

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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IPR2024-01357

Patent 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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IPR2025-00260

Patent 8,604,678

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**PETITIONERS' OPPOSITION TO PATENT OWNER'S REVISED  
MOTION TO AMEND**

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## I. INTRODUCTION

In its Preliminary Guidance, the Board found every limitation in PO's proposed substitute claims obvious. Paper 42 at 24-33. PO's Revised Contingent Motion to Amend offers nothing new. *See* Paper 46. No new structure. No new evidence. No new expert testimony. Just the same limitations rearranged, the same arguments repackaged, and the same result: claims that are unpatentable over the instituted prior art.

The phosphor-reduction limitation—backscattered light “reduces the wavelength conversion layer material necessary for a given color emission product”—is not inventive. It is physics. The Preliminary Guidance recognized this, crediting Prof. Doolittle's testimony that a reduction in necessary phosphor is “the natural result” of the prior art's light-recycling structure, reflecting “a fundamental principle of engineering” and “a well-known engineering trade-off.” Paper 42 at 25-27. PO's only response is to criticize Prof. Doolittle's un rebutted testimony as allegedly “conclusory at best.” *See* Paper 46 at 16-18 (arguing “upon scrutiny, Petitioners have not met their burden of persuasion”). PO otherwise relocates the limitation from claim 31 to claim 30 and adds an arbitrary 20% to 40% range to claim 31. Paper 46 at 13. Neither move addresses the Board's obviousness determination.

The preferential-scattering limitation—the light scattering material “scatters excitation light... relatively more than” light generated by the phosphor—fares no better. Rather than responding to the Board’s determination that original proposed claim 40’s “angular emission color uniformity” limitation was obvious, Paper 42 at 29, PO removed that claim limitation and substituted the preferential-scattering limitation from original claim 11. Paper 46 at 13. Beyond being nonresponsive, *see* 37 C.F.R. § 42.121(f)(2), the Preliminary Guidance already determined the same claim limitation obvious over Basin-2007 or Krummacher combined with Stokes, Paper 42 at 29-31. But PO’s only defense is a teaching-away argument recycled from its PO Response—an argument the Board has now rejected twice, in this proceeding and in the IPR of the related ’539 patent. *See* IPR2025-00698, Paper 11 at 21-23.

PO narrowed the required wavelength range in response to the Preliminary Guidance’s determination of no written description, but the new range—“between 450 nm and 470 nm”—does nothing with respect to obviousness, as Petitioners have already shown that blue LEDs with peaks in this range were typical. Ex. 1002, ¶ 121; Ex. 1010, 27:4-5, 28:55, 29:45; Ex. 1001, 7:24-25.

PO had the opportunity to respond to the Board’s guidance regarding obviousness with new claim limitations, new technical arguments, or new expert analysis. Paper 42 at 33 (PO’s “revised MTA may only respond to [the]

Preliminary Guidance or Petitioner's Opposition and may be accompanied by new evidence (including declarations).") (citing 37 C.F.R. § 42.121(e)(3)). PO chose instead to shuffle its arguments and hope for a different outcome. The Board has already determined phosphor reduction and preferential scattering of blue light are the natural result of known prior art structures. PO has no substantive response.

The Revised MTA further introduces written description and indefiniteness defects with its new claim limitations. The "20% to 40%" phosphor reduction range finds no support in a specification that discloses only reduction "up to 40%." And the phosphor reduction limitations are indefinite: the term "wavelength conversion layer material necessary for a given color emission product" is subjective, and the specification provides no definition to determine how to quantify and measure the claimed reduction, as now required by claim 31. PO's 450 nm to 470 nm range also lacks written description support, because it covers any emission in that range, not limited to an emission peak, and so is not commensurate with the specification's disclosure.

