LLC d/b/a GE Lighting</i> , No. 1:24-cv-473 (N.D. Ohio), served on September 5, 2024                                                                                                                     |
| 2010           | Ledvance’s Initial Invalidity and Unenforceability Contentions, <i>Feit Electric Co., Inc. v. Ledvance, LLC</i> , No. 5:24-cv-31 (E.D. Ky.), served on September 24, 2024                                                                                                                                                |
| 2011           | Elong’s Initial Invalidity and Unenforceability Contentions, <i>Feit Electric Co., Inc. v. Elong International USA Inc.</i> , No. 3:24-cv-1089 (N.D. Tex.), served on December 9, 2024                                                                                                                                   |
| 2012           | Comparison of Petition and Expert Testimony Analysis                                                                                                                                                                                                                                                                     |
| 2013           | Mike Krames, <i>Light-Emitting Diode Technology for Solid-State Lighting</i> , in <i>Frontiers of Engineering: Reports on Leading-Edge Engineering from the 2009 Symposium</i> , 67 (2009)                                                                                                                               |
| 2014           | E. Fred Schubert, <i>Light-Emitting Diodes</i> (2nd ed. 2006)                                                                                                                                                                                                                                                            |
| 2015           | Matthew G. Bevan & Bruce M. Romenesko, <i>Modern Electronic Packaging Technology</i> , 20 JOHNS HOPKINS APL TECH. DIGEST 22 (1999)                                                                                                                                                                                       |
| 2016           | X. A. Cao & S. D. Arthur, <i>High-power and reliable operation of vertical light-emitting diodes on bulk GaN</i> , 85 Applied Physics Letters 3971 (2004).                                                                                                                                                               |

IPR2024-01357

IPR2025-00260

U.S. Patent No. 8,604,678

| Exhibit | Description                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2017    | Michael R. Krames et al., <i>Status and Future of High-Power Light-Emitting Diodes for Solid-State Lighting</i> , 3 J. Display Tech. 160 (2007)                                                                                                                                                                                                                                                                                                     |
| 2018    | Mehmet Arik et al., <i>Thermal Management of LEDs: Package to System</i> , 5187 Proc. SPIE 64 (2004)                                                                                                                                                                                                                                                                                                                                                |
| 2019    | U.S. Dep’t Energy, <i>Critical Materials Strategy</i> (Dec. 2010)                                                                                                                                                                                                                                                                                                                                                                                   |
| 2020    | Zongyuan Liu et al., <i>Measurement and numerical studies of optical properties of YAG:Ce phosphor for white light-emitting diode packaging</i> , 49 Applied Optics 247 (2010)                                                                                                                                                                                                                                                                      |
| 2021    | March 2024 United States District Courts — Federal Court Management Statistics for N.D. Tex., E.D. Ky., and N.D. Ohio ( <a href="https://www.uscourts.gov/data-news/reports/statisticalreports/federal-court-management-statistics/federal-courtmanagement-statistics-march-2024">https://www.uscourts.gov/data-news/reports/statisticalreports/federal-court-management-statistics/federal-courtmanagement-statistics-march-2024</a> )             |
| 2022    | September 2024 United States District Courts — Federal Court Management Statistics for N.D. Tex., E.D. Ky., and N.D. Ohio ( <a href="https://www.uscourts.gov/data-news/reports/statisticalreports/federal-court-management-statistics/federal-courtmanagement-statistics-september-2024">https://www.uscourts.gov/data-news/reports/statisticalreports/federal-court-management-statistics/federal-courtmanagement-statistics-september-2024</a> ) |
| 2023    | Declaration of William A. Doolittle, Ph.D., dated November 6, 2024, <i>Feit Electric Company, Inc. v. Savant Technologies, d/b/a GE Lighting</i> , Case No. 24-cv-00473                                                                                                                                                                                                                                                                             |
| 2024    | Rebuttal Declaration of William A. Doolittle, Ph.D., dated November 20, 2024, <i>Feit Electric Company, Inc. v. Savant Technologies, d/b/a GE Lighting</i> , Case No. 24-cv-00473                                                                                                                                                                                                                                                                   |
| 2025    | Deposition Transcript of William A. Doolittle, Ph.D., dated June 10, 2025                                                                                                                                                                                                                                                                                                                                                                           |
| 2026    | Declaration of E. Fred Schubert, Ph.D., dated June 25, 2025                                                                                                                                                                                                                                                                                                                                                                                         |
| 2027    | U.S. Provisional App. No. 61/427,411, filed on December 21, 2010                                                                                                                                                                                                                                                                                                                                                                                    |
| 2028    | U.S. Provisional App. No. 61/390,091, filed on October 5, 2010                                                                                                                                                                                                                                                                                                                                                                                      |
| 2029    | Home Depot - Feit Electric White Filament LED Light Bulbs listing                                                                                                                                                                                                                                                                                                                                                                                   |
| 2030    | Candle Power Forums article: Feit LED filament bulb with white filaments                                                                                                                                                                                                                                                                                                                                                                            |
| 2031    | The Home Depot Announces 2024 Innovation Award Winners                                                                                                                                                                                                                                                                                                                                                                                              |

IPR2024-01357

IPR2025-00260

U.S. Patent No. 8,604,678

| <b>Exhibit</b> | <b>Description</b>                                                                             |
|----------------|------------------------------------------------------------------------------------------------|
| 2032           | Feit Electric Lighting Instagram consumer comments regarding filaments                         |
| 2033           | Feit Electric Lighting Instagram consumer comments regarding yellow filaments                  |
| 2034           | Feit Electric Lighting Instagram consumer comments: Regular Yellow Filament vs. White Filament |
| 2035           | Home Depot White Filament price point of \$29.97                                               |
| 2036           | Home Depot Yellow Filament price point of \$21.97                                              |
| 2037           | Reddit: Do white filament LED edison bulbs exist?                                              |
| 2038           | Deposition Transcript of William A. Doolittle, Ph.D., dated July 17, 2025                      |
| 2039           | Declaration of E. Fred Schubert, Ph.D., dated July 25, 2025                                    |

## I. INTRODUCTION

Petitioners Savant Technologies LLC d/b/a GE Lighting, LEDVANCE LLC, Elong International USA Inc., and Xiamen Longstar Lighting Co. Ltd.

(“Petitioners”) argue a *new ground* for the first time in their Reply—that the challenged claims would have been obvious in view of a *single* prior art reference. This new and untimely argument fails for two reasons. First, Petitioners presented no single-reference grounds in either of their Petitions, and the Board should reject these new grounds based on the Board’s well-established rules which prohibit new arguments in reply. Second, Petitioners conceded in their Petitions that *no single reference* teaches all limitations of any challenged claim. Petitioners’ new and contradictory reversal belies their original grounds and highlights the impropriety of their new grounds.

Petitioners no doubt resort to this impermissible tactic because they cannot defend the alleged motivation to combine the various references they presented in their Petitions. The Petitions took disparate teachings from incompatible prior art references and improperly cobbled them together to arrive at the claimed invention. This approach was unfounded from the beginning, as addressed in Patent Owner’s Response. For example, Petitioners would combine Stokes with other references even though Stokes and its outside phosphor arrangement

expressly teaches away from any such combination. Petitioners also ignore one of the most critical defects in their original grounds. Additionally, Petitioners combine various references that describe structurally different LED packaging forms and applications, but critically fail to explain *how* a POSA would have combined those disparate teachings to arrive at the claimed invention relying on impermissible hindsight alone. Petitioners do not even attempt to rebut this argument.

Finally, Petitioners' arguments about a lack of nexus to the secondary considerations of non-obviousness are facially deficient. Contrary to Petitioners' assertion, there is no requirement that Patent Owner provide a claim chart mapping the claims to its own product. Consistent with Federal Circuit precedent, Patent Owner demonstrated that each of the enumerated secondary considerations is directly related to the success of and market praise for *white filament style* light emitting devices—including Petitioners' products that practice the claimed invention.

## **II. ARGUMENT**

### **A. Petitioners' attempt to unfairly add new grounds to the Petition is in direct violation of the Board's rules and should be denied**

Recognizing that the Petitions fail to demonstrate a clear motivation to combine the asserted references, Petitioners now seek to introduce new arguments

IPR2024-01357  
IPR2025-00260  
U.S. Patent No. 8,604,678

based on alleged single-reference obviousness grounds. These new grounds were neither included in the Petition nor instituted, as shown below by the list of grounds on which the Board instituted in IPR2024-01357 and IPR2025-00260.

#### **IPR2024-01357**

| Ground | Claims                              | Description                                                                |
|--------|-------------------------------------|----------------------------------------------------------------------------|
| 1      | 1-3, 6, 7, 9, 10, 16-21, 25, and 26 | Obvious over Basin-2007 in view of Basin-2005 <sup>2</sup>                 |
| 2      | 19, 20 and 29                       | Obvious over Hussell in view of Basin-2007 and Van Woudenberg <sup>3</sup> |
| 3      | 1-3, 6, 10, 16, 19, 21, and 25      | Obvious over Krummacher in view of Shimizu and Stokes <sup>4</sup>         |
| 4      | 19, 20 and 29                       | Obvious over Hussell in view of Krummacher and Van Woudenberg              |

#### **IPR2025-00260**

| Ground | Claims   | Description                                                                                                                   |
|--------|----------|-------------------------------------------------------------------------------------------------------------------------------|
| 1      | 1        | Obvious over Basin-2007 in view of Basin-2005 <sup>5</sup> (duplicate of IPR2024-01357 ground)                                |
| 2      | 11-14    | Obvious over Basin-2007 in view of Basin-2005 and Stokes <sup>6</sup>                                                         |
| 3      | 1, 11-14 | Obvious over Krummacher in view of Shimizu and Stokes (duplicate of IPR2024-01357 ground with respect to independent claim 1) |

IPR2024-01357, Paper 1 at 18; IPR2025-00260, Paper 1 at 20; IPR2024-01357, Paper 17 at 4-5; IPR2025-00260, Paper 17 at 3-4. The rules are clear that all grounds challenging the claims of a patent must be presented in the petition. 37 C.F.R. § 42.104(b). There are no exceptions to this rule, and *none* of the instituted grounds were based on just a single reference.

Petitioners' change in position is clearly demonstrated by comparing Petitioners' words from the Petition with their words from the Reply:

| IPR2024-01357 Petition <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Reply to Patent Owner Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><u>Ground 1</u>: “Basin-2007 discloses every element in challenged claims 1-3, 6, 7, 9, 10, 16-21, 25, and 26 <b><u>with one exception: it does not specifically disclose</u></b> that the LED chip emits blue light at a wavelength of greater than or equal to 440 nm.” Pet. at 19 (emphasis added).</p> <p><u>Ground 2</u>: “Hussell discloses every feature covered by claims 20 and 29 <b><u>except Hussell does not explicitly disclose</u></b> (i) a light diffusing layer that improves an off-state white appearance of the wavelength conversion component and (ii) that the wavelength of blue light emitted by the semiconductor light emitting device is greater than or equal to 440 nm.” Pet. at 39 (emphasis added).</p> <p><u>Ground 3</u>: “Krummacher discloses every element in the challenged claims <b><u>except</u></b> the specific wavelength of the blue light emitted by the LED chip.” Pet. at 55 (emphasis added).</p> <p><u>Ground 4</u>: Hussell, in combination with Van Woudenberg discloses every element in claims 19, 20 and 29 <b><u>except</u></b> a light diffusing layer that improves an off-state white appearance of the wavelength conversion component.” Pet. at 77-78 (emphasis added).</p> | <p>“<i>The Petition presented multiple paths to obviousness</i> with respect to the blue LED chip emitting light at wavelengths greater than 440 nm, including: (1) the primary references disclose conventional blue LED chips, which would be understood to emit light at wavelengths greater than 440 nm based on the knowledge of a POSITA, as confirmed by the secondary references, <b><u>rendering the claims obvious over the primary references alone</u></b>; and (2) the secondary references disclose conventional blue LED chips that explicitly emit light at wavelengths greater than 440 nm, and it would have been obvious to use such conventional blue LED chips in the conventional blue-pumped white LEDs described in the primary references.” Reply at 8-9 (emphasis added).</p> |

