

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.,
Petitioner,

v.

W&WSENS DEVICES INC.,
Patent Owner.

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

PETITIONER'S UPDATED EXHIBIT LIST

Pursuant to 37 C.F.R. § 42.63(e), Petitioner Samsung Electronics Co., Ltd.; Samsung Electronics America, Inc.; Samsung Semiconductor, Inc.; and Samsung Austin Semiconductor LLC hereby submits a current listing of Petitioner's exhibits. Exhibits 1057-1072 are being filed today.

Exhibit	Description
1001	U.S. Patent No. 12,243,948 B2 to Wang et al. ("’948 patent").
1002	Declaration of Dr. Michael Lebby
1003	Prosecution History of the ’948 patent (downloaded from Public PAIR).
1004	U.S. Patent Application Publication No. 2012/0049044 A1 to Kuboi (" <i>Kuboi</i> ").
1005	U.S. Patent Application Publication No. 2012/0012741 A1 to Vasylyev (" <i>Vasylyev</i> ").
1006	U.S. Patent Application Publication No. 2012/0033119 A1 to Shinohara (" <i>Shinohara</i> ").
1007	European Patent Application EP 2 172 974 A1 to NXP B.V. (" <i>NXP</i> ").
1008	Zhihong Huang et al., <i>Microstructured silicon photodetector</i> , Applied Physics Letters, Vol. 89 (2006), pp. 033506-1 to -3.
1009	Richard A. Myers et al., <i>Enhancing near-infrared avalanche photodiode performance by femtosecond laser microstructuring</i> , Applied Optics, Vol. 45, No. 35 (Dec. 2006), pp. 8825-31.
1010	Abbas El Gamal et al., <i>CMOS Image Sensors</i> , IEEE Circuits & Devices Magazine (May/June 2005), pp. 6-20.
1011	<i>Electrical Engineering Dictionary – CRCnetBase 2000</i> (Phillip A. Laplante editor-in-chief, CRC Press LLC 2000), pp. 1-11.
1012	S.M. Sze et al., <i>Semiconductor Devices - Physics and Technology</i> (John Wiley & Sons, Inc. 3d ed. 2012), pp. 6-9, 205-10, 325-30, 392-406, 416-17, 466-67.

Exhibit	Description
1013	John P. Uyemura, <i>CMOS Logic Circuit Design</i> (Kluwer Academic Publishers 2002), pp. 64, 74-102, 315-17, 458-60.
1014	Khalil Jumah Tawfiq Hamam, <i>Organic Solar Cells Based on High Dielectric Constant Materials: An Approach to Increase Efficiency</i> (June 2013) (Ph.D. dissertation, Western Michigan University), pp. 1-122.
1015	P. Kalugasalam et al., <i>Dielectric and AC Conduction Studies of Lead Phthalocyanine Thin Film</i> , Chalcogenide Letters, Vol. 6, No. 9 (Sept. 2009), pp. 469-76.
1016	Matthew Saucedo, <i>Porphyrin Thin Film Dielectrics</i> , SUNFEST Technical Report TR-CST01NOV04, Center for Sensor Technologies, Univ. of Pennsylvania, Philadelphia, PA (2004), pp. 181-98.
1017	N. Venkatramaiah et al., <i>Spectroscopic and dielectric studies of meso-tetrakis(p-sulfonatophenyl) porphyrin doped hybrid borate glasses</i> , Journal of Alloys and Compounds, Vol. 509 (2011), pp. 2797-803.
1018	Tom J. Savenije, <i>Photogeneration and transport of charge carriers in a porphyrin p/n heterojunction</i> , Physical Review B, Vol. 55, No. 15 (Apr. 1997), pp. 9685-92.
1019	Ümit Salan et al., <i>Synthesis, characterization, electrical and dielectric permittivity measurements of 2,9,16,23-tetra(4-ferrocenylimino-3-nitrophenoxy)phthalocyanines</i> , Journal of Porphyrins and Phthalocyanines, Vol. 10 (2006), pp. 1263-70.
1020	Teresa M. Figueira-Duarte et al., <i>Pyrene-Based Materials for Organic Electronics</i> , Chemical Reviews, Vol. 111 (2011), pp. 7260-314.
1021	Jurgen Michel et al., <i>Advances in fully CMOS integrated photonic devices</i> , Proceedings of SPIE, Vol. 6477 (2007), pp. 64770P-1 to -11.
1022	Mark Beals et al., <i>Process Flow Innovations for Photonic Device Integration in CMOS</i> , Proceedings of SPIE, Vol. 6898 (2008), pp. 689804-1 to -14.

Exhibit	Description
1023	Donald A. Neaman, <i>Semiconductor Physics and Devices – Basic Principles</i> (McGraw Hill 3d ed. 2003), pp. 247-50, 260-61.
1024	Laurent Frey et al., <i>Color filters including infrared cut-off integrated on CMOS image sensor</i> , Optics Express, Vol. 19, No. 14 (2011), pp. 13073-80.
1025	U.S. Patent Application Publication No. 2012/0153124 A1 to Yu et al.
1026	U.S. Patent No. 8,390,036 B2 to Goto.
1027	U.S. Patent Application Publication No. 2008/0157141 A1 to Han.
1028	Horst Zimmermann, <i>Integrated Silicon Optoelectronics</i> (Springer. 2d ed. 2010), pp. 1-7.
1029	Ran Aharoni et al., <i>Basic model of absorption depth and injection levels in silicon under intermediate illumination levels</i> , Optics Communications, Vol. 291 (2013), pp. 1-6.
1030	M.M. El-Nahass et al., <i>Structural and optical properties of Ni (II) tetraphenyl porphyrin thin films</i> , Eur. Phys. J. Appl. Phys., Vol. 57 (2012), pp. 30201-p1 to -p13.
1031	Martin A. Green, <i>Self-consistent optical parameters of intrinsic silicon at 300K including temperature coefficients</i> , Solar Energy Materials & Solar Cells, Vol. 92, (2008), pp. 1305-10.
1032	P.A. Lane et al., <i>Electroabsorption studies of phthalocyanine/perylene solar cells</i> , Solar Energy Materials & Solar Cells, Vol. 63 (2000), pp. 3-13.
1033	Connie J. Chang-Hasnain et al., <i>High-contrast gratings for integrated optoelectronics</i> , Advances in Optics and Photonics, Vol. 4 (2012), pp. 379-440.
1034	H.H. Li, <i>Refractive Index of Silicon and Germanium and Its Wavelength and Temperature Derivatives</i> , J. Phys. Chem. Ref. Data, Vol. 9, No. 3 (1980), pp. 561-658.
1035	U.S. Patent No. 8,378,339 B2 to Nomura et al.
1036	M.M. El-Nahass et al., <i>Structural and optical properties of thermally evaporated zinc phthalocyanine thin films</i> , Proc. 2nd Saudi Sci. Conf. (Mar. 2004), pp. 277-93.

Exhibit	Description
1037	M.E. Azim-Araghi et al., <i>Electrical and optical properties of an organic semiconductor metal-free phthalocyanine (C₃₂H₁₈N₈)</i> , Eur. Phys. J. Appl. Phys., Vol. 58 (2012), pp. 30201-p1 to -p6.
1038	International Patent Publication No. WO 2011/085297 A1 to Han et al. (“Han”).
1039	J.S. Arney et al., <i>Color Properties of Specular Reflections</i> , IS&T’s NIP20: 2004 International Conference on Digital Printing Technologies, pp. 445-49.
1040	Andrew Blakers et al., <i>Thin Single Crystalline Elongate Silicon Solar Cells</i> , Energy Procedia, Vol. 15 (2012), pp. 58-66.
1041	A. El Amrani et al., <i>Solar Module Fabrication</i> , International Journal of Photoenergy, Article ID 27610 (2007), pp. 1-5.
1042	Ji-Tao Liu et al., <i>Curing Determination of EVA for Solar Panel Application by DSC</i> , Application Note, PerkinElmer (2010), pp. 1-3.
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1044	Richard S. Quimby, <i>Photonics and Lasers - An Introduction</i> (John Wiley & Sons, Inc. 2006), pp. 249-79.
1045	U.S. Patent No. 8,013,238 B2 to Hockaday.
1046	A. Vandenbroucke et al., <i>Influence of temperature and bias voltage on the performance of a high resolution PET detector built with position sensitive avalanche photodiodes</i> , IOP Publishing for Sissa Medialab (2012), pp. 1-30.
1047	U.S. Patent No. 8,274,122 B2 to Shimotsusa.
1048	Renato Turchetta et al., <i>Introduction to CMOS Image Sensors</i> , Molecular Expressions™ Optical Microscopy Primer: Digital Imaging in Optical Microscopy (July 16, 2004), pp. 1-9, available at https://web.archive.org/web/20120508153832/https://micro.magnet.fsu.edu/primer/digitalimaging/cmosimagesensors.html

Exhibit	Description
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1050	Prosecution History of the ’948 Divisional (downloaded from Public PAIR).
1051	Christopher Chase et al., <i>Size effect of high contrast gratings in VCSELs</i> , Optics Express, Vol. 17, No. 26 (Dec. 2009), pp. 24002-07.
1052	Eric R. Fossum, <i>CMOS Image Sensors: Electronic Camera-On-A-Chip</i> , IEEE Transactions on Electron Devices, Vol. 44, No. 10 (Oct. 1997), pp. 1689-98.
1053	U.S. Patent Application Publication No. 2008/0259981 A1 to Wang et al.
1054	Sunetra Mendis et al., <i>CMOS Active Pixel Image Sensor</i> , IEEE Transactions on Electron Devices, Vol. 41, No. 3 (Mar. 1994), pp. 452-53.
1055	U.S. Patent Application Publication No. 2008/0055432 A1 to Koseki.
1056	Certified English translation of Japanese Published Unexamined Patent Application No. P2007-129024A to Hasegawa (“Hasegawa”)
1057	Prosecution History of U.S. Patent Application No. 19/036,506.
1058	Anna Köhler and Heinz Bässler, <i>Electronic Processes in Organic Semiconductors</i> , Wiley-VCH (2015), pp. 193-207, 307-11.
1059	Simiao Yu et al., <i>n-Type semiconductors for organic electrochemical transistor applications</i> , Synthetic Metals, Vol. 293, Article 117295 (2023), pp. 1-16.
1060	PCT Publication WO 2012/012672 A2 to Felten et al. (“Felten”)
1061	M. Stolka, <i>Special Polymers for Electronics and Optoelectronics, Photoconductive Polymers</i> , Ch. 8, Springer-Science+Business Media, B.V. (1995), pp. 284-314.
1062	U.S. Patent Application Publication No. 2013/0056715 A1 to Asami et al. (“Asami”).

Exhibit	Description
1063	U.S. Patent Application Publication No. 2015/0200312 A1 to Watanabe et al. (“ <i>Watanabe</i> ”).
1064	U.S. Patent No. 3,676,118 to Mott et al. (“ <i>Mott</i> ”).
1065	U.S. Patent No. 3,951,654 to Mammino (“ <i>Mammino</i> ”).
1066	U.S. Patent No. 5,312,706 to Springett (“ <i>Springett</i> ”).
1067	U.S. Patent Application Publication No. 2014/0347787 A1 to Fathi et al. (“ <i>Fathi</i> ”).
1068	Satyajit Sahu and Amlan J. Pal, <i>Organic Photodetectors Based on Phthalocyanine and Fullerenes: Dielectric Properties</i> , J. of Nanosci. and Nanotech., Vol. 9 (2009), pp. 450-54.
1069	Chong-yang Liu et al., <i>Reversible Charge Trapping/Detrapping in a Photoconductive Insulator of Liquid Crystal Zinc Porphyrin</i> , Chem. of Materials, Vol. 9 (1997), pp. 1422-29.
1070	Samuel J. Hein et al., <i>Perylene bisbenzimidazole nonlinear dielectric material for energy storage</i> , RSC Advances, Vol. 9 (2019), pp. 361-64.
1071	Tomas Vincze et al., <i>Photoresponse Dimensionality of Organic Field-Effect Transistor</i> , Materials, (2021), 14, 7465, pp. 1-7, https://doi.org/10.3390/ma14237465 .
1072	<i>W&Wens Devices Inc. v. Samsung Elecs. Co.</i> , Case No. 2:24-cv-00854-JRG, Memorandum Claim Construction Opinion and Order, Dkt. 261 (E.D. Tex. July 14, 2026).
1073-1083	Reserved
1084	Table Listing Public Availability Dates for Sensors.
1085	M. Alarcon et al., Samsung Galaxy S5 Teardown, TechInsights Inc. (Apr. 11, 2014), https://www.techinsights.com/blog/samsung-galaxy-s5-teardown .
1086	Dick James and Daniel Yang, Samsung Galaxy S6 Teardown, TechInsights Inc. (Apr. 2, 2015), https://www.techinsights.com/blog/samsung-galaxy-s6-teardown

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1087	<i>W&Wens Devices Inc. v. Samsung Elecs. Co.</i> , Case No. 2:24-cv-00854-JRG, Complaint for Patent Infringement, Dkt. 1 (E.D. Tex. Oct. 21, 2024).
1088	<i>W&Wens Devices Inc. v. Samsung Elecs. Co.</i> , Case No. 2:24-cv-00854-JRG, Joint Motion for Entry of an Order of Partial Dismissal Without Prejudice, Dkt. 82 (E.D. Tex. Oct. 7, 2025).
1089	<i>W&Wens Devices Inc. v. Samsung Elecs. Co.</i> , Case No. 2:24-cv-00854-JRG, Order Granting Joint Motion for Partial Dismissal Without Prejudice, Dkt. 84 (E.D. Tex. Oct. 17, 2025).
1090	<i>W&Wens Devices Inc. v. Samsung Elecs. Co.</i> , Case No. 2:24-cv-00854-JRG, First Amended Complaint for Patent Infringement, Dkt. 52 (E.D. Tex. Apr. 16, 2025).
1091	FPO IP Research & Communities search string (Nov. 25, 2025), https://www.freepatentsonline.com/search.html .
1092	FPO IP Research & Communities results of search string (Nov. 25, 2025), https://www.freepatentsonline.com/result.html?p=1&edit_alert=&srch=xprtsrch&query_txt=%28PD%2F01%2F01%2F1789-%3E05%2F21%2F2013%29+AND+%28%28%E2%80%9Chole%0D%0Asemiconductor+elongated%E2%80%9D%7E20%29+OR+%28%E2%80%9Chole%0D%0Asemiconductor+vertical%E2%80%9D%7E20%29%29+AND+%28photoelectric%0D%0AOR+photodiode+OR+photodetect*%29&uspat=on&usapp=on&date_range=all&stemming=on&sort=relevance&search=Search .
1093	Prosecution History of U.S. Patent Application No. 19/036,506.
1094	Excerpts of Prosecution History of U.S. Patent Application No. 16/042,535.
1095	<i>Samsung Elecs. Co. v. W&Wsens Devices Inc.</i> , IPR2025-00997, Order Granting Joint Motion to Terminate Proceeding, Paper 12 (PTAB Nov. 7, 2025).

Respectfully submitted,

Dated: August 4, 2026

By: /Joshua L. Goldberg/
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CERTIFICATE OF SERVICE

The undersigned certifies that a copy of the foregoing **Petitioner's Updated Exhibit List** and **Exhibits 1057-1072** were served electronically via email on August 4, 2026, in their entirety on the following:

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