

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. AND
SAMSUNG ELECTRONICS AMERICA, INC.,
PETITIONERS,

v.

TOPWIRE LLC,
PATENT OWNER.

IPR2026-00324
U.S. PATENT NO. 9,859,202

PETITIONERS' OPPOSITION TO PATENT OWNER'S REQUEST
FOR DISCRETIONARY DENIAL

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PETITIONERS' EXHIBIT LIST

Exhibit	Description of Documents
EX1001	U.S. Patent No. 9,859,202
EX1002	Prosecution History of U.S. Patent No. 9,859,202
EX1003	Declaration of Peter Elenius in support of petition for <i>inter partes</i> review of U.S. Patent No. 9,859,202
EX1004	<i>TopWire LLC v. Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.</i> , No. 2:25-cv-01183, