

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

Petitioners,

v.

FEIT ELECTRIC COMPANY, INC.,
Patent Owner.

IPR2024-01357
Patent 8,604,678

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.

IPR2025-00260
Patent 8,604,678

PETITIONERS' REPLY TO THE PATENT OWNER RESPONSES

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I. INTRODUCTION

Having found a reasonable likelihood that Petitioners would prevail, the Board instituted review on all grounds, confirming that the Petitions established a *prima facie* case of obviousness. Patent Owner's burden in its Responses was to overcome the specific reasoning laid out in the Board's comprehensive Institution Decisions. It has failed to do so.

Rather than facing the Board's detailed Institution Decisions and addressing the Board's reasoning, PO's Responses (Paper 26 ("POR-1357"), Paper 34 ("POR-260")) rehash the same arguments the Board has already found unpersuasive. Accordingly, the challenged claims 1-3, 6, 7, 9-14, 16-21, 25, 26, and 29 are unpatentable for obviousness and should be canceled.

PO relies entirely on recycled arguments about motivation to combine. PO does not dispute that the prior art disclosed each element in every challenged claim. PO does not dispute that each primary prior art reference, when read considering the state of the art, renders obvious blue LED chips of the claimed wavelength. Instead, PO assumes, without explanation or support, that Petitioners somehow waived that basis for a finding of obviousness.

To distract from the facts it is forced to concede, PO resorts to a baseless attack on the credibility of Petitioners' expert and offers insubstantial and irrelevant alleged evidence of nonobviousness. Neither gambit withstands scrutiny

nor provides any reason for the Board to reverse its initial findings. The record contains overwhelming evidence that the challenged claims are nothing more than the predictable combination of known elements for their known purposes. The Board should issue a Final Written Decision canceling the challenged claims.

II. BACKGROUND

A. The Board found a reasonable likelihood of obviousness

On August 26, 2024, Petitioners filed a petition in IPR2024-01357 demonstrating that claims 1-3, 6, 7, 9, 10, 16-21, 25, 26, and 29 of the '678 patent are unpatentable as obvious. (Paper 1 ("Petn-1357")). The Petition established that the claimed invention was the predictable combination of known elements to achieve a known goal: a conventional blue LED chip, a YAG phosphor, and a TiO₂ diffusing layer to achieve white LED package with an improved off-state appearance. (*Id.*)

After PO asserted additional claims in parallel district court litigation, Petitioners filed a second petition on December 9, 2024, in IPR2025-00260, challenging dependent claims 11-14 of the '678 patent on substantially the same grounds, in further view of the known scientific principle of nanoparticles preferentially scattering light. (IPR2025-00260, Paper 1 ("Petn-260")). On June 23, 2025, the Board again found that Petitioners demonstrated a reasonable likelihood

of prevailing, instituted trial on all challenged claims in that petition, and consolidated the proceedings. (IPR2025-00260, Paper 17 (“ID-260”), p.2).

B. PO’s Responses Reheat its Preliminary Response

PO’s Responses fail to rebut the instituted grounds. Instead, the Responses largely rehash the arguments from the Preliminary Response that the Board already found unpersuasive.

In particular, PO rests its entire case on the alleged lack of a motivation to combine the prior art references, recycling the same arguments the Board has already rejected. (EX1054,¹ pp.30-47; Paper 13 (“POPR-1357”), pp.50-67; ID-1357, pp.26-31). To this, PO adds two insubstantial arguments: an unfounded attack on the credibility of Petitioners’ expert, Prof. Doolittle, and a meritless assertion of secondary considerations of nonobviousness. (POR-1357, pp.25-29, 47-51). Nothing in the PO Responses addresses the core technical issues or the reasoning in the Board’s Institution Decisions.

III. CLAIM CONSTRUCTION

The Board previously held that “light diffusing layer” carries its plain and ordinary meaning (“a layer that diffuses light”), explicitly rejecting PO’s attempts

¹ Exhibits EX1054 and EX1055 are machine comparison copies of PO’s post-institution filings with highlighting applied to any new or revised material.

to import unrecited functional or structural limitations (for example, cost reduction, color-uniformity, or reflect-back requirements). (ID-1357, pp.17-20). PO no longer disputes the plain and ordinary meaning. (POR-1357, pp.2-3).

Since institution, the Northern District of Texas has issued an order broadly construing certain terms in the '678 patent. (EX1044). The court construed (and held not indefinite)² the following terms:

- “improves an off-state white appearance” (claims 1, 19, 29) means “causes an observer to conclude that a wavelength conversion component has more of a white appearance in an off state.” (*Id.*, pp.6-11).
- “an average particle size that improves the OFF state white appearance” (claim 21) means “an average particle size causes an observer to conclude that a wavelength conversion component has more of a white appearance in an off state” (*id.*, pp.12-16)
- “planar shapes” (claim 25) means “substantially two-dimensional shapes” (*id.*, pp.22-30)

² Petitioners maintain that the claims are indefinite, as discussed in their

Opposition to PO’s Motion to Amend, and referenced below with respect to Prof. Doolittle’s credibility.

