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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

**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.

Case No. IPR2025-00698
Patent No. 8,614,539

PETITIONERS' REPLY IN SUPPORT OF THE PETITION

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A. Introduction

The ’539 patent claims a conventional white LED with a diffusing layer. Patent Owner does not dispute that Krummacher discloses every structural element of the claimed invention arranged as claimed in a single device: a blue LED, a phosphor layer, and a layer of TiO_2 nanoparticles.

The only contested issue is whether the prior art made obvious such a device with TiO_2 particles of an average size “selected such that” the particles scatter blue light more than other wavelengths of light. It did. As the Board found at institution, (1) TiO_2 nanoparticles as disclosed in Krummacher preferentially scatter blue light as a matter of fundamental physics, and (2) Stokes discloses that fundamental relationship and provides reasons for a POSA to prefer particles that preferentially scatter blue light. ID at 22-25; *see also* IPR2024-01357, Paper 17 at 26-31. PO has done nothing to disturb the Board’s Institution Decision, and the challenged claims should be cancelled.

Indeed, PO does not even acknowledge the Board’s guidance. Instead, PO offers nothing but recycled arguments largely copied verbatim from prior filings.[1] PO submits no new expert testimony and did not depose Petitioners’ expert.

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[1] The challenged claims here are not patentably distinct from the challenged claims of the ’678 patent in IPR2024-01357. *See* 37 C.F.R. § 42.73(d)(3)(i) (PO estoppel).

PO made the same average particle size argument — that Stokes "identifies no particle sizes at all" and "does not address average particle sizes" (POR at 31-32) —in its Preliminary Response. *Compare* POR § IX.A, *with* Paper 10 at 22-27. The Board was not persuaded: Stokes discloses particles of particular sizes and those particles have an average particle size. ID at 22 (crediting that "the average particle size of a set of exact theoretical particles is the same as the exact particle size."). Yet PO does not challenge, or even address, the Board's reasoning. POR at 27-32; *see infra* § B.1.

PO's motivation to combine or teaching away argument — that the references address "very different lighting applications" (POR at 33) — is the same argument that the Board has already rejected three times as irrelevant, including in the related IPR2024-01357 proceeding. ID at 23-24; IPR2024-01357, Paper 17 at 26-31; IPR2024-01357, Paper 42 at 29-31. Again PO does not address the Board's reasoning. POR §§ IX.B-C; *see infra* § B.2.

These arguments were plainly wrong when first made; for PO to press them again without addressing the Board's guidance is extraordinary.

The remainder of PO's arguments, also recycled from elsewhere, fare no better. PO's alleged objective evidence of nonobviousness is insubstantial and unrelated to the claimed invention. *Compare* POR § IX.D, *with* IPR2024-01357, Paper 26 § IX.E; *see infra* § C.1. PO's claim construction argument, reprised from

PO's motions in IPR2024-01357, is both wrong and irrelevant to patentability. *Compare* POR § VIII, *with* IPR2024-01357, Paper 56; *see infra* § D.

B. The challenged claims are obvious

PO contests only the average particle size limitation (POR § IX.A) and motivation to combine (POR §§ IX.B-C), waiving all other challenges. *See* Paper 12 at 10. As detailed below, PO adds nothing to these arguments the Board has already rejected.

1. The Board explained how the "average particle size" requirement is disclosed, yet PO ignores the Board's explanation

The challenged claims require "a light scattering material, wherein the light scattering material has an average particle size that is selected such that the light scattering material will scatter excitation light from a radiation source [i.e., blue light] relatively more than the light scattering material will scatter light generated by the at least one photoluminescence material[.]" EX1101, cl. 1. The limitation is functional: it requires a light scattering material that achieves a result — preferential scattering of blue light — not a specific numerical "average particle size."

As the Board explained at institution, the Petition "clearly sets out two theories for how the references teach this limitation, with citations to each reference and supporting explanation." ID at 22. Under the first theory,

Krummacher discloses TiO_2 particles in a range where, "[a]ccording to the DuPont model [disclosed in Stokes], TiO_2 particles of such a size generally scatter more blue light (e.g., excitation light) than red or green light." Pet. at 26; EX1102 ¶ 124. Under the second, "to the extent that the claim language ... requires an average particle size selected for that reason (rather than an average particle size that leads to that outcome)," it is rendered obvious by Stokes. Pet. at 26-27. The Board found both theories sufficient. ID at 22-23.

Despite the Board's reasoned explanation of what the Petition already "clearly sets out," Patent Owner argues in its Response that it cannot understand the instituted grounds. ID at 22; POR at 28-32. Incredibly, it does so in the exact same words as the POPR without even an acknowledgement of the Board's explanation. *Compare* POPR at 22-27, *with* POR at 28-32.

With respect to Krummacher, PO argues that the disclosed range of 50-1000 nm does not render obvious the preferential scattering requirement, because it discloses "a vast range of particle sizes without identifying any part of that range as particularly beneficial" and includes sizes "where the blue light scattering is near equal." POR at 29-30. But PO made this same argument in its POPR, using the same language. *Compare* POR at 29-30, *with* POPR at 24-26. The Board credited the Petition's showing that TiO_2 particles within Krummacher's range "generally scatter more blue light (e.g., excitation light) than red or green light." ID

at 18 (quoting Pet. at 26); *see also* EX1102 ¶ 124 (cited at ID at 22). PO does not address this finding.