There are no single-reference obviousness combinations in the Petition, and Petitioners cannot backfill now, particularly in light of their explicit statements in the Petition that each of the primary references *do not teach* certain claim elements. *See* table above (highlighting Petitioners’ admissions).

**B. Petitioners’ arguments continue to lack a credible motivation to combine the cited references**

**1. Patent Owner’s statements regarding motivation to combine are directly responsive to the Board’s guidance**

As an initial matter, Petitioners’ suggestion that Patent Owner’s Response ignores the Board’s Institution Decision is unfounded. *See* Reply at 5, 10. Indeed, the Board invited Patent Owner to elaborate on Petitioners’ lack of a motivation to combine regarding quantum efficiency. *See* Paper 17 (Institution Decision) at 28. In its Patent Owner Response, Feit Electric further explained *why* one of skill in the art would account for the quantum efficiency of the various references, including Basin-2005, Shimizu, and Stokes, when considering whether it is appropriate to combine such references with Basin-2007 or Krummacher. *See*,

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<sup>1</sup> Petitioners made it clear that their Petition in IPR2025-00260 rested on the exact same grounds as IPR2024-01357. *See* IPR2025-00260, Paper 1 at 20; IPR2025-00260, Paper 14 at 2 (“The [IPR2025-00260] Petition relies upon the same grounds as the [IPR2024-01357] petition filing, it just extends the earlier ground mappings to claims 11-14 as a consequence of their belated addition to the litigation”).

*e.g.*, Paper 26 (Patent Owner Response) at 34-36, 41, 44, 46-47; Paper 34 at 38-40, 43-44.

**2. Patent Owner’s new arguments regarding “UV-pumped” versus “blue-pumped” LEDs fail to show that one of skill would have been motivated to combine the asserted references**

It is Petitioners’ burden to show that one of skill in the art would have combined the primary references, which they concede do not disclose the claimed wavelength, with the identified secondary references. *See* table in Section II.A. To combine multiple references, there must be a reason that motivates one of skill in the art to do so. *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367-68 (Fed. Cir. 2016) (“[Petitioner] must [demonstrate] a motivation to combine accompanied by a reasonable expectation of achieving what is claimed in the patent-at-issue”). Petitioners have not met their burden. Furthermore, Patent Owner has provided multiple reasons why one of skill in the art would be deterred from combining Basin-2007 or Krummacher with the secondary references. One such reason is the efficiency loss associated with the combination. *See* Patent Owner Response to IPR2024-01357 (Paper 26) at 34-36.

Resting solely on attorney argument, Petitioners attempt to suggest that “it was (and remains) the industry standard” to utilize blue light LEDs, such as those claimed in the ’678 patent. *See* Reply at 20. Petitioner cites no evidence for its

conclusory statements that “[b]y 2010, the industry had overwhelmingly adopted blue LEDs with peak wavelengths of 450-470 nm as conventional for creating white light with YAG phosphors.” Reply at 18. Nor that “a POSITA seeking to create an efficient and commercially-viable white light product would have been motivated to use exactly such a blue LED chip. It was (and remains) the industry standard for a reason.” Reply at 20. These statements belittle innovations in an industry that took years to develop. *See, e.g.*, EX2026, ¶¶ 65-71. Petitioners’ unsupported attorney argument should be provided no evidentiary weight. *See Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1043 (Fed. Cir. 2017) (“Attorney argument is not evidence.”); *Elbit Sys. of Am., LLC v. Thales Visionix, Inc.*, 881 F.3d 1354, 1359 (Fed. Cir. 2018) (“attorney argument is not evidence and cannot rebut other admitted evidence”).