- “light mixing chamber” (claim 29) means “an interior volume, separate from the wavelength conversion component, where light mixes” (*id.*, pp.16-22)

These constructions are consistent with the plain meaning approach advocated by Prof. Doolittle in his testimony and adopted by the Board in its Institution Decisions. Petitioners submit that no further construction of the claims is necessary to determine obviousness in these proceedings.

IV. ARGUMENT

PO’s arguments against obviousness rely on a series of legally and factually unsupported positions: that a skilled artisan would not have been motivated to physically combine the references, that Petitioners’ expert is not credible, and that secondary considerations support the claims. As demonstrated below, each of these arguments collapses under the weight of the evidence.

A. PO does not respond to the Institution Decisions, conceding obviousness

Instead of grappling with the Board’s analysis, PO ignores the reasoning in the Institution Decisions and, thus, fails to rebut the *prima facie* case for obviousness. As a result, PO has waived its opportunity to contest the key findings that established a reasonable likelihood of unpatentability. The following sections detail these concessions, including PO’s failure to dispute the disclosure of every

claim element and its recycling of motivation arguments the Board has already rejected.

1. PO does not dispute that the prior art discloses every element of the challenged claims

Across the instituted grounds, the primary references disclose the blue-pumped white LED architecture and the claimed wavelength conversion and light diffusing layers. The Petitions provided element-by-element mappings, and the Board instituted on all grounds. (Petrn-1357, pp.19-79; ID-1357, pp.2, 23-31.) In its Responses, PO contests only motivation to combine and secondary considerations, and does not identify any missing limitation. (*See generally* POR-1357, pp.29-51.) That leaves the element disclosures undisputed for this trial. Having waived any challenge to the prior art's disclosure of the claim elements, PO's case rises or falls entirely on its flawed motivation arguments.

2. PO does not dispute that a POSITA would have understood the blue LED chips in the primary references to emit light at wavelengths above 440 nm

PO's failure to engage on the merits is most telling with respect to the claimed wavelength limitation. The Petition presented extensive evidence showing that a POSITA in 2010 would have understood the conventional blue-pumped white LED packages in Basin-2007 and Krummacher to include conventional blue LED chips emitting light with a wavelength of 440 nm or greater. (Petrn-1357,

pp.24-25, 61-63). This showing was based on contemporaneous prior art that described such LEDs. For example, Basin-2005 disclosed blue LED chips in a conventional white LED package that were assumed to “emit a blue light in the range of 420-490 nm.” (EX1006, ¶[0030]). Similarly, Shimizu and Stokes disclosed conventional blue-pumped white LEDs with blue emission peaks at 450, 460, 470, and 480 nm. (Petn-1357, pp.24-25).

The Board found this evidence persuasive, concluding that “a skilled artisan would have found it obvious to include wavelengths from the higher end of the range—as disclosed in so many references.” (ID-1357, pp.27-28). The Board specifically noted that Basin-2007’s reference to a “conventional white light LED” supported this conclusion, as other references established what was “conventional.” (*Id.*, p.28).

In its Response, PO offers no substantive rebuttal to this evidence or to the Board’s findings. It presents no counter-evidence, no expert testimony, and no technical argument to suggest that a POSITA would have understood the blue LED chips disclosed in the prior art to only emit light at wavelengths below 440 nm. Instead, PO’s entire argument on this dispositive issue rests on mischaracterizing the Petitions as having conceded that the primary references are deficient. (POR-1357, pp.30-31). For example, PO states:

Relying solely on Prof. Doolittle's say-so, Petitioners argue that "[a POSITA] would have understood the blue light disclosed in Basin-2007 to include blue light with a wavelength greater than 440 nm" because "a [POSITA] would understand that blue light LEDs used in conventional white-light LED light sources typically had wavelengths greater than 440 nm." Pet. at 24. However, Petitioners have not presented any ground based on Basin-2007 alone. Instead, Petitioners seem to recognize the weakness of that argument and therefore propose combining teachings from two references by substituting the LED from Basin-2005 in place of the LED in Basin-2007. Petitioners argue that Basin-2007 and Basin-2005 have similar structures and therefore would have been obvious to combine. However, the fact that Basin-2007 and Basin-2005 may share similar structures is not enough to establish a motivation to combine.

(POR-1357, pp.30-31).

To the contrary, the Petition presented multiple paths to obviousness 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, rendering the claims obvious over the primary references alone; 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 . (Petrn-1357, pp.24-25, 61-63).

The Board’s Institution Decision acknowledged and approved both theories in responding to PO’s Preliminary Response. (ID-1357, pp.26–28). The PO Responses ignore these findings which are in direct contradiction to PO’s “solely on Prof. Doolittle’s say-so” argument. Petitioners remain free to prove obviousness based on either theory. *See Mobotix Corp. v. e-Watch, Inc.*, IPR2013-00334, Paper 18 at 1 (PTAB Jan. 10, 2014) (holding Petitioner “is free to prove the obviousness of claims ... based on [a single reference] alone” even where trial only instituted on a multi-reference combination); *see also Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1374–75 (Fed. Cir. 2019).

By failing to substantively address Petitioners’ evidence and the Board’s explicit findings on this issue, PO has waived any challenge to the fact that a POSITA would have understood the blue LEDs in the primary references to emit light at wavelengths of 440 nm or greater. And because PO “does not respond to [the Board’s] analysis in the Institution Decision” on this dispositive issue, the Board should adopt its prior reasoning. *See Kingston Tech. Co., Inc. v. Polaris Innovations Ltd.*, IPR2017-00116, Paper 31 at 25 (Feb. 13, 2018) (FWD).

