

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD., SAMSUNG ELECTRONICS
AMERICA, INC., SAMSUNG SEMICONDUCTOR, INC., and SAMSUNG
AUSTIN SEMICONDUCTOR LLC,
Petitioners,

v.

W&WSENS DEVICES INC.,
Patent Owner.

Case PGR2025-00082
U.S. Patent No. 12,243,948

**PATENT OWNER'S REPLY ON
DISCRETIONARY DENIAL**

PATENT OWNER'S EXHIBIT LIST

Exhibit	Description
2001	Messages between W&Wsens and Samsung (April 25, 2019 through April 26, 2019)
2002	Messages between W&Wsens and Samsung (April 27-28, 2019, August 14, 2019, February 20, 2020)
2003	Messages between W&Wsens and Samsung (April 27, 2019, August 14-15, 2019, February 20, 2020)
2004	Messages between W&Wsens and Samsung (April 24-25, 2019, May 14, 2019, August 14, 2019, March 3, 2020)
2005	W&Wsens Devices Inc. presentation – Thin Silicon Photosensors for The Next Generation
2006	Excerpts from the file history of U.S. Patent No. 10,348,240
2007	Excerpts from the file history of U.S Patent No. 10,587,095
2008	Excerpts from Plaintiff W&Wsens Devices Inc.'s Supplemental Objections and Responses to Defendants' First Set of Interrogatories (Nos. 1, 3, 4, and 5), <i>W&Wsens Devices, Inc. v. Samsung Elecs. Co.</i> , No. 24-cv-00854-JRG, E.D. Tex., served October 1, 2025
2009	Excerpts from Plaintiff W&Wsens Devices Inc.'s Objections and Responses to Defendants' First Set of Interrogatories (Nos. 1-11), <i>W&Wsens Devices, Inc. v. Samsung Elecs. Co.</i> , No. 24-cv-00854-JRG, E.D. Tex., served March 20, 2025
2010	Photon-trapping microstructures enable high-speed high-efficiency silicon photodiodes, <i>Nature Photonics</i> 11, 301-308 (2017)
2011	Order Denying Motion to Stay, <i>W&Wsens Devices, Inc. v. Samsung Elecs. Co.</i> , No. 24-cv-00854-JRG, Dkt. No. 90 (E.D. Tex. Nov. 3, 2025)

Exhibit	Description
2012	Second Amended Docket Control Order, <i>W&Wsens Devices, Inc. v. Samsung Elecs. Co.</i> , No. 24-cv-00854-JRG, Dkt. No. 54 (E.D. Tex. April 22, 2025)
2013	Order, <i>Resonant Sys., Inc. v. Sony Grp. Corp.</i> , No. 2:22-cv-00424-JRG, Dkt. No. 84 (E.D. Tex. July 9, 2024)
2014	Order, <i>Gen. Access Sols., Ltd. v. Cellco P'ship</i> , No. 2:22-cv-00394-JRG, Dkt. No. 225 (E.D. Tex. May 22, 2024)
2015	Order, <i>Cal. Inst. of Tech. v. Samsung Elecs. Co.</i> , No. 21-cv-00446-JRG, Dkt. No. 108 (E.D. Tex. Jan. 20, 2023)
2016	U.S. District Court – National Judicial Caseload Profile Federal for the Eastern District of Texas (June 2025)
2017	Excerpts from Defendants' Supplemental Invalidity Contentions cover pleading, <i>W&Wsens Devices, Inc. v. Samsung Elecs. Co.</i> , No. 24-cv-00854-JRG, E.D. Tex., served May 30, 2025
2018	U.S. Patent No. 10,622,498
2019	U.S. Patent No. 9,530,905
2020	Tech Times Webpage – Three types of photodiodes and their structure and operating principles, available at https://techtimes.dexerials.jp/en/photonics/three-types-of-photodiodes/
2021	U.S. Patent Application Publication No. 2020/0006416 (“Baba”)
2022	Excerpts from file history of U.S. Patent Application No. 16/042,535
2023	PV Education Webpage – Optical Properties of Silicon, available at https://www.pveducation.org/pvcdrom/materials/optical-properties-of-silicon#
2024	TechInsight – The state of the art of CMOS Image Sensors, by Ziad Shukri, presented at IISW 2021

Exhibit	Description
2025	Excerpts from “Introduction to Solid State Physics,” by Charles Kittel (7th ed. 1996)
2026	U.S. Patent Application Publication No. 2011/0309331 (“Yu-331”)
2027	U.S. Patent Application Publication No. 2014/0016660 (“Lunev”)
2028	Intentionally Omitted
2029	Excerpts from “Electrical Engineering Dictionary,” by Phillip. A. Laplante, CRC Press LLC 2000
2030	PatDocs Machine Translation of JP3423279B2 to Hiramoto
2031	Wikipedia webpage, “Beer-Lambert law” available at https://en.wikipedia.org/wiki/Beer-Lambert_law , dated October 8, 2025
2032	“Understanding the Limits of the Bouguer-Beer-Lambert Law,” by T. Mayerhöfer, et al., Spectroscopyonline, available at https://www.spectroscopyonline.com/view/understanding-the-limits-of-the-bouguer-beer-lambert-law , dated 2023-2024
2033	JP3423279B2 to Hiramoto
2034	Excerpts from file history of U.S. Patent Application No. 19/036,506 (the “’947 Divisional”) from Sept. 16, 2025 to Nov. 21, 2025
2035	U.S. Provisional Application 61/826,446 filed May 22, 2013
2036	Excerpts from ’871 Patent File History
2037	FPO IP Research & Communities – Search string of Ex. 1091 modified to remove “vertical” condition, available at https://www.freepatentsonline.com/search.html , dated December 12, 2025
2038	FPO IP Research & Communities - Search results of query in Exhibit 2037, dated December 12, 2025

This Reply addresses Samsung's new argument that the Examiner erred during prosecution of the '948 Patent. See Paper 11 ("Pet. Opp.").