Ultimately, the Revised MTA fails because the alleged invention is just obvious. Prior art references like Basin-2007 and Krummacher disclose the same structure disclosed in the '678 patent: a blue-pumped white LED covered with a TiO<sub>2</sub> light diffusing layer. Thus, PO's Responses were dominated by the argument that blue LEDs might not emit blue light. Now, PO's Revised MTA seeks to

capture basic physics. In any case, because PO's proposed amendments simply recite obvious benefits of obvious structures, the proposed claims are obvious.

Accordingly, the Board should deny PO's Revised Contingent Motion to Amend and decline to enter the revised proposed claims 30-49.

## **II. ARGUMENT**

### **A. The substitute claims lack written description support**

PO bears the burden of demonstrating written description support for its proposed substitute claims. 37 C.F.R. § 42.121(d)(1); *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 at 4, 7 (precedential). The Preliminary Guidance found that PO "ha[d] not set forth sufficient written description support for the proposed substitute claims." Paper 42 at 4, 8-14. PO's Revised MTA does not cure the deficiency.

#### **1. The written description showing remains conclusory and unsupported by explanation or expert testimony**

PO's written-description tables merely list paragraph citations without explaining how those paragraphs convey possession of the claimed combinations. Paper 46 at 5-12. No expert testimony supports the contention that a POSITA would understand the cited passages to disclose the claimed subject matter. For claim 30, PO cites 36 distinct paragraphs spanning multiple embodiments without explaining how the disparate disclosures evidence possession of the claim as a whole. Indeed, PO's citations for claim 30 span planar two-layer configurations

(Figs. 2-3), dome-shaped shells (Figs. 17-19), and an embodiment (Fig. 14) that has additional light scattering particles mixed into the phosphor layer. PO does not identify which embodiment supports each claim, nor does it explain how citations to incompatible embodiments together demonstrate possession of any particular claimed combination. The Preliminary Guidance specifically faulted PO for this approach. Paper 42 at 8-9. PO's Revised MTA repeats the error. String citations to scattered paragraphs cannot substitute for a coherent written description showing.

**2. The 20% to 40% phosphor reduction range is arbitrary and unsupported**

Proposed claim 31 requires that phosphor reduction is “by between 20% and 40%.” The specification discloses reduction “up to 40%.” Ex. 1001, 3:29-32. “Up to 40%” means any value up to 40%—at best, a ceiling without a floor. PO's written-description table cites thirteen paragraphs spanning several embodiments for this limitation without identifying which one purportedly discloses the claimed 20% minimum. Paper 46 at 7. PO offers no explanation, let alone expert testimony, because the specification offers no support.

Nothing in the specification identifies 20% at all, let alone as a threshold, a minimum, or a value of any significance. And 40% appears to be simply the best results the inventors achieved, not a technically significant limit. The specification provides no indication that 40% represents a maximum, a threshold beyond which

the device would not function, or a value of any meaning. The specification does report experimental reductions of approximately 25% and 33% in certain embodiments where the light reflective/scattering material 122 is *included* in the phosphor-containing wavelength conversion layer 118, which is not the claimed configuration wherein the light diffusing layer is separate from wavelength conversion layer. Ex. 1001, Fig. 12, 15:31-16:65. Isolated data points for a different, unclaimed embodiment are not a disclosure of the endpoints for the claimed range. *Indivior UK Ltd. v. Dr. Reddy's Labs. S.A.*, 18 F.4th 1323, 1330-31 (Fed. Cir. 2021). The prior art teaches phosphor reduction; PO cannot avoid it by manufacturing a range unsupported by the specification.