The Board found that a POSA would use "Stokes teachings to further refine that size range to optimize the particle size to preferentially scatter blue light." ID at 23. PO argues otherwise — that the passages cited in the Petition "identif[y] no specific particle sizes" and "do[] not address average particle sizes." POR at 31. The Board disagreed. Stokes discloses that "the radiation scattering particles have a size such that the particles preferentially scatter blue or UV LED light as compared to yellow, green, red or white light from the luminescent material," which the Board found "sufficiently discloses selecting a particle size." ID at 22 (quoting EX1108, 7:1-4). Stokes also discloses specific particle size ranges, as the Board noted. *See* ID at 14 (quoting EX1108, 7:9-22 (disclosing that "100 to 200 nm TiO_2 particles" have "at least a 50% greater scattering power for blue radiation" than for green or red)); *see also* EX1108, 6:60-7:8 (preferred mean particle diameters of 100-300 nm and 140-240 nm, and for blue LEDs at 450 nm, 150-225 nm). As to the distinction between "particle size" and "average particle size," the Board credited the Petition's explanation that "the average particle size of a set of exact theoretical particles is the same as the exact particle size." ID at 22. PO does not address the Board's reasoning on any of these points.

PO also argues the Petition "fails to explain how a POSITA would have modified Krummacher in view of Stokes." POR at 31-32. Again, the Board addressed this as well:

> [W]e find that Petitioner has explained sufficiently the "why" and "how" the references would have been combined. As the Petition explains, Krummacher discloses radiation scattering particles having a size range of 50 to 1000 nm. See Pet. 26 (citing EX1107 ¶ 39). Petitioner further explains that a person of ordinary skill in the art would use Stokes teachings to further refine that size range to optimize the particle size to preferentially scatter blue light. See id. at 26-27. Petitioner further provides reasons, suggested in Stokes itself, why a person of ordinary skill would have made this modification to Krummacher. See id. at 27-28 (citing EX1108, 7:17-26; EX1102 ¶ 128).

ID at 23. Again, PO ignored the Board's explanation.

PO has given the Board no reason to revisit its findings, and the challenged claims are obvious.

2. The Board has thrice rejected PO's arguments against combining the references, yet PO does not address the Board's reasoning

PO argues that Petitioners "rely exclusively on the testimony of Prof. Doolittle, who fails to address the very different lighting applications

disclosed in these three separate references." POR at 33. The Board has rejected this argument three times. ID at 23-24; IPR2024-01357, Paper 17 at 26-31; IPR2024-01357, Paper 42 at 29-31.

The Board first rejected an essentially identical argument at institution in IPR2024-01357. IPR2024-01357, Paper 17 at 26-28 (rejecting "different applications" argument as to Ground 1); *id.* at 30-31 (same for Ground 3). When PO re-raised the argument in its Preliminary Response here, the Board rejected it again. ID at 23-24. And the Board confirmed the obviousness of the Krummacher-Stokes combination a third time in its Preliminary Guidance on Patent Owner's Motion to Amend in IPR2024-01357. IPR2024-01357, Paper 42 at 30.

PO's Response does not address the Board's reasoning in any of these decisions. Instead, PO presses a series of arguments, each of which the Board has already considered, without acknowledging or responding to the Board's explanations.

PO's "different applications" argument rests on the premise that obviousness requires importing an LED chip from Shimizu or Stokes into Krummacher. POR at 33 ("Petitioners fail to explain why a POSITA would want to import a blue-light LED chip from Stokes or Shimizu into Krummacher"). But no one is "importing" an LED chip. Krummacher already discloses a blue LED (EX1107 ¶¶ 31-32, 36) and a TiO_2 scattering layer (EX1107 ¶ 39). It is error to "require a motivation to

combine each element of the claim—even those present together in a reference." *General Electric Co. v. Raytheon Techs. Corp.*, 983 F.3d 1334, 1352 (Fed. Cir. 2020); *see also Guardant Health, Inc. v. Univ. of Washington*, No. 24-1129, slip op. at 9-10 (Fed. Cir. Jan. 23, 2026) (applying *GE*). The question is not whether these devices could be physically merged, but whether a POSA would combine the teachings of these references to arrive at the claimed device. Krummacher already discloses that device.

With respect to packaging, PO argues that bond wires and housing differ between vertical chips and DIP/SMD LEDs. POR at 34. The Board found this unpersuasive at institution (ID at 23-24), and PO adds nothing new. The test is not whether a skilled artisan could physically merge two devices but whether the teachings of the references, taken together, make the claimed device obvious. *Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC*, 825 F.3d 1373, 1381 (Fed. Cir. 2016); *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). Blue InGaN LED chips were commodity components used across all of these applications. *See* EX1101, 7:14-26 (identifying blue LEDs by commercial product name and stating the wavelength is "typically 450 nm to 470 nm"); EX1108, 4:37-40, 6:62-67 (blue LEDs at 450 and 480 nm). The applications differ; the LED does not.

PO also argues that quantum efficiency considerations would have taught away from using a blue LED at wavelengths above 440 nm. POR at 36-37. The

Board rejected this in the ’678 proceedings: “Patent Owner does not explain why these same considerations did not convince Basin-2005, Shimizu, or Stokes to use lower wavelengths.” IPR2024-01357, Paper 17 at 28. And the Board declined to credit it here. ID at 23. PO does not address the Board’s reasoning. Moreover, PO’s argument isolates one variable — the LED chip’s external quantum efficiency — while ignoring the system-level trade-off. Blue-pumped white LEDs are more efficient overall because only a portion of the blue light must be converted by the phosphor; UV-pumped lamps must convert all of the primary light, incurring greater energy losses. EX1102 ¶¶ 51-52. Dr. Schubert’s own textbook confirms the point:

> A fundamental drawback of UV-pumped white LEDs is the energy loss (Stokes shift) incurred when converting UV light to white light. The potential luminous efficiency 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 at 358-59. Under oath, Dr. Schubert initially denied this and acknowledged it only when shown his own words. EX1148, 87:5-88:4. At best, PO identifies a known design choice between a near-UV pump and a blue pump. A known design choice does not teach away. *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004).

PO similarly relies on the prosecution history (POR at 6-8), but this too is a teaching-away argument, and it fails. The Examiner allowed the claims because McNulty is designed to maximize reflection of excitation light back into the phosphor — the opposite of the claimed configuration, in which blue excitation light passes through the wavelength conversion component to contribute to the final emission product. EX1104 at 392-97. Distinguishing a reference designed to trap UV light says nothing about whether a POSA would apply Stokes's teachings to Krummacher, where blue light passes through the device.

Separate from the LED-chip question, PO argues there is no reason to apply Stokes's particle size teaching to Krummacher's TiO_2 layer, and that any such reason comes from the '539 patent rather than the prior art. POR at 37-38. The Board already found otherwise — the motivation is "suggested in Stokes itself." ID at 23 (citing EX1108, 7:17-26; EX1102 ¶ 128). Stokes explains that preferential scattering renders the light output "more uniform" by scattering source radiation toward the phosphor while reducing backscattering of phosphor radiation. EX1108, 7:17-26. Prof. Doolittle explained this motivation. EX1102 ¶ 128. PO calls this testimony "conclusory" (POR at 34) but does not engage with it. Dr. Schubert's declaration does not address it. EX2001 ¶¶ 103-111.

The same analysis applies to claims 18 and 28, challenged under Ground 2. Hussell discloses an elongated hollow wavelength conversion tube designed as "a

filament for a drop-in replacement for an incandescent bulb" (EX1111 ¶¶ 32, 52) but does not address preferential scattering or the wavelength of blue light. Pet. at 63. The combination supplies what Hussell does not spell out: Krummacher provides the TiO_2 scattering solution for off-state appearance (EX1107 ¶¶ 3-4, 39-41; EX1102 ¶¶ 219-230), Stokes provides the particle size teaching, and Van Woudenberg discloses the wavelength range of blue LEDs like those in Hussell (EX1120, 5:15-19). The Board instituted on this ground and found PO's arguments unpersuasive. ID at 24-25. PO does not address the Board's reasoning. Hussell itself teaches that it is desirable to enhance scattering from the tube by texturing its surfaces (EX1111 ¶ 48), and the use of scattering particles in replacement bulb enclosures was itself known (*see, e.g.*, EX1149, 1:5-15; EX1159 ¶¶ 17-19; EX1160, 23:40-57). The teachings of these references, taken together, describe the claimed device. PO identifies no limitation for which they do not. PO's objection that Petitioners addressed only pairs of references mischaracterizes the Petition and misapplies *KSR*. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 417-18 (2007).

Again, PO has given the Board no reason to revisit its findings, and the challenged claims remain obvious.

3. The dependent claims fall with the independent claims

The Petition provided element-by-element mappings for all challenged claims across both grounds, supported by Prof. Doolittle's declaration. Pet. at 20-

75; EX1102 ¶¶ 110-255. The Board instituted on all grounds and all claims, noting that PO raised no arguments specific to the dependent claims and "determin[ing] that Petitioner shows a reasonable likelihood of prevailing with respect to the obviousness of claims 2-11, 18-20, and 23-25 over Krummacher, Stokes, and Shimizu". ID at 24. In its Response, PO contests only the average particle size limitation and motivation to combine, and does not identify any element of any dependent claim that the prior art purportedly fails to disclose. *See generally* POR §§ IX.A-C. Accordingly, the dependent claims are unpatentable for the same reasons set forth above with respect to the independent claims.

C. There is no credible evidence of nonobviousness

1. There are no secondary indicia of nonobviousness

Patent Owner offers the same evidence and the same arguments it submitted in IPR2024-01357. *Compare* POR at 39-45, *with* IPR2024-01357, Paper 26 at 60-64. The evidence is insubstantial and unpersuasive for the same reasons. *See* IPR2024-01357, Paper 40 at 28-30.

First, PO fails to establish a nexus. PO provides no claim chart and no expert testimony mapping the features of its commercial products to the full scope of the challenged claims. PO invokes the *WBIP* presumption (POR at 44-45), but that presumption requires the patent owner to show that the product on which it relies "is the invention disclosed and claimed in the patent." *WBIP, LLC v. Kohler*

Co., 829 F.3d 1317, 1329 (Fed. Cir. 2016). PO's only nexus citation is EX1138, its infringement contentions from the district court mapping Petitioners' accused products (not PO's own). Absent coextensiveness between PO's products and the challenged claims, there is no presumption of nexus, and the evidence carries little weight. *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019). Dr. Schubert's secondary-considerations opinions (EX2001 ¶¶ 118-121) describe commercial success of white-filament bulbs without mapping a single Feit product to a single claim element. As Dr. Schubert admits, the alleged evidence of nonobviousness is "tied to the 'white filament' aspect of the products, which is due ***in part*** to the claimed light scattering material." EX2001 ¶ 122 (emphasis added). The success PO identifies is thus "tied to" an overall aesthetic that the challenged claims neither disclose nor require. Dr. Schubert does not even claim that aesthetic is achieved through the claimed particle size selection — only that the light scattering material contributes "in part." And the light scattering material itself (TiO_2 nanoparticles) was undisputedly in the prior art. EX1107 ¶ 39.

The alleged evidence of success and praise is directed to a consumer-perceptible aesthetic, not to the claimed particle size selection. PO's exhibits make the point:

- "Clear glass LED bulbs with exposed white filament offer a sleek aesthetic." (EX2029.)

- "Lower profile white filaments" that "help create a timeless look." (EX2031.)
- "The white filaments make the bulb look less obtrusive when it's off." (EX2030.)

The goal of a white off-state appearance was well-known in the prior art; Krummacher disclosed a TiO_2 scattering layer to achieve exactly this result. EX1107 ¶¶ 3-4, 39-41. The alleged $8.00 price premium (EX2035; EX2036) tracks the visible aesthetic, not anything allegedly inventive in the '539 patent. That is, the alleged commercial success PO identifies is attributable to a known feature of the prior art, not to particle size selection. There is no nexus. *Fox Factory*, 944 F.3d at 1373.

Second, there is a substantial temporal disconnect. The '539 patent issued in December 2013. There was an actual commercial embodiment created by the named inventors (the Intematix ChromaLit remote phosphor, EX1150; EX1151), but there is no evidence it was successful. The products PO now holds up as evidence of success (its white-filament bulbs) were not introduced until years later. PO's assertion that the claimed particle size selection, rather than subsequent advancements in technology, somehow satisfied a long-felt need falls flat.
Dr. Schubert himself concedes the point: the success he identifies is due only "in part" to the claimed light scattering material (EX2001 ¶ 122), with the remainder attributable to improvements in phosphors, chip efficiency, and filament

manufacturing that postdate the prior art. PO's "unexpected results" argument fares no better — it is a timing argument, not evidence of unexpected technical results. POR at 44 ("If the claimed invention were as obvious and expected as Petitioners contend, then they and others would have introduced white-filament LED bulbs to the market long before 2010."). PO provides no data comparing expected versus actual scattering performance, and the timing itself undercuts PO's theory: if the claimed particle size selection produced truly unexpected results, those results would have been apparent when the invention was made, not a decade later when white-filament bulbs reached the consumer market.

Third, the evidence itself is de minimis and anecdotal: three Instagram comment threads (EX2032-2034), a Reddit post (EX2037), a Candle Power Forums post (EX2030), and a Home Depot innovation award from PO's own retail partner (EX2031). Online consumer reviews and a single retailer award warrant "only limited weight." *Nested Bean, Inc. v. Big Beings USA Pty Ltd*, IPR2020-01234, Paper 34 at 46-47 (PTAB Jan. 24, 2022). And PO's purported commercial success is contradicted by the public record: 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% of reviewers recommend the product. EX1152. PO further frames Petitioners as "copiers" (POR at 43-44), but its only evidence is infringement contentions from the district court

(EX1138). "[N]ot every competing product that arguably falls within the scope of a patent is evidence of copying." *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010). Infringement contentions show PO's litigation positions, not that Petitioners copied the alleged invention.

PO's alleged objective evidence of nonobviousness is neither objective nor evidence of nonobviousness. Accordingly, it cannot overcome the already exceptionally strong prima facie case of obviousness.

2. Dr. Schubert is not a credible expert

Patent Owner's Response relies on Dr. Schubert's declaration submitted with the Preliminary Response, which predates his September 2025 deposition.[2] As discussed above, Dr. Schubert's opinions ignore, and cannot be reconciled with, the knowledge of a POSA, as reflected in his own textbook. *See supra* § B.1 (average particle size); *supra* § B.2 (quantum efficiency). When confronted with these inconsistencies under oath, Dr. Schubert deflected rather than engaging. *See,*

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[2] Patent Owner has not submitted any new testimony from Dr. Schubert since his September 2025 deposition in IPR2024-01357. In addition to not submitting a declaration with its Patent Owner Response in this proceeding, Patent Owner did not submit any expert testimony in support of its motions to amend in IPR2024-01357.

e.g., EX1148, 87:5-88:4 (textbook passage on UV-pumped LED efficiency); *id.* at 51:7-14 (unable to state the wavelength of a typical blue LED).

Dr. Schubert's lack of credibility is evidenced by more than just the quality of his opinions. At a 2021 bench trial on allegations that Dr. Schubert committed inequitable conduct in connection with the 2010 revival of an abandoned patent, *Schubert v. Philips Lumileds Lighting Co., LLC*, No. 1:12-cv-00924-MN (D. Del.), District Judge Noreika questioned Dr. Schubert's candor regarding his professed inability to recall events, addressing Dr. Schubert directly: "I just don't believe you can't remember anything. And it seems like we're just going down this I don't remember anything that happened, and I think there is probably some stuff in there that you remember if you're asked to remember it." EX1175, 303:17-304:4.

Dr. Schubert's conduct in these proceedings bears out Judge Noreika's concern. At his September 2025 deposition in IPR2024-01357, Dr. Schubert denied having "ever been the subject of a formal investigation or proceeding involving accusations of dishonesty or fraud." *Compare* EX1148, 89:7-13 ("A. No. Q. Did you say no? A. Correct."), *with* EX1175, 179 ("I got accused of fraud on the Patent Office"). In 2009, before the patent revival at issue in the Lumileds case, Dr. Schubert had also been the subject of an NSF investigation into alleged

conflicts of interest and misuse of federal grant funds.[3] Contemporaneously, he was removed as Principal Investigator and Director of the NSF's $18.5 million

[3] The NSF's Small Business Innovation Research (SBIR) program funds research at small businesses; the principal investigator must be primarily employed by the small business. 15 U.S.C. § 638. In 2005, Troy Research Corporation — a company Dr. Schubert had founded with his wife (EX1194 ¶¶ 9, 20) — obtained a $100,000 SBIR grant from the NSF. EX1186; EX1194 ¶ 15. The grant application listed Dr. Schubert's post-doctoral fellow as principal investigator (EX1194 ¶¶ 15-17; EX2002 at 17) and gave the company's address as "Suite 110" at a single-family residence Dr. Schubert owned (EX1186; EX1187). In 2009, the NSF Office of Inspector General opened an investigation (Case No. I09020004) into allegations that Dr. Schubert had not disclosed his interest in the company to RPI and that the company had misused the SBIR funds. EX1169. The OIG ultimately found that "[RPI] was aware of [Dr. Schubert's] interest in [Troy Research] and acted to mitigate any conflict of interests" and that "there was no evidence indicating that NSF award funds were misused or misappropriated." *Id.* Between 2010 and 2012, Dr. Schubert and his wife filed scores of FOIA requests with NSF concerning the investigation, including requests for the closeout memorandum by

(cont.)

Smart Lighting Engineering Research Center, which he had founded only a year earlier. EX2002; EX1184; EX1185. When asked about these events at his September 2025 deposition, Dr. Schubert professed no recollection — not of the investigation, not of his company, not of his wife's involvement, not of why NSF might have documents containing allegations of fraud against him. EX1148, 89:7-13; 109:2-8; 110:2; 112:20; 113:6-13.

Petitioners sent Patent Owner's counsel a detailed letter documenting the NSF investigation into alleged conflicts of interest and misuse of federal funds by Dr. Schubert, and asked that Dr. Schubert come prepared to address the investigation at his deposition in this proceeding. EX1194; EX1197 (Petitioners "expect Dr. Schubert to come prepared to testify regarding the matters in the attached"). Dr. Schubert testified he was "given the freedom to read the letter" but "had other things to do" and did not read it. EX1195, 48:21; 50:4-5; 50:13-15; 49:16-19. Yet he also proclaimed that he had "absolutely no idea" what fraud

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case number (EX1192; EX1194 ¶ 11), documents concerning "allegations made against Fred Schubert" of "fraud" and "failure to disclose interest in any entity" (EX1172 (Requests 2011-188 to 2011-192); EX1194 ¶ 14), and a letter "employed jointly by NSF and RPI in the attempt to force" his resignation as ERC director (EX1172 (Request 2011-473); EX1194 ¶ 27).

allegations Petitioners were referring to. EX1195, 43:20-24. Asked whether he was the subject of the investigation: "it could have been me, but I'm not certain." EX1195, 22:6-7. Shown a FOIA log entry in his own name requesting the closeout memorandum by case number: "that's how it looks like. I do not have a recollection." EX1195, 33:7-8.

Dr. Schubert's consistent excuse was the passage of time. Asked why his recollection was vague: "2008 and 2009 is more than 15 years ago." EX1195, 34:18-20. Asked why he could not recall whether his company was the company described in the investigation: "my recollection is vague" because "this dates back to a timeframe that is more than 10 years ago." EX1195, 28:7-8. Asked why he did not recall requesting the closeout memorandum: "It looks like the request was made in 2011. That is 15 years ago, and I do not recall that request." EX1195, 34:8-11. These are events that Dr. Schubert testified about in a district court bench trial in 2021, that he was cross-examined about six months prior in IPR2024-01357, and that were set out in a letter specifically designed to refresh his recollection and provided to him five weeks before he was cross-examined again.

Either Dr. Schubert is not being candid in his testimony, or his recollection of the time period relevant to obviousness is too impaired to support his opinions. Either way, Dr. Schubert's testimony is not credible evidence of nonobviousness.

D. Patent Owner's claim construction objections are irrelevant

PO raises two objections regarding claim construction, neither of which changes the prior art analysis. First, PO argues that Petitioners' claim construction positions are inconsistent across forums because Savant argued indefiniteness in the district court while the Petition stated "no construction should be necessary." POR at 23-25 (citing *Revvo*; *Tesla*; *American Airlines*). Second, PO argues that Prof. Doolittle's declaration provides explanations that amount to "constructions" contradicting the Petition's no-construction position. POR at 24-26 (citing *Hologic*).

Neither objection identifies a claim construction that would change the prior art analysis. PO has never itself argued — across three iterations of this argument in two proceedings — that any term requires a construction or that such a construction would change the prior art analysis. The Board adopted plain and ordinary meaning at institution without issue. ID at 9-10. PO requests dismissal of the grounds of unpatentability (POR at 25), but Section 318(a) requires a final written decision on the patentability of every challenged claim once trial is instituted. *See SAS Inst., Inc. v. Iancu*, 584 U.S. 357 (2018).

Even taken on its own terms, PO's cross-forum inconsistency argument fails for the reasons given in Petitioners' Opposition to Patent Owner's Motion to Terminate (IPR2024-01357, Paper 60). In summary:

First, the prior art unambiguously satisfies the limitation regardless of any indefiniteness question. The Director's safe harbor in *Tesla, Inc. v. IV II Ltd.*, IPR2025-00340, Paper 18 at 3-4, applies where a petitioner shows "that, notwithstanding the alleged indefiniteness of the claim term, an ordinarily skilled artisan would understand that the asserted art satisfies the claim limitation." Stokes discloses "100 to 200 nm TiO_2 particles" with "at least a 50% greater scattering power for blue radiation." EX1108, 7:9-17. The prior art unambiguously satisfies the limitation. *See Intel Corp. v. Qualcomm Inc.*, 21 F.4th 801, 813-14 (Fed. Cir. 2021) (Board may resolve prior art challenge despite potential indefiniteness). PO does not argue that a different construction would change whether the prior art meets this limitation, because it cannot.

Second, the positions are not contradictory. As discussed above, the prior art unambiguously discloses particles of an average size such that they preferentially scatter blue light. But whether one can reasonably determine the metes and bounds of the claim for enforcement purposes is a different question under a different standard. Petitioners have been consistent in this. IPR2024-01357, Paper 60 at 6-9 (opposition to motion to terminate); IPR2024-01357, EX2025, 41:1-9 (Prof. Doolittle: positions reflect "different specifications and different guidelines"). The Board has never found any inconsistency. *See* IPR2024-01357, Paper 42 at 16-20 (Preliminary Guidance addressing indefiniteness); ID at 9-10

(using plain meaning). Every adverse decision PO cites involved a petitioner that either refused to explain or could not explain genuinely inconsistent positions. *Revvo Techs., Inc. v. Cerebrum Sensor Techs., Inc.*, IPR2025-00632, Paper 20 at 4-5 (PTAB Nov. 3, 2025) (precedential Director review); *American Airlines, Inc. v. Intellectual Ventures I LLC*, IPR2025-01055, Paper 11 (PTAB Nov. 21, 2025). Yet here PO has never explained how Petitioners' positions are allegedly inconsistent.

Third, Petitioners withdrew all indefiniteness arguments in the district court and stipulated that the relevant claim terms have plain and ordinary meanings consistent with the district court's Markman order. EX1196.[4] In *Caption Health, Inc. v. Univ. of British Columbia*, IPR2025-01422, Paper 15 at 3 (PTAB Dec. 18, 2025), the Director held that a stipulation "resolves any potential inconsistency in claim construction positions between forums." The district court case is administratively closed pending IPR. There is no risk of inconsistent outcomes.

PO separately argues that three passages in Prof. Doolittle's declaration amount to "constructions" that contradict the Petition's no-construction position.

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[4] The requirements of the '678 patent are not identical to the requirements of the '539 patent, but as noted above, the challenged claims of the '539 and '678 patents are patentably indistinct, and the stipulation withdraws the indefiniteness positions that gave rise to PO's objection.