Indeed, Petitioners’ reliance on attorney argument belies the hindsight bias inherent in their deficient arguments regarding alleged motivation to combine. The Federal Circuit discussed the importance of secondary considerations of non-obviousness, which Patent Owner addresses below, in “guard[ing] as a check against hindsight bias.” *See In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1079 (Fed. Cir. 2012). Fact finders

sometimes fall into this trap, but “objective considerations might serve to resist the temptation to read into the prior art the teachings of the invention in issue.” *Id.*

**3. Stokes does not express a simple preference of one structure over another—it *teaches away* from the claimed invention**

Petitioners attempt to sweep under the rug their deficiencies regarding the challenges to claims 11-14 based on Stokes. *See* Reply at 23-24. Rather than concede that it is not possible to combine Stokes with *any other* asserted reference to arrive at the claimed invention, as Patent Owner explained in its Response to IPR2025-00260 (Paper 34), Petitioners downplay the teachings of Stokes as “a mere preference for a different structure.” *See* Reply at 24. Petitioners offer no evidentiary citation to support this assertion. *Id.* In doing so, Petitioners ignore the explicit disclosures in Stokes that teach away from combining Stokes’ outer phosphor layer with either Basin-2007 or Krummacher. As Patent Owner highlighted in its Response (Paper 34 at 27-28), Stokes enumerates multiple reasons why it is *advantageous* to place the phosphor layer on the outside of the diffusion layer, in stark contrast with the claimed invention:

- “[O]ne purpose of the scattering layer between the radiation source...and the luminescent material...is to make the blue light source appear more similar to the yellow light source. Thus,

[removing] the memory of the LED or laser diode chip geometry.”

EX1008 at 4:3-10.

- “[T]he scattering layer [acting as a barrier between the LED and the phosphor layer] serves the additional purpose of lowering the intensity of the radiation incident on the phosphor, so as not to allow the intense, highly collimated and coherent laser radiation to damage the phosphor layer.” EX1008 at 4:10-15.
- “By placing material 46 between the phosphor 45 and the LED 43, the phosphor 45 will remain cooler than if the phosphor 45 was in direct contact with the heat emitting LED 43.” EX1008 at 6:13-19.

In addition to touting these benefits, Stokes *acknowledges and criticizes* methodologies that place the phosphor material below the diffusion layer. For instance, Stokes acknowledges the Shimizu reference (EX1010, Pat. 6,069,440) as one method that discloses placing the luminescent (phosphor) material below the light scattering material, and Stokes expressly criticizes the resulting penumbra effect of the Shimizu approach. EX1008 at 2:23-64. Stokes similarly criticizes other prior art embodiments that placed the phosphorous luminescent material below the light scattering material. *Id.* at 1:36 – 2:22; EX2039 at ¶ 17.

This is not a mere design preference. Stokes actively teaches away from combining its teachings with any of the primary references, all of which suggest placing the phosphor layer below the light scattering material. *See Depuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1326 (Fed. Cir. 2009) (“An inference of nonobviousness is especially strong where the prior art’s teachings undermine the very reason being proffered as to why a person of ordinary skill would have combined the known elements.”). Petitioners fail to rebut these teachings, therefore the Board should correctly conclude that Stokes is incompatible with any of the primary references.

**4. Petitioners do not respond to Patent Owner’s arguments regarding different LED packaging techniques**

As explained in Patent Owner’s Response and in Dr. Schubert’s declaration, there are various forms of LED packaging, and the form has an effect on the light design and output. *See, e.g.*, Patent Owner Response to IPR2024-01357 (Paper 26) at 37-38; EX2026 at ¶¶ 42, 51-62, 109, 119, 128, 132. Petitioners do not address these differences in their Reply. It is Petitioners’ burden to show (1) that one of skill in the art would have been motivated to combine this difference structures and (2) *how* one of skill in the art would have overcome these differences in order to arrive at the claimed invention. *See Tennent Co. v. Oxygenator Water Techs., Inc.*, IPR2021-00625, Paper 9 at 39 (P.T.A.B. Aug. 20, 2021) (criticizing petitioner for

failing to show “which portions of the cited secondary references would be combined with [the primary reference], how they would be combined with [the primary reference], and whether one of ordinary skill in the art would have had a reasonable expectation of success in combining them with [the primary reference]”). Petitioners choose not to explain *how* one of ordinary skill in the art would have combined features from references that describe very different forms of LED packaging—not in their Petition, nor in their Reply. Accordingly, the Board should find that Petitioners have failed to meet their burden of proving that it would have been obvious for a POSITA to combine teachings from references that describe different LED packaging forms.

**C. Petitioners’ arguments regarding the blue LED emission spectrum mischaracterize the issue and Dr. Schubert’s testimony**

As described in Section II.A, Petitioners admit that the specific wavelength of light claimed in the ’678 patent is not disclosed in any of the primary references. To remedy their motivation to combine deficiencies, Petitioners improperly pivoted to new single-reference obviousness theories that necessarily require supplementation about what one of skill in the art would understand regarding the wavelength of blue light. However, as Dr. Schubert has repeatedly explained, the question of what constitutes blue light to one of skill in the art *depends on the specific application*. EX2026 at ¶¶ 44-45; EX1048 at 52:19 – 53:23, 69:19 –

72:11. Petitioners struggle to identify a teaching of the specific wavelength of blue light, and instead resort to mischaracterizing Dr. Schubert’s testimony. Petitioners point to Dr. Schubert’s textbook, which discloses multiple possible wavelengths falling within the claimed wavelength range. *See* Reply at 12-13. But Petitioners fail to mention that Dr. Schubert’s response to their criticism—the examples in Dr. Schubert’s text relate to blue-light emitting LED devices, not white-light emitting LED devices. *See* EX1048 at 82:18-83:7. Again, as Dr. Schubert has repeatedly explained, the application matters. *See, e.g., id.* at 52:19 – 53:23, 69:19 – 72:11. The application may determine whether a POSITA would use a coarse or fine definition of blue light, thus impacting the range of potential wavelengths. *See id.* Petitioners alone bear the burden to prove that the primary references disclose the claimed wavelength, and they have already admitted that none of the primary references disclose the 440 nm limitation. *See* Section II.A.

**D. Secondary considerations demonstrate non-obviousness**

Secondary considerations are an integral part of the obviousness analysis and must be considered before reaching any obviousness conclusion. *See Apple Inc. v. Samsung Elecs. Co., Ltd.*, 839 F.3d 1034, 1048, 1052-1053 (Fed. Cir. 2016) (en banc) (“[o]bjective indicia of nonobviousness must be considered in every case where present” and “may often be the most probative and cogent evidence in the

record.”); *see also Extended-Release Capsule Patent Litig.*, 676 F.3d at 1075–76 (same). Objective indicia “may often be the most probative and cogent evidence in the record.” *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538 (Fed Cir. 1983).