**3. The 450 nm to 470 nm limitation encompasses devices emitting incidental blue light**

During prosecution PO amended the claims to require “blue light having a wavelength of greater than or equal to 440 nm” to avoid the McNulty reference. *See, e.g.,* Ex. 1004 at 194-202. In response to the Preliminary Guidance finding that the limitation lacked written description support, PO amended the claims to require “blue light having a wavelength of between 450 nm and 470 nm.” Paper 46 at 6, 14-15. But the alleged support for the revised proposed claims describes off-the-shelf blue LEDs with a “peak wavelength” of “typically 450 nm to 470 nm.” Ex. 1001, 7:24-25. Because the claims require only “blue light having a

wavelength of between 450 nm and 470 nm,” not that the “peak wavelength” be in that range, there is a significant mismatch between the specification language and proposed claim language, and a failure of written description. Light sources produce incidental blue light in the 450 nm to 470 nm range even if they do not have a peak wavelength in that range. For example, an LED with a peak wavelength below 440 nm—and thus outside the range in the specification relied upon—will still emit light at wavelengths between 450 nm and 470 nm range—and thus nonetheless fall within the scope of the revised claims. *See, e.g.*, Ex. 2004, Fig. 7, ¶¶ 74, 106 (an LED having a peak emission of about 430 nm emitting incidental light in the claimed range).

Indeed, the specification’s technical discussion presumes a blue-dominant device, not just incidental blue light. As discussed extensively with respect to the obviousness of a blue LED having a peak wavelength in this range, blue-pumped white LED packages like those claimed by the ’678 patent depend on blue LEDs as the primary excitation source. Ex. 1002, ¶ 121; Ex. 1001, 11:37-12:12. A device could emit with a peak wavelength well outside of the claimed blue range, yet incidental emission in the 450 nm to 470 nm range would bring it within the scope of the claims, despite being outside the specification’s disclosure.

**B. Substitute claim 31 is indefinite**

Under *Nautilus, Inc. v. Biosig Instruments, Inc.*, a claim is indefinite if it fails to “inform, with reasonable certainty, those skilled in the art about the scope of the invention.” 572 U.S. 898, 901 (2014). The Board’s Preliminary Guidance addressed indefiniteness challenges to certain limitations in PO’s original proposed claims. Paper 42 at 17-20. The “20% to 40%” range added in revised proposed claim 31, however, is new claim language that introduces new points of indefiniteness.

**1. The 20% to 40% range cannot be quantified without a defined methodology**

The Preliminary Guidance addressed the written description for phosphor reduction, finding that “the baseline is the wavelength conversion layer material before the reduction, and that any reduction suffices.” Paper 42 at 17-18. The specific “20% to 40%” range recited in claim 31 presents a different issue. Claiming a specific percentage range—as opposed to “any reduction”—requires a methodology to quantify the reduction. Claim 31 provides none.

How is “20% to 40%” measured? The percentage is unitless, and “quantity” could refer to mass, volume, or particle count. Claim 31 also leaves unclear whether the reduction applies to the phosphor alone or the entire wavelength conversion layer. A component might fall inside the claimed range under one

measure and outside under another. The specification identifies no governing methodology.

The Federal Circuit has “repeatedly said that when ‘multiple methods’ for determining whether a claim limitation is met ‘lead[] to different results without guidance ... as to which method should be used,’ the claim is indefinite.” *Akamai Technologies, Inc. v. MediaPointe, Inc.*, No. 24-1571, slip op. at 15 (Fed. Cir. Nov. 25, 2025) (quoting *Dow Chemical Co. v. Nova Chemicals Corp.*, 803 F.3d 620, 634 (Fed. Cir. 2015)). Here, without any specified methodology, a POSITA has no way to determine whether a given device falls within the claimed range.

## **2. The 20% to 40% limitation requires operation to determine infringement**

Claim 31 is an apparatus claim directed to a “wavelength conversion component.” Yet the claim defines the component not by its physical structure but by an operational result: that redirected light reduces wavelength conversion layer material “by between 20% and 40%.”

As discussed below, Petitioners maintain that any reduction percentage within this range reflects routine engineering optimization and therefore adds no patentable weight. But to the extent the limitation is cognizable as a structural distinction, it is indefinite. A person examining the physical component cannot determine from its structure alone whether it falls within the claimed range. The

component's phosphor loading is a fixed quantity; whether that quantity represents a "20% to 40%" reduction requires comparing the device against a hypothetical baseline—a device without the light diffusing layer, producing the same "color emission product." The term "color emission product" is itself undefined; the specification provides no parameters for what constitutes "a given" product—whether CCT, CRI, CIE coordinates, or some combination thereof.

As the Preliminary Guidance noted, the baseline for the reduction is "the wavelength conversion layer material before the reduction." Paper 42 at 17-18. But a manufacturer is not going from one state to another—it is simply manufacturing a device with a particular phosphor loading. To know whether that loading represents a 19% reduction or a 21% reduction, the manufacturer would need to build the baseline device, operate both devices, and compare results. But no such comparison is possible. Removing the diffusing layer degrades color uniformity, causing color emission to vary with viewing angle, meaning there is no comparable "color emission product." Meanwhile, adding phosphor to compensate for the absent diffusing layer introduces confounding variables including increased self-absorption and scattering within the phosphor layer itself.

Under *IPXL Holdings, LLC v. Amazon.com, Inc.*, 430 F.3d 1377, 1383-84 (Fed. Cir. 2005), claims that conflate apparatus structure with operational characteristics are indefinite because a manufacturer "would not know from the

claim” whether its product infringes. A manufacturer cannot determine at the point of production whether its component achieves a reduction within the claimed range without constructing a hypothetical baseline device, selecting a target color emission product, and comparing operational results.

**C. The substitute claims are obvious**

PO’s Revised MTA proposes revised substitute claims 30-49, which can be organized into three categories: (1) phosphor-reduction claims (claims 30-31 and dependents 32-39); (2) preferential-scattering claims (claims 40, 45, and dependents 41-44); and (3) hybrid claims (claims 46-49). PO also narrowed the claimed wavelength of blue light from “ $\geq 440$  nm” to “between 450 nm and 470 nm”—a range of peak wavelengths identified as “typical[]” in the specification and disclosed throughout the prior art.

The Preliminary Guidance found obvious all relevant limitations from the original Motions to Amend. Paper 42 at 24-31. PO’s Revised MTA either accepts these findings (by removing contested limitations) or repeats arguments the Board has already rejected.

**1. The phosphor-reduction claims are obvious (claims 30-39)**

The underlying structure of claims 30-39—a blue-pumped white LED with a phosphor layer and a TiO<sub>2</sub> light-diffusing layer—is the same structure the Board found obvious in the original claims. The new limitations in claims 30 and 31 do

not save these claims; they merely recite the natural results of the obvious structure. The reduction in necessary phosphor is physics, not invention. Claiming it expressly (claim 30) or within an arbitrary percentage range (claim 31) does not transform an obvious structure into a patentable one, and the claims are obvious as a whole.

**a. Claim 30's phosphor-reduction limitation is the natural result of the prior art structure**

Claim 30 adds the limitation that light “directed back at the wavelength conversion layer reduces the wavelength conversion layer material necessary for a given color emission product.” The Board agreed this limitation “is rendered obvious based on the structure rendered obvious by” the instituted grounds. Paper 42 at 27. The Preliminary Guidance found phosphor reduction is “the natural result” of the prior art’s light-recycling structure, reflecting “a fundamental principle of engineering... that increasing the efficiency of a process allows for the use of less input material to achieve the same output” and “a well-known engineering trade-off.” *Id.* at 25-27.

PO’s Revised MTA characterizes the Board’s basis for its obviousness determination as “conclusory” and based on “hindsight.” Paper 46 at 16-17. But the Board’s Preliminary Guidance was neither.

The Preliminary Guidance found phosphor reduction obvious based on “a fundamental principle of engineering... that increasing the efficiency of a process allows for the use of less input material to achieve the same output” and “a well-known engineering trade-off.” Paper 42 at 25-27. The Board credited Prof. Doolittle’s testimony that “it was a fundamental principle of engineering understood by a POSITA that increasing the efficiency of a process allows for the use of less input material to achieve the same output.” Paper 42 at 26-27 (citing Ex. 1065, ¶¶ 11-15). And the Board determined that “the benefits of light recycling to increase conversion efficiency and reducing phosphor material would have been known to persons of ordinary skill,” further citing the prior art Vriens and Oh. Paper 42 at 26-27.

Vriens teaches that reflecting “UV/blue light back to the phosphor... makes it possible to reduce the phosphor grain density somewhat.” Ex. 1057, 5:6-15. Oh teaches “recycl[ing] unabsorbed transmitted blue” back into the phosphor, achieving the same color output with less than half the phosphor concentration. Ex. 1058 at 1-3. The ’678 specification itself describes phosphor reduction as a natural consequence of the claimed structure. Ex. 1001, 3:21-32. PO’s Revised MTA does not address these teachings, offer new expert testimony, or explain why the Board’s evidence-supported analysis was wrong.

**b. Claim 31’s “20% to 40%” range does not confer patentability**

Claim 31 requires the reduction of necessary phosphor “by between 20% and 40%.” As discussed above, the Board found the general phosphor-reduction limitation obvious as “the natural result” of the prior art structure. Paper 42 at 26-27. Adding an arbitrary requirement for a certain percentage reduction rather than reduction generally does not avoid obviousness.

As discussed above, neither endpoint has any apparent significance—the specification discloses reduction “up to 40%” in passing and says nothing about 20%. Ex. 1001, 3:29-32. The prior art established that light-recycling structures inherently enable phosphor reduction. Vriens discloses that reflecting blue light back to the phosphor “makes it possible to reduce the phosphor grain density.” Ex. 1057, 5:6-15. Because the prior art discloses the general relationship that light recycling reduces necessary phosphor, discovering the optimum degree of reduction is routine experimentation, not invention. *In re Aller*, 220 F.2d 454, 456 (CCPA 1955); *In re Peterson*, 315 F.3d 1325, 1329-30 (Fed. Cir. 2003). Targeting a particular percentage does not confer patentability.

**c. Dependent claims 32-39 add only conventional features**

PO has never argued that any of the remaining dependent limitations provide a patentable distinction, and none does. If the Board reaches this motion, it will

have already found the original claims obvious, including dependent claims reciting the same phosphor/binder mixtures, binder materials, deposition methods, scattering materials, and form factors. Claims 32-39 add nothing that would change the obviousness analysis. “The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007).

**2. The preferential-scattering claims are obvious (claims 40-45)**

The underlying structure of claims 40-45 is the same structure the Board found obvious in the original claims: a blue-pumped white LED with a phosphor layer and a TiO<sub>2</sub> light-diffusing layer. If the Board reaches this contingent motion, it will have already determined that structure unpatentable. Preferential blue-light scattering is a known property of the nano-scale TiO<sub>2</sub> particles the prior art already discloses; the Board found this limitation obvious over Basin-2007 or Krummacher combined with Stokes. Paper 42 at 29-31. PO’s sole defense is a teaching-away argument the Board has now rejected twice.

**a. PO’s teaching-away argument fails**

PO’s argument that Stokes teaches away from obviousness (Paper 46 at 18-20) misses the mark.

The Preliminary Guidance found “the concept of selecting a particle size to maximize scattering of blue light to aid in conversion was known in the art” and that “Basin-2007 and Krummacher both disclose TiO<sub>2</sub> nanoparticles.” Paper 42 at 29-30. Based on these findings, the Board determined that the preferential-scattering limitation was obvious. *Id.* at 29-31.

PO argues combining Stokes with the primary references would “eviscerate one of the stated purposes of the ’678 Patent” because Stokes positions phosphor on the outside. Paper 46 at 19-20. But Stokes is cited for its particle-size teaching, not its layer arrangement. Petitioners do not propose adopting Stokes’s layer arrangement. Basin-2007 and Krummacher provide the device structure—scattering layer positioned outside the phosphor layer, as claimed. Ex. 1005, ¶¶ 32, 46, Fig. 2; Ex. 1007, ¶¶ 38-42, Fig. 2. Stokes is cited for its teaching that nano-scale TiO<sub>2</sub> particles—which would include those disclosed by Basin-2007 and Krummacher—preferentially scatter blue light. Ex. 1008, 7:1-26.

Stokes does not teach away from its particle-size principle. Teaching away requires that “a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference.” *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). PO bears the burden of establishing teaching away, and “[t]he nature of the teaching is highly relevant.” *Id.* Stokes’s criticism of Shimizu’s layer arrangement, Ex. 1008, 2:60-3:26, does not discourage using nano-scale TiO<sub>2</sub>

particles for light diffusion. A POSITA would not read Stokes as teaching away from the particle sizes it expressly identifies as effective for preferential blue-light scattering. More fundamentally, Stokes cannot teach away from a result the primary references already achieve—the TiO<sub>2</sub> nanoparticles Basin-2007 and Krummacher disclose already produce preferential blue-light scattering. *Cf. Sigray, Inc. v. Carl Zeiss X-Ray Microscopy, Inc.*, No. 23-2211, slip op. at 12-13 (Fed. Cir. May 23, 2025) (reference’s stated goal of minimizing magnification could not overcome physical reality that disclosed geometry necessarily produced magnification within claimed range).

In instituting the related ’539 patent IPR, the Board rejected identical teaching-away arguments, finding Stokes “sufficiently discloses selecting a particle size” and that “a person of ordinary skill in the art would use Stokes teachings to further refine [Krummacher’s] size range to optimize the particle size to preferentially scatter blue light.” IPR2025-00698, Paper 11 at 21-23. PO’s Revised MTA does not acknowledge—let alone distinguish—this adverse authority.

PO offers nothing new to disturb the combinability conclusion—no new expert declaration, no new technical analysis, no engagement with the Board’s reasoning. Each element of claims 40 and 45 is disclosed or rendered obvious by the prior art. The base structure was found obvious; the preferential-scattering limitation is obvious over Stokes.

**b. Dependent claims 41-44 add only conventional features**

PO has never argued that any of the dependent limitations in claims 41-44 provide a patentable distinction, and none does. If the Board reaches this motion, it will have already found the original claims obvious—including dependent claims reciting the same device types, particle sizes, and form factors. Claims 41-44 add nothing that would change the obviousness analysis.

**3. The hybrid claims are obvious (claims 46-49)**

Claims 46-49 depend from Claim 30 and incorporate preferential-scattering limitations—combining two sets of limitations the Board has already found obvious.

**a. Each claim limitation is independently obvious**

Claims 46-49 are proposed substitutes for original claims 11-14, which depended from claim 1 and added preferential-scattering limitations. In the Revised MTA, PO proposes amending claim 30 to require a reduction in necessary phosphor. Because claims 46-49 depend from claim 30, they now inherit the phosphor reduction limitation, combining it with preferential scattering. As discussed in detail above, and as found by the Board, each is obvious independently. Paper 42 at 25-27, 29-31.

The remaining limitations—claim 47’s “at least twice as much” scattering ratio, claim 48’s blue-light limitation, and claim 49’s particle-size limitation—are from original claims 12-14, and PO has not argued that they lend patentability.

**b. Combining two inherent results of the same structure does not yield a nonobvious claim**

The hybrid claims do not combine separate inventive contributions—they claim two physical phenomena that both flow naturally from the prior art structure. The Board found that a reduction in necessary phosphor is “the natural result” of the light-recycling structure disclosed by Basin-2007 and Krummacher. Paper 42 at 25-27. Preferential blue-light scattering is likewise a known property of the nano-scale TiO<sub>2</sub> particles those same references disclose. Paper 42 at 29-31. PO’s hybrid claims simply recite both consequences of a single known structure.

In any case, a POSITA would have been motivated to obtain both benefits in a single device—they are complementary results, not competing design choices. Under *KSR*, “the combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” 550 U.S. at 416. Here, PO combines two predictable results of the same familiar structure. No unexpected synergy is identified. PO’s only defense is the teaching-away argument, which fails for the reasons stated in Section C.2.a.

### III. CONCLUSION

PO's Revised MTA offers no path to patentability. The Board's Preliminary Guidance found every limitation in PO's proposed substitute claims obvious. PO's response was to shuffle those same limitations among claims, remove contested limitations, and repeat arguments the Board has already rejected.

The phosphor reduction limitations recite "the natural result" of the prior art's light-recycling structure—physics, not invention. Preferential scattering of blue light is likewise the natural result of using nano-scale TiO<sub>2</sub> particles, as Stokes recognized. If the Board reaches this contingent motion, it will have already found obvious the underlying structure that renders each of these limitations unpatentable.

The substitute claims are unpatentable as obvious. They also lack written description support and are indefinite. Petitioners respectfully request that the Board deny PO's Revised Contingent Motion to Amend and decline to enter proposed substitute claims 30-49.

Date: January 6, 2026

Respectfully submitted,

/s/David C. Radulescu  
David C. Radulescu, Lead Counsel  
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**APPENDIX A – EXHIBIT LIST**

| <b>Exhibit</b> | <b>Description</b>                                                                                                                                                                                                                           |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 <sub>2</sub> (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 TiO<sub>2</sub></i> ”, TAPPI JOURNAL, November 1997, Vol. 80(11) |
| EX1017         | William D. Ross, “ <i>Theoretical Light-Scattering Power of TiO<sub>2</sub> 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                                                                                                                                                         |

| Exhibit | Description                                                                                                                                                                                                                                            |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EX1023  | Sudhakar Madhusoodhanan and Devdatt S. Nagvekar, “UV Curable High Opacity Ink Jettable White Ink”, 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 <a href="https://perma.cc/C3LU-9ET5">https://perma.cc/C3LU-9ET5</a>                                                                               |
| EX1027  | U.S. District Courts – Median Time from Filings to Trial for Civil Cases (March 31, 2024), available at <a href="https://perma.cc/6FA3-3G89">https://perma.cc/6FA3-3G89</a>                                                                            |
| 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.                                                                                                                      |

| Exhibit | Description                                                                                                                                                                                     |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | 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.                                                                                  |
| 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 POPR-1357 and POR-1357                                                                                                                                                            |
| EX1055  | Comparison of Schubert POPR-1357 and POR-1357 declarations                                                                                                                                      |
| EX1056  | U.S. Patent No. 8,104,908 (“Harbers”).                                                                                                                                                          |

| Exhibit | Description                                                                                                                                                                                                               |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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) |
| 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.                                                                                                              |
| EX1066  | <i>Feit Electric Co., Inc. v. LEDVANCE LLC</i> , No. 5:24-cv-31 (E.D. Ky. Feb. 2, 2024). Stayed April 2, 2025. <i>Id.</i> , Dkt. 63                                                                                       |
| EX1067  | <i>Feit Electric Co., Inc. v. Savant Technologies LLC d/b/a GE Lighting</i> , No. 1:24-cv-473 (N.D. Ohio Mar. 13, 2024). Stayed April 1, 2025. <i>Id.</i> , text order                                                    |
| EX1068  | <i>Feit Electric Co. Inc v. Elong International USA Inc., et al.</i> , No. 3:24-cv-1089 (N.D. Tex. May 6, 2024). Claim construction order issued July 2, 2025. (EX1044). Stayed November 21, 2025. <i>Id.</i> , Dkt. 164  |

**CERTIFICATE OF SERVICE**

The undersigned certifies that on January 6, 2026 the foregoing was served  
on counsel at the following electronic service addresses:

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