3. PO advances the same arguments regarding motivation to combine that were rejected at institution, without addressing the Board’s reasons for rejection

Having waived any challenge to what the prior art discloses, PO’s case rests entirely on its arguments against motivation to combine. But these recycled arguments from its Preliminary Response fail to address the Board’s specific reasons for already rejecting them. As the Board has explained, where a “Patent Owner did not provide any additional explanation in its Response,” the Board may rely on its prior reasoning. *Cloudflare, Inc. v. Sable Networks, Inc.*, IPR2021-00909, Paper 42 at n.30 (Oct. 18, 2022) (FWD). PO’s arguments fail again here for the same reasons they did at institution.

First, PO argues that a POSITA would not have combined references directed to different applications, such as a camera flash and an automotive headlamp. (POR-1357, pp.32-33). PO made the same argument in its Preliminary Response. (POPR-1357, pp.54-55). The Board properly rejected this reasoning, finding a motivation to combine based on the technical problem the primary references sought to solve, the unattractive off-state color of phosphor-based LEDs. (ID-1357, pp.26-28). The Board correctly focused on the underlying technology, not the end-use product. (*Id.*). In contrast, PO’s arguments still rely on the flawed premise that the references must be physically compatible for bodily incorporation, arguing for example “neither Petitioners nor Prof. Doolittle have

identified any motivation for their *proposed Frankenstein combination of features* from these three disparate references.” (POR-1357, pp.38) (emphasis added). As the Federal Circuit has consistently held, evidence of bodily incorporation is not required. *See, e.g., Allied Erecting v. Genesis Attachments*, 825 F. 3d 1373, 1381 (Fed. Cir. 2016) (citing cases). Thus, PO’s Responses fail to address the Board’s reasoning.

Second, PO rehashes its argument that a POSITA would have been deterred from using a blue LED chip emitting at wavelengths greater than 440 nm because of “quantum efficiency” considerations, suggesting a preference for violet or near-UV LEDs. (POR-1357, pp.34-35). This argument, too, was made in the Preliminary Response (POPR-1357, pp.55-56) and explicitly rejected by the Board. The Board correctly noted that “Patent Owner does not explain why these same considerations did not convince Basin-2005, Shimizu, or Stokes to use lower wavelengths.” (ID-1357, p.28). The PO Responses still provide no explanation. They do not address why numerous prior art references, including those authored by PO’s own expert, preferred blue-pumped LEDs for white light generation.

Because the Responses’ motivation arguments fail to confront, let alone overcome, the deficiencies already identified by the Board, they provide no basis to alter the Board’s preliminary conclusion that a POSITA would have been motivated to combine the teachings of the prior art references.

B. Petitioners present overwhelming evidence of obviousness

Beyond PO's failure to address the Institution Decisions, PO's arguments are both conceptually confused and factually incorrect. PO's case rests entirely on flawed assertions about motivation that are contradicted by the state of the art, including a 2006 textbook authored by PO's own expert. As the following sections demonstrate, the evidence of obviousness is overwhelming.

1. It is incontrovertible that a POSITA would have understood the blue LED chips disclosed in the primary references to emit light at wavelengths above 440 nm

As the Board noted in its Institution Decision, Petitioners provided extensive evidence showing that a POSITA would have understood the conventional blue LEDs in the prior art to emit light at wavelengths of 440 nm or greater. (ID-1357, pp.27-28). That understanding was not based on conjecture nor "solely on Prof. Doolittle's say-so", but on the fundamental science of phosphor-based LEDs, which motivated a POSITA to select components that worked together efficiently. (Petrn-1357, pp.6-10; EX1002, ¶¶65-69).

The ubiquitous phosphor for white LEDs was, and is, YAG:Ce. As shown in Shimizu, for example, a POSITA would have known that YAG:Ce is most efficiently excited by light in the 450-470 nm range. (EX1010, Figs. 3A, 5A). Consequently, a POSITA designing a white LED system around a YAG phosphor

would have been motivated to select a blue LED chip that emits in this optimal range to maximize the light output and overall system efficiency. (*Id.*).

The prior art confirms this standard practice and that a POSITA would have understood the blue LED chips disclosed in the prior art to include the claimed wavelength range. Shimizu discloses multiple examples of blue LEDs with emission peaks at 450 nm, 460 nm, or 470 nm. (EX1010, 27:4-5, 28:55, 25:24-25, 29:45). Likewise, Basin-2005 assumes a blue light range of 420-490 nm, and Stokes discloses blue LED chips with emission peaks at 450 nm or 480 nm. (EX1006, ¶[0030]; EX1008, 4:37-40, 6:62-67). Indeed, the 450-470 nm range was the industry standard. (*See, e.g.*, EX1045, p.3 (“Today's commercial pc-WLEDs normally use a 450-470 nm blue GaN LED chip.”); EX1046, p.26 (“The majority of white light LEDs in production today are ... based on gallium-nitride, emitting blue light between 450-470 nm.”); EX1047, p.5 (“...460 nm is by far the most common peak wavelength of blue LEDs, and also the wavelength of the ubiquitous white LEDs based on conversion by YAG:Ce.”)).

This consensus is confirmed by PO's expert, Dr. Schubert. In his 2006 textbook, Dr. Schubert repeatedly describes “blue” LEDs having peak wavelengths squarely in the claimed range, including specific examples with emission peaks at 460 nm and 470 nm. (EX2014, pp.109, 215, 217-219; EX1048, 58:12-18, 60:9-12, 60:20-61:4). In particular, Dr. Schubert's textbook disclosed a chart describing

“blue” LEDs as having an “associated typical LED peak wavelength range” from “455-490 nm”:

Table 16.5. Colors and associated typical LED peak wavelength ranges

Color	Wavelength	Color	Wavelength
Ultraviolet	< 390 nm	Yellow	570–600 nm
Violet	390–455 nm	Amber	590–600 nm
Blue	455–490 nm	Orange	600–625 nm
Cyan	490–515 nm	Red	625–720 nm
Green	515–570 nm	Infrared	> 720 nm

(EX2014, p.284).

Dr. Schubert’s attempt to dismiss these technical definitions by inventing a distinction between “coarse” and “fine” color categorization (EX1048, 58:22–59:11) is a *post hoc* rationalization that lacks credibility. Indeed, when asked if he would be surprised that his own textbook never describes a blue LED chip as having a peak wavelength less than 440 nm, Dr. Schubert refused to answer directly. (*Id.*, 69:19-72:10). Instead, he pivoted to irrelevant discussions of UV emitters and his “coarse” versus “fine” color theory, demonstrating an unwillingness to acknowledge the clear teachings of his own work when they contradict his litigation positions. (*Id.*).

This evidence confirms that a POSITA would have considered it obvious to use a standard blue LED chip, emitting light at wavelengths greater than 440 nm,

in the systems of Basin-2007 and Krummacher, rendering the claims obvious over those references alone in view of the knowledge of a POSITA. *See Game & Tech. Co. v. Activision Blizzard*, 926 F.3d 1370, 1378 (Fed. Cir. 2019) (obviousness can rest on a single reference if it would have been obvious to modify that reference) (non-precedential).

2. PO's arguments regarding the alleged failure of the Petition to show a motivation to combine miss the mark

Having failed to contest that the prior art discloses every limitation of the challenged claims, PO's case rests entirely on its assertion that a POSITA would not have been motivated to combine the references. These arguments, however, rely on a flawed understanding of the obviousness standard, are contradicted by the technical realities of the time, and are unsupported by credible expert testimony.

a. Prof. Doolittle provided competent, credible testimony, while Dr. Schubert's testimony is unreliable

Unable to challenge the substance of the prior art, PO resorts to an unfounded attack on the credibility of Petitioners' expert, Prof. Doolittle. (POR-1357, pp.25-29). PO's argument centers on a purported contradiction between Prof. Doolittle's testimony in this proceeding and his opinions regarding indefiniteness under 35 U.S.C. § 112 in a parallel district court case.

That argument ignores the different standards governing obviousness in an *inter partes* reviews and indefiniteness in district court proceedings. Prof. Doolittle correctly explained that he applied the plain and ordinary meaning in his declaration because “indefiniteness is not something that the PTAB can rule on.” (EX2025, 39:13-41:9, 26:16-27:2). He further correctly testified that whether a claim term is understandable for a § 103 analysis is a different question from whether it is indefinite under the law. (*Id.*, 46:8-47:12). Prof. Doolittle correctly tailored his testimony to these “different specifications and different guidelines.” (*Id.*, 41:1-9). The inquiries are legally distinct: one assesses the adequacy of the patentee’s disclosure under § 112, while the other assesses what would have been obvious to a skilled artisan under § 103. Yet PO says “[e]ven worse, Prof. Doolittle stands by **both** positions today.” (POR-1357, p.28). As discussed in their Opposition to PO’s Motions to Amend, Petitioners also continue to stand by both positions today.

PO also complains that Prof. Doolittle was “nonresponsive” during cross-examination. (POR-1357, pp.28-29.) This mischaracterizes the record. Prof. Doolittle was very responsive in the face of ambiguous and unfair questions designed to elicit “admissions” to support PO’s already-once-rejected theories. For example:

Q. So the first [question] is, you did not explain in your declaration why one of ordinary skill in the art would have combined teachings involving a flash bulb with teachings involving an automobile headlight? Correct?

(EX2025, 83:15-85:20). As discussed in detail above, the Board had already rejected the theory that there would be no motivation to combine “teachings involving a flash lamp ... with other teachings involving an automobile headlight” as misguided. (ID-1357, pp.26-28).

The same pattern was repeated throughout the deposition, including with respect to “why one of ordinary skill in the art would’ve combined teachings regarding blue LEDs with teachings regarding UV LEDs” (EX2025, 85:22-91:20), “why one of ordinary skill in the art would’ve combined teachings about one type of phosphor ... with teachings involving a different kind of phosphor” (*id.*, 91:21-107:10), and “why one of ordinary skill in the art would have been motivated to combine teachings related to remote phosphors with teachings related to non-remote phosphors?” (*id.*, 140:4-141:20). Far from being “obstructionist,” the record reflects that Prof. Doolittle, a non-lawyer, earnestly addressed aggressive questioning that sought concrete answers to irrelevant and misleading questions. That PO was “forced” to object (and “move to strike”) Prof. Doolittle’s answer “no less than eighteen times” says more about the questioning than it does about Prof. Doolittle’s credibility. (*See* POR-1357, p.28).

In stark contrast, the credibility of PO's expert, Dr. Schubert, is questionable. His litigation-only theories conflict with his own pre-litigation writings. As discussed, his testimony regarding the typical wavelengths of blue LED chips and the drivers of efficiency for white LED packages is controverted by his own textbook. (*See, e.g.* EX1048, 61:12-21, 87:5-88:4).

b. Efficiency considerations motivated POSITAs to use conventional blue LED chips in white LED packages, rather than deterring them

PO's central technical argument, that a POSITA would have been deterred from using a blue LED chip emitting light at wavelengths greater than 440 nm due to lower "quantum efficiency" than chips emitting at lower wavelengths (POR-1357, pp.34-35), is factually incorrect and fundamentally misunderstands how a POSITA evaluated white LED package efficiency in 2010. By 2010, the industry had overwhelmingly adopted blue LEDs with peak wavelengths of 450-470 nm as conventional for creating white light with YAG phosphors, precisely because this approach yielded the highest overall system efficiency.

Dr. Schubert opines that quantum efficiency, not luminous efficacy, is the relevant metric because approximately 90% of the light from the LED chip is absorbed by the phosphor. (EX2026, ¶115). Based on this premise, he argues that a POSITA would have been deterred from using blue LED chips emitting light at

wavelengths greater than 440 nm because of the corresponding drop in quantum efficiency. (*Id.*, ¶113).

This argument conflates the quantum efficiency of a bare LED chip with the overall luminous efficacy of a complete white LED package. While a near-UV or violet LED chip (approx. 390 nm peak) might have had a higher quantum efficiency in isolation, a POSITA would know that converting that light into white light using phosphors incurs a significant energy penalty known as the Stokes shift. (EX1048, 84:7–12). This energy loss is larger when converting near-UV light to red, green, and blue light than when converting blue light to yellow. And a blue LED chip efficiently contributes to the final visible emission product, while a near-UV LED does not. So using a blue LED chip with a peak in the 450-470 nm range with an efficient YAG phosphor leads to higher overall luminous efficacy. A POSITA would have been motivated by efficiency, not deterred. (*See, e.g.*, EX1047, pp.4-5 (concluding “it is advantageous from an efficiency point of view to take pumping LEDs with emission at as long wavelengths as possible.”)).

This principle is not only explained in the prior art but also confirmed by Dr. Schubert’s own textbook. Under oath, Dr. Schubert initially denied this fundamental drawback of UV-pumped LEDs. (EX1048, 87:5-12). Only when confronted was he forced to acknowledge the following passage from his textbook:

A fundamental drawback of UV pumped white LEDs is the energy loss (Stoke's shift). The potential luminous efficacy of UV pumped white LED lamps is, therefore, markedly lower than that of white sources based on a blue LED exciting a yellow phosphor.

(EX2014, pp.358-9; *see also* EX1048, 87:5-88:4).

Thus, a POSITA would not have been “deterred” from using a blue LED chip emitting at wavelengths greater than 440 nm; to the contrary, 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. PO's argument rests on a flawed technical premise that is directly refuted by its own expert's non-litigation writing. The overwhelming and un rebutted evidence confirms that a POSITA would have understood the “conventional” blue LEDs in the primary references to emit light at or above 440 nm.

Ultimately, PO's efficiency argument fails not only on the facts, but also on the law. At best, its argument identifies a known design choice between using a near-UV pump and a blue pump. The law is clear that a mere preference for one known alternative does not constitute a teaching away from another. *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004). To teach away, the prior art must actively discourage or criticize the proposed path. PO provides no evidence of such

discouragement. To the contrary, the widespread commercial adoption of blue-pumped LEDs proves it was a preferred, not a disfavored, solution. Thus, even if PO's technical premise were cognizable, its argument would still fail to meet the legal standard for deterrence.

c. The obviousness grounds involve applying known principles to known structures and do not require bodily incorporation

PO repeatedly argues that the references cannot be combined because they relate to different applications (e.g., camera flash vs. headlight), different specific structures (e.g., TFFC vs. conventional LEDs), or different layer placements. (POR-1357, pp.30-33, 38–39; POR-260, pp.27-29). This entire line of arguments improperly frames the obviousness inquiry as requiring the “bodily incorporation” of one reference into another, a premise the law squarely rejects. *Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC*, 825 F.3d 1373, 1381 (Fed. Cir. 2016) (quoting *In re Keller*, 642 F.2d 413, 425 (CCPA 1981); *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007)).

The Board already correctly rejected this premise at institution, noting that the claims are not limited to any specific LED architecture or end-use application. (ID-1357, pp.27-28, 30-31). The combinations presented in the Petition are straightforward applications of this principle. As Prof. Doolittle testified, a POSITA would not be constrained by the specific exemplary applications

mentioned in the prior art, as the underlying technology is the same. (*See, e.g.*, EX2025, 68:16-70:9, 83:15-85:20).

For Grounds 1 and 3, PO argued that a skilled artisan would not bodily incorporate references, for example, disclosing a camera flash (Basin-2007) and disclosing an automotive headlamp (Basin-2005). But the question is not whether a headlamp can be physically combined with a camera flash, but whether a skilled artisan would have been motivated to apply the teachings from one reference to the other to solve a common technical problem. As the Board found, a POSITA would have been motivated to solve the known problem of the unattractive off-state color of phosphor-converted white LED packages, and would have been motivated to use a conventional blue LED chip in such a device. The end-use application is irrelevant to the underlying technology.

For Grounds 2 and 4, regarding the light bulb claims, the combinations simply apply the known technique of using a diffusing layer to improve off-state appearance (from Basin-2007 or Krummacher) to a known light bulb structure (Hussell). So the inquiry is not whether Basin can be physically combined with Hussell's bulb, but rather whether a skilled artisan would have been motivated to apply the teachings about light diffusing layers to improve the appearance of Hussell's bulb. The motivation is clear: improving the unattractive off-state appearance of the phosphor-converted LED bulb. This motivation is further

confirmed by references like Tanda and Tong, which show that applying coatings to improve the aesthetic or functional properties of such replacement bulbs was a common and well-understood practice. (EX1059, EX1060). And PO's suggestion that frosted bulbs are inconsistent with a light diffusing layer is misguided.

"Frosting" may be accomplished by adding scattering particles like TiO_2 to a bulb, making that suggestion entirely consistent with the claimed invention. (EX1007, ¶39 ("Such scattering particles are known, for example, in the production of frosted glass."); *see also* EX1049, 2:70-3:3).

With respect to dependent claims 11-14, challenged in IPR2025-00260, PO's argument regarding Stokes is another flawed bodily incorporation argument. PO contends that because Stokes places its scattering layer between the LED and the phosphor, a POSITA would be discouraged from applying its teachings to the claimed configuration, where the diffusing layer is on the outside. (POR-260, pp.27-29). But Petitioners do not propose incorporating Stokes's physical structure. Rather, Petitioners rely on Stokes for its teaching of a general principle: that one can select a specific average particle size "such that the particles preferentially scatter blue... LED light as compared to yellow... light from the luminescent material" (EX1008, 7:1-4; Pet-0260, 38). As Prof. Doolittle testified, he relied on Stokes for its teachings on preferential scattering, not the specific placement of the layer in Stokes's device. (EX2038, 41:2-5).

A POSITA seeking to optimize the external diffusing layer already taught by Basin-2007 or Krummacher would have been motivated to apply Stokes's teachings on particle selection for predictable benefits. That is, applying this principle would achieve at least two goals: (1) improving the uniformity of the emitted light by preferentially scattering the concentrated blue light from the chip, and (2) increasing the conversion of blue to yellow light, thereby improving efficiency. (*See* EX1022, ¶48). And a mere preference for a different structure in a reference does not constitute a teaching away; the prior art must actively discourage the proposed combination, which nothing here does.

All of these proposed combinations fall well within the ordinary skill in the art. PO offers no credible evidence that applying a known diffusing layer or optimizing based on known principles presented any technical hurdle that would not have been obvious to a POSITA in 2010.

d. PO's alleged evidence of nonobviousness is insubstantial and irrelevant

PO's reliance on secondary considerations is misplaced.

First, PO fails to establish a nexus. It provides no evidence mapping the features of its commercial product (the Feit Electric white filament light bulbs) to the full scope of the challenged claims. Absent such coextensiveness, there is no presumption of nexus, and the evidence carries little weight. *See Fox Factory, Inc.*

v. SRAM, LLC, 944 F.3d 1366, 1373 (Fed. Cir. 2019). Furthermore, the alleged success and praise are directed to a specific decorative product: a vintage-style filament bulb. (POR-1357, pp.48-50). The goal of a white off-state appearance was undisputedly well-known as reflected by Basin-2007 and Krummacher, among others, so any success cannot be attributable to that known feature, nor any of the other conventional features of the prior art.

Second, there is a substantial temporal disconnect. The '678 patent issued in 2013. There was an actual commercial embodiment created by the named inventors (Intematix Chromalit remote phosphor), but there is no evidence it was successful. (See EX1050; EX1051). The products PO now holds up as evidence of success (the Feit Electric white filament bulbs) were not introduced until nearly a decade later. So PO's assertion that the claimed invention, rather than subsequent advancements in technology, somehow satisfied a long-felt need falls flat.

Third, the evidence itself is *de minimis* and anecdotal. The PO Responses rely on curated consumer comments from Instagram, a Reddit thread, and a single "Innovation Award" from PO's retail partner, Home Depot. (POR-1357, pp.48-50). This is no evidence of widespread commercial success or industry acclaim. And the Board should give "only limited weight" to such online reviews. *Nested Bean, Inc. v. Big Beings USA Pty Ltd*, IPR2020-01234, Paper 34 at 45-46 (PTAB Jan. 24, 2022) (FWD).

Otherwise, PO's purported evidence of commercial success is contradicted by a public record of widespread technical failure of its product; as summarized by Home Depot, "many users report a significant issue with longevity, as numerous bulbs begin to flicker and fail within a short period of use," and only 33% recommend the product. (*See, e.g.*, EX1052).

PO's evidence is far from sufficient to overcome the *prima facie* case of obviousness.

V. CONCLUSION

The PO's Responses fail to rebut the well-supported case for obviousness established in the Petitions and approved by the Institution Decisions. PO has waived its opportunity to contest the dispositive fact that the primary prior art references disclose the claimed wavelengths of blue light. PO's remaining arguments are recycled, legally flawed, and unsupported by credible evidence or expert testimony. By avoiding the Board's analysis and the overwhelming technical evidence, PO has failed to carry its burden.

The record, in contrast, contains overwhelming evidence that the challenged claims of the '678 patent are directed to nothing more than the predictable combination of known elements for their known purposes.

Petitioners respectfully request that the Board issue a Final Written Decision canceling the challenged claims.

Date: October 3, 2025

Respectfully submitted,

/s/ David C. Radulescu

David C. Radulescu, Lead Counsel

Reg. No. 36,250

APPENDIX A – EXHIBIT LIST

Exhibit No.	Description
EX1001	U.S. Patent No. 8,604,678
EX1002	Declaration of William A. Doolittle, Ph.D.
EX1003	Curriculum Vitae of William A. Doolittle, Ph.D.
EX1004	File History for U.S. Pat. Appl. No. 13/273,212 (excl. references)
EX1005	U.S. Pat. Pub. No. 2009/0057699 (“Basin-2007”)
EX1006	U.S. Pat. Pub. No. 2007/0045761 (“Basin-2005”)
EX1007	U.S. Pat. Pub. No. 2008/0079015 (“Krummacher”)
EX1008	U.S. Patent No. 6,791,259 (“Stokes”)
EX1009	U.S. Patent No. 5,998,925 (“Shimizu-APA”)
EX1010	U.S. Patent No. 6,069,440 (“Shimizu”)
EX1011	U.S. Pat. Pub. No. US2010/0124243 (“Hussell”)
EX1012	DuPont: Polymers, Light and the Science of TiO ₂ (2007)
EX1013	DuPont: Titanium Dioxide for Coatings (2007)
EX1014	Erik S. Thiele and Roger H. French, “ <i>Computation of Light Scattering by Anisotropic Spheres of Rutile Titania</i> ”, Adv. Mater. 1998, 10, No. 15
EX1015	Erik S. Thiele and Roger H. French, “ <i>Light-Scattering Properties of Representative, Morphological Rutile Titania Particles Studied Using a Finite-Element Method</i> ”, J. Am. Ceram. Soc., 81 [3] 469–79 (1998)
EX1016	Robert W. Johnson, Erik S. Thiele, And Roger H. French, “ <i>Light-scattering efficiency of white pigments: an analysis of model core-shell pigments vs. optimized rutile TiO₂</i> ”, TAPPI JOURNAL, November 1997, Vol. 80(11)
EX1017	William D. Ross, “ <i>Theoretical Light-Scattering Power of TiO₂ and Microvoids</i> ”, Ind. Eng. Chem., Prod. Res. Develop., Vol. 13, No. 1, 1974
EX1018	Feit Electric’s Initial Infringement Contentions - Claim Charts (May 28, 2024)
EX1019	U.S. Patent No. 8,547,010 (“Jagt”)
EX1020	Int’l Pat. Pub. No. WO 2008/044171 A2 (“Van Woudenberg”)
EX1021	Declaration of Etai Lahav
EX1022	Declaration of William A. Doolittle, Ph.D. regarding claims 11-14 of the ’678 patent
EX1023	Sudhakar Madhusoodhanan and Devdatt S. Nagvekar, “ <i>UV</i>

Exhibit No.	Description
	<i>Curable High Opacity Ink Jettable White Ink</i> ”, RadTech e 5 2006 Technical Proceedings (2006)
EX1024	U.S. Pat. Pub. No. 2011/0001151 (“Toquin”)
EX1025	<i>Feit Elec. Co. v. Savant Techs. LLC d/b/a GE Lighting</i> , No. 1:24-cv-473 (N.D. Ohio), December 12, 2024 docket entry
EX1026	Kentucky Eastern, U.S. District Court – Judicial Caseload Profile (September 30, 2024), available at https://perma.cc/C3LU-9ET5
EX1027	U.S. District Courts – Median Time from Filings to Trial for Civil Cases (March 31, 2024), available at https://perma.cc/6FA3-3G89
EX1028	Civil Docket for No. 3:20-cv-3126 (N.D. Tex.)
EX1029	<i>Feit v. LEDVANCE</i> , Scheduling Order, No. 5:24-cv-31 (E.D. Ky.), Dkt. 33
EX1030	<i>Feit v. Savant</i> , Joint Motion for Leave to Amend the Case Management Order, National Science Foundation, Semiannual Report to Congress, dated September 2010. (so ordered January 7, 2025 setting claim construction hearing for May 27, 2025).
EX1031	<i>Feit v. Elong</i> , Scheduling Order, No. 3:24-cv-1089 (N.D. Tex.), Dkt. 37.
EX1032	<i>Feit v. Savant</i> , Case Management Order, No. 1:24-cv-473 (N.D. Ohio), Dkt. 19.
EX1033	Stipulations re District Court Litigations.
EX1034	<i>Feit v. LEDVANCE</i> , Plaintiff’s Preliminary Claim Constructions, No. 5:24-cv-31 (E.D. Ky.), served Nov. 6, 2024.
EX1035	<i>Feit v. Savant</i> , Plaintiff’s Final Claim Constructions, No. 1:24-cv-473 (N.D. Ohio), served Dec. 10, 2024.
EX1036	<i>Feit v. Elong</i> , Joint Claim Construction and Prehearing Statement, No. 3:24-cv-1089 (N.D. Tex.), Dkt. 45.
EX1037	<i>Feit v. LEDVANCE</i> , Plaintiff’s Disclosure of Initial Infringement Contentions, No. 5:24-cv-31 (E.d. Ky.), served Aug. 30, 2024.
EX1038	<i>Feit v. Savant</i> , Supplemental Initial Infringement Contentions, No. 1:24-cv-473 (N.D. Ohio), served Oct. 8, 2024.
EX1039	<i>Feit v. Elong</i> , Plaintiff’s Disclosure of Asserted Claims and Preliminary Infringement Contentions, No. 3:24-cv-1089 (N.D. Tex.), served Oct. 23, 2024.
EX1040	<i>Feit v. Elong</i> , Memorandum and Opinion Order, dated May 5, 2025, No. 3:24-cv-1089 (N.D. Tex.), Dkt. 60.