Secondary considerations demonstrate that the claimed invention was not obvious. Patent Owner provided a plethora of evidence to this effect in its Patent Owner Responses. *See* Paper 26 at 47-51. For the most part, Petitioners do not dispute the facts, nor could they. Instead, Petitioners improperly allege that there is no nexus because Patent Owner has not provided a claim chart mapping the features of its commercial product. Reply at 23. There is no requirement that Patent Owner do so. Indeed, in Petitioners’ cited case, *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373–74 (Fed. Cir. 2019), the Federal Circuit explained that “the patent owner is afforded an opportunity to prove nexus by showing that the evidence of secondary considerations is the ‘direct result of the unique characteristics of the claimed invention.’” Patent Owner did exactly that and has satisfied the nexus requirement. Each of the enumerated secondary considerations is directly related to the success of and market praise for light emitting devices with an improved OFF state white appearance, including Petitioners’ products that

practice the claimed invention (*see* EX1018, EX1037, EX1038, EX1039)<sup>2</sup>. Indeed, customers will pay more for a bulb that looks white in the OFF state than they will pay for exactly the same bulb that looks yellow in the OFF state. Compare EX2035 (Patent Owner’s white-filament product priced at \$29.97) with EX2036 (similar yellow-filament product priced at \$21.97); *see also* EX2026, ¶ 138; Paper 26 at 47-50. It is rare to see such a strong and clear nexus to the claimed invention.

Petitioners also assert that an earlier commercial embodiment of the ’678 patent belies Patent Owner’s commercial success, but they concede that “there is no evidence that it was [or was not] successful.” Reply at 25. By contrast, Patent Owner has presented extensive evidence that present-day products that practice the ’678 Patent *are* commercially successful and have received industry praise for the very features that are claimed in the ’678 patent.

**E. Professor Doolittle’s testimony speaks for itself**

As described in Patent Owner’s Response, Professor Doolittle was unable to provide a straight answer to even the most basic of questions. Paper 26 at 26-29

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<sup>2</sup> Petitioners also do not dispute Patent Owner’s proffered evidence of copying by Petitioners themselves. In support, Patent Owner cites the very claim charts that Petitioners introduced as evidence, which provides an element-by-element identification of Petitioners’ products practicing the ’678 Patent. If the claims were obvious as Petitioners claim, then Petitioners would have introduced their competing products years earlier to meet the long-felt need.

(citing EX2025). Petitioners claim that the questions were “unfair” (Reply at 16), but the record speaks for itself. Patent Owner invites the Board to review Professor Doolittle’s testimony in detail and determine for itself whether Professor Doolittle provided forthcoming responses as an expert in the field.

### **III. CONCLUSION**

Petitioners' reply only amplifies the deficiencies in the Petitions, with Petitioners now improperly arguing a *new ground* for the first time. As for the instituted grounds, Petitioners inexplicably dismiss Stokes’ express teaching away as merely a preference. And Petitioners do not even attempt to explain how a person skilled in the art would have combined features from structurally different LED packaging forms and applications to arrive at the claimed invention. Beyond the prior art, Petitioners would have the Board ignore strong secondary indicia of non-obviousness—including commercial success and industry praise tied directly to LED bulbs with an improved OFF state white appearance—because Patent Owner allegedly did not include a claim chart mapping the claims to its own commercial embodiment. The Federal Circuit requires no such mapping, and the Board should reject this argument.

IPR2024-01357  
IPR2025-00260  
U.S. Patent No. 8,604,678

Petitioners have not met their burden of proving unpatentability, and Patent Owner respectfully submits that the Board should confirm all challenged claims for the reasons stated herein and in Patent Owner's Responses (Papers 26 and 34).

Date: November 13, 2025

Respectfully submitted,

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**CERTIFICATE OF WORD COUNT UNDER 37 C.F.R. § 42.24(c)(4)**

I, the undersigned, do hereby certify that the foregoing Patent Owner Preliminary Response, including footnotes, contains 3,255 words, as measured by the Word Count function of Microsoft Word as specified by 37 C.F.R. § 42.24(c)(4).

*/Charles M. McMahon/*

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Charles M. McMahon

## **CERTIFICATE OF SERVICE**

I hereby certify that on November 13, 2025, a true and correct copy of the foregoing was served by electronic mail upon the following counsel of record for

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