POR at 24-26 (citing *Hologic*). None of the three is actually a construction. In the first, Prof. Doolittle notes that the prosecution history confirms "blue light having a wavelength of greater than or equal to 440 nm" was intended to distinguish UV LEDs — that is a description of the prosecution history, not a construction, and the term has a clear meaning that requires no construction. EX1102 ¶ 93 (*citing* EX1104, pp. 194, 200-03). In the second, he confirms that TiO_2 particles are "light scattering particles within the meaning of the claims," citing the specification's own language. EX1102 ¶ 94 (citing EX1101, 8:19-21, 6:28-31). In the third, he confirms that phosphor materials are "photoluminescent materials within the meaning of the claims," again citing the specification. EX1102 ¶95 (citing EX1101, 1:36). None of these narrows or changes the plain meaning of any claim term. None is inconsistent with the Petition's statement that "no construction should be necessary." Pet. at 20. PO's reliance on *Hologic* is inapposite: there, the Board denied institution where the petitioner applied a *different* construction than it advanced. IPR2018-00019, Paper 17 (PTAB Apr. 18, 2018). Here, all agree that the prior art analysis proceeds under plain meaning throughout.

Neither objection has substance, and neither provides a basis to avoid deciding the patentability of the challenged claims.

E. Conclusion

Claims 1-11, 18-20, 23-25, and 28 of U.S. Patent No. 8,614,539 are unpatentable under 35 U.S.C. § 103(a). The Board has already found that the prior art discloses each element of the challenged claims, arranged as claimed, and Patent Owner has given the Board no reason to revisit those findings. Patent Owner's alleged objective evidence of nonobviousness is neither objective nor evidence of nonobviousness, its claim construction objections are irrelevant, and its expert testimony is not credible. The challenged claims should be cancelled.

Date: April 1, 2026

Respectfully submitted,

/s/ David C. Radulescu
David C. Radulescu, Lead Counsel
Reg. No. 36,250

PETITIONER'S UPDATED EXHIBIT LIST	
Exhibit No.	**Description**
EX1101	U.S. Patent No. 8,614,539
EX1102	Declaration of William A. Doolittle, Ph.D. re the '539 patent
EX1103	Curriculum Vitae of William A. Doolittle, Ph.D.
EX1104	File History for U.S. Pat. Appl. No. 13/273,215 (excl. references)
EX1105	U.S. Pat. Pub. No. 2009/0057699 ("Basin-2007")
EX1106	U.S. Pat. Pub. No. 2007/0045761 ("Basin-2005")
EX1107	U.S. Pat. Pub. No. 2008/0079015 ("Krummacher")
EX1108	U.S. Patent No. 6,791,259 ("Stokes")
EX1109	U.S. Patent No. 5,998,925 ("Shimizu-APA")
EX1110	U.S. Patent No. 6,069,440 ("Shimizu")
EX1111	U.S. Pat. Pub. No. US2010/0124243 ("Hussell")
EX1112	DuPont: Polymers, Light and the Science of TiO2 (2007)
EX1113	DuPont: Titanium Dioxide for Coatings (2007)
EX1114	Erik S. Thiele and Roger H. French, "Computation of Light Scattering by Anisotropic Spheres of Rutile Titania", Adv. Mater. 1998, 10, No. 15
EX1115	Erik S. Thiele and Roger H. French, "Light-Scattering Properties of Representative, Morphological Rutile Titania Particles Studied Using a Finite-Element Method", J. Am. Ceram. Soc., 81 [3] 469–79 (1998)

PETITIONER'S UPDATED EXHIBIT LIST	
Exhibit No.	**Description**
EX1116	Robert W. Johnson, Erik S. Thiele, And Roger H. French, "Light-scattering efficiency of white pigments: an analysis of model core - shell pigments vs. optimized rutile TiO2", TAPPI JOURNAL, November 1997, Vol. 80(11)
EX1117	William D. Ross, "Theoretical Light-Scattering Power of Ti02 and Microvoids", Ind. Eng. Chem., Prod. Res. Develop., Vol. 13, No. 1, 1974
EX1118	[Intentionally omitted]
EX1119	U.S. Patent No. 8,547,010 ("Jagt")
EX1120	Int'l Pat. Pub. No. WO 2008/044171 A2 ("Van Woudenberg")
EX1121	Declaration of Etai Lahav
EX1122	[Intentionally omitted]
EX1123	Sudhakar Madhusoodhanan and Devdatt S. Nagvekar, "UV Curable High Opacity Ink Jettable White Ink", RadTech e|5 2006 Technical Proceedings (2006)
EX1124	U.S. Pat. Pub. No. 2011/0001151 ("Toquin")
EX1125 to EX1133	[Intentionally omitted]
EX1134	Feit v. LEDVANCE, Plaintiff's Preliminary Claim Constructions, No. 5:24-cv-31 (E.D. Ky.), served Nov. 6, 2024
EX1135	Feit v. Savant, Plaintiff's Final Claim Constructions, No. 1:24-cv-473 (N.D. Ohio), served Dec. 10, 2024
EX1136	Feit v. Elong, Joint Claim Construction and Prehearing Statement, No. 3:24-cv-1089 (N.D. Tex.), Dkt. 45

PETITIONER'S UPDATED EXHIBIT LIST	
Exhibit No.	**Description**
EX1137	Feit v. LEDVANCE, Plaintiff's Disclosure of Initial Infringement Contentions, No. 5:24-cv-31 (E.d. Ky.), served Aug. 30, 2024
EX1138	Feit v. Savant, Supplemental Initial Infringement Contentions, No. 1:24-cv-473 (N.D. Ohio), served Oct. 8, 2024
EX1139	Feit v. Elong, Plaintiff's Disclosure of Asserted Claims and Preliminary Infringement Contentions, No. 3:24-cv-1089 (N.D. Tex.), served Oct. 23, 2024
EX1140-1147	[Intentionally omitted]
EX1148	Schubert Deposition Transcript, IPR2024-01357 (Sept. 12, 2025)
EX1149	U.S. Patent No. 3,175,117 (Kardos)
EX1150	"Intematix Introduces ChromaLit XT Remote Phosphor for High-Intensity LED Lighting," Apr. 16, 2012, Intematix, Press Release
EX1151	Datasheet – Intematix ChromaLit XT *Remote Phosphor Light Source*
EX1152	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)
EX1153-1158	[Intentionally omitted]
EX1159	U.S. Patent Application Publication 2007/0139949 A1 (Tanda)
EX1160	U.S. Patent 9,310,030 (Tong)
EX1161-1165	[Intentionally omitted]

PETITIONER'S UPDATED EXHIBIT LIST	
Exhibit No.	**Description**
EX1166	*Feit Electric Company, Inc. v. Ledvance, LLC* (Case No, 5-24-031-DCR), Order Staying case, Apr. 2, 2025, EDKY
EX1167	*Feit Electric Company, Inc. v. Savant Technologies LLC d/b/a GE Lighting*, 1-24-cv-00473 (NDOH), Order Staying case, Apr. 2, 2025, docket entry, NDOH
EX1168	[Intentionally omitted]
EX1169	NSF OIG Closeout Memorandum, Case No. I09020004, Ex. 12 to Schubert Deposition
EX1170	NSF OIG Semiannual Report to Congress (Sept. 2011) (excerpts)
EX1171	NSF FOIA Log FY 2010
EX1172	NSF FOIA Log FY 2011
EX1173	NSF FOIA Log FY 2012
EX1174	[Intentionally omitted]
EX1175	Trial Transcript, *E. Fred Schubert v. Lumileds LLC*, C.A. No. 1:12-cv-924-MN, Doc. 345 (May 13, 2021)
EX1176	*E. Fred Schubert v. Lumileds LLC*, C.A. No. 1:12-cv-924-MN, Lumileds' Reply Post-Trial Brief of Unenforceability of U.S. Patent No. 6,294,475 for Inequitable Conduct and Unclean Hands, Dkt. 338, June 4, 2021.
EX1177	LinkedIn Profile of Martin Schubert
EX1178	Mont et al., J. Appl. Phys. 103, 083120 (2008)
EX1179	NASA Press Release, Rice Business Plan Competition (April 2009)
EX1180	[Intentionally omitted]

PETITIONER'S UPDATED EXHIBIT LIST	
Exhibit No.	**Description**
EX1181	Smart Lighting ERC Cooperative Agreement (COI provisions)
EX1182	E. Fred Schubert Deposition Transcript, Elong (Oct. 10, 2025)
EX1183	[Intentionally omitted]
EX1184	Internet Archive of smartlighting.rpi.edu (Nov. 14, 2009), perma.cc/2UH4-FE43
EX1185	Internet Archive of smartlighting.rpi.edu (Mar. 23, 2010), perma.cc/P2RM-6Y34
EX1186	SBIR.gov Award Record, Award #0512690 (Troy Research Corp.), perma.cc/G63H-63UR
EX1187	Rensselaer County Property Records, 18 Ledgewood Dr., perma.cc/FS65-NAFP
EX1188-1189	[Intentionally omitted]
EX1190	NSF Press Release, Smart Lighting ERC Award (Sept. 2008), perma.cc/8XTW-F2YL
EX1191	NSF ERC Program Description, perma.cc/7AEF-VVHV
EX1192	NSF FOIA Log, Request 11-29 (Jan. 12, 2011)
EX1193	MIT Clean Energy Prize Finalists (May 2009), perma.cc/DTZ8-7ZLQ
EX1194	Letter from Counsel for Petitioner to Counsel for Patent Owner dated Feb. 3, 2026
EX1195	E. Fred Schubert Deposition Transcript, IPR2025-00698 (Mar. 13, 2026)
EX1196	*Feit Electric Company, Inc. v. Savant Technologies LLC d/b/a GE Lighting*, Case No. 1:24-cv-00473-BMB, Stipulation, Dkt. 50, Mar. 3, 2026

PETITIONER'S UPDATED EXHIBIT LIST	
Exhibit No.	**Description**
EX1197	Email from Counsel for Petitioner to Counsel for Patent Owner dated Feb. 3, 2026

CERTIFICATE OF WORD COUNT UNDER 37 C.F.R. § 42.24(b)(2)

I, the undersigned, do hereby certify that the foregoing Patent Owner Response, including footnotes, contains 5,464 words, as measured by the Word Count function of Microsoft Word as specified by 37 C.F.R. § 42.24(b)(2).

/s/David C. Radulescu
David C. Radulescu, Lead Counsel

CERTIFICATE OF SERVICE

The undersigned certifies that on April 1, 2026 the foregoing was served on counsel at the following electronic service addresses:

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