Exhibit No.	Description
EX1041	National Science Foundation, Closeout Memorandum, Case Number: I-09080045.
EX1042	National Science Foundation, Semiannual Report to Congress, dated September 2010.
EX1043	National Science Foundation, 2011 FOIA Logs.
EX1044	<i>Feit v. Elong</i> , Memorandum and Opinion Order, dated July 2, 2025, No. 3:24-cv-1089 (N.D. Tex.), Dkt. 81.
EX1045	S. Ye, et al., <i>Phosphors in phosphor-converted white light-emitting diodes: Recent advances in materials, techniques and properties</i> , Materials Science and Engineering R 71 (2010) 1–34
EX1046	U.S. Department of Energy, <i>Life-Cycle Assessment of Energy and Environmental Impacts of LED Lighting Products</i> , Part 2: LED Manufacturing and Performance, dated May 2012.
EX1047	Philippe F. Smet, et al., <i>Selecting Conversion Phosphors for White Light-Emitting Diodes</i> , 2011 J. Electrochem. Soc. 158 R37
EX1048	Deposition Transcript of E. Fred Schubert, Ph.D. M.S., dated September 12, 2025.
EX1049	U.S. Patent No. 3,175,117 (“Kardos”).
EX1050	Intematix Introduces ChromaLit XT Remote Phosphor for High-Intensity LED Lighting, dated April 16, 2012.
EX1051	Intematix, ChromaLit XT 2012 Datasheet, dated November 5, 2012.
EX1052	Home Depot, Feit Electric 60-Watt Equivalent A15 Dimmable White Filament CEC Clear Glass E26 LED Ceiling Fan Light Bulb, True White 3500K (2-Pack).
EX1053	<i>Intentionally Omitted</i>
EX1054	Comparison of Patent Owner’s Pre-institution and Post-institution Response filings
EX1055	Comparison of E. Fred Schubert’s Pre-institution and Post-institution Declaration filings
EX1056	U.S. Patent No. 8,104,908 (“Harbers”).
EX1057	U.S. Patent No. 5,813,753 (“Vriens”).
EX1058	Jeong Rok Oh, et al., <i>Full down-conversion of amber-emitting phosphor-converted light-emitting diodes with powder phosphors and a long-wave pass filter</i> , Optics Express Vol. 18, Issue 11, pp. 11063-11072 (2010)

Exhibit No.	Description
EX1059	U.S. Pat. Pub. No. 2007/0139949 (“Tanda”)
EX1060	U.S. Patent No. 9,310,030 (“Tong”).
EX1061	<i>Tinnus Enterprises, LLC v. Telebrands Corp.</i> , Brief for Intervenor, dated August 29, 2017, No. 17-1726 (Fed. Cir. 2017), Dkt. 39.
EX1062	<i>Tinnus Enterprises, LLC v. Telebrands Corp.</i> , Motion of Intervenor to Withdraw from Appeal, dated March 29, 2018, No. 17-1726 (Fed. Cir. 2017), Dkt. 72.
EX1063	Memorandum to Patent Trial and Appeal Board, dated January 6, 2021.
EX1064	US Provisional Patent Application Ser. No. 61/386,437 (“Tong”)
EX1065	Declaration of William A. Doolittle, Ph.D. Regarding Claims 11-14 Of The ’678 Patent, dated October 3, 2025.

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), I hereby certify that this brief complies with the type-volume limitation of 37 C.F.R. § 42.24(a). The word count application of the word processing program used to prepare this brief indicates that the brief contains 5,467 words, excluding the parts of the brief exempted by 37 C.F.R. § 42.24(a).

Date: October 3, 2025

/s/ David C. Radulescu

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CERTIFICATE OF SERVICE

The undersigned certifies that on October 3, 2025 the foregoing was served on counsel at the following electronic service addresses:

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