I. THERE WAS NO ERROR IN THE EXAMINER'S SEARCH

The Examiner conducted a thorough and substantive examination of the '948 Patent before correctly allowing it to issue. The Examiner rejected then-pending claims 1-2 and 8-13 as obvious and provided a discussion of "Relevant Prior Art" evidencing the Examiner's robust search for and consideration of prior-art "pillar shaped photodetector devices." See Ex. 1003 at 294, 301-312; *id.* at 296-298, 22-23; Paper 13 ("POPR") at 9-13 (discussing prosecution history).

Samsung's argument about the Examiner's searches lacks merit. Pet. Opp. at 4-6. The Examiner searched based on specific limitations in the claims. In contrast and as discussed below, Samsung's proposed hypothetical search is based on terms **not** in the challenged claims. Ex. 1003 at 324 (Entry L6 and L7). The Examiner's search results are in addition to the prior art the same Examiner found during examination of the '948 Patent's divisional parent, U.S. 12,087,871, including search results containing the term "shapes." Ex. 2036 at 37 (Search History, L83: searching for "shapes," among other terms, near the terms "face" or "surface"). This search is consistent with the MPEP's direction to "employ[] broader text terms, with or without classification parameters" and "brows[e] all patent documents in one or more classifications" when the "spatial relationships or **shapes**" of claim elements

“constitute important aspects of the claimed invention.” MPEP § 904.02 (Rev. 07.2022, Feb. 2023). Thus, the Examiner conducted a thorough prior art search.

Samsung's argument is based on a flawed hypothetical search string. Pet. Opp. at 5-6. Samsung argues that the Examiner would have found “Kuboi or another piece of prior art disclosing . . . the limitation indicated as allowable” by using a hypothetical search string. *Id.* at 6 (citing Ex. 1091, Ex. 1092). Samsung's proposed search string permits the term “vertical” as an alternative to “elongated,” but “vertical” is not a limitation in any challenged claim. Ex. 1091. And, Samsung's explanation for using “vertical” contradicts its own arguments that a reasonable Examiner should have searched for specific claim language. *See* Pet. Opp. at 5, n.2. Moreover, a search based on “elongated,” the term actually used in the challenged claims, instead of “vertical” would **not** have returned *Kuboi*. Ex. 2037 (Samsung's query minus the “vertical” condition); Ex. 2038 (yielding 3 results); *see generally*, Ex. 1004 (not containing “elongated”). Thus, it appears Samsung used hindsight to craft a search query custom-designed to return its asserted *Kuboi* reference. Samsung fails to establish what a reasonable Examiner would have searched without already knowing about *Kuboi*, so there is no showing of Examiner error.¹

¹ Samsung contends its expert “explains” this argument, but the cited pages of testimony do not mention prior art searches. *See* Ex. 1002, ¶¶ 156, 110-201)

II. THE EXAMINER WITHDREW THE REJECTION SAMSUNG CITES

Samsung's alternative argument for Examiner error depends on a rejection that the Examiner withdrew. As explained in its POPR, W&Wsens successfully argued that the claim limitations of the '948 Divisional were fully enabled and supported by the intrinsic record after receiving an initial rejection from the Examiner under § 112(a). See POPR at 44-45; Ex. 1093 at 434-436 (Sept 26, 2025 Supplemental Response); *id.* at 462 (Examiner Interview Summary).²

Samsung incorrectly states that W&Wsens' response to the initial § 112 rejections was to add new claims that removed the rejected holes limitation and “instead recited the pillar height.” Pet. Opp. at 7 (citing Ex. 1093 at 430-433). The allowed claims of the '948 Divisional still recite “the hole's specific depth.” W&Wsens simply moved that limitation to allowed claim 48. Ex. 1093 at 433. That is why the Examiner explained the §112(a) rejections “have been withdrawn in light of the remarks provided on September 26, 2025,” rather than, say, be rendered moot in light of claim amendments. *Id.* at 459. Thus, Samsung fails to show any examiner error, and institution should be denied on discretionary grounds for the reasons set forth in W&Wsens' request. Paper 10.

² Both parties submitted exhibits for the '948 Divisional file history. See Ex. 1050; Ex. 1093; Ex. 2034. For sake of clarity, this paper cites to Ex. 1093.

Respectfully submitted,

Date: December 12, 2025

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CERTIFICATE OF SERVICE

The undersigned certifies, in accordance with 37 C.F.R. § 42.6(e), and pursuant to agreement by the parties that filing with the Board through the Patent Trial and Appeal Case Tracking System (P-TACTS) constitutes electronic service, that service was made on Petitioners as detailed below.

<i>Date of service</i>	December 12, 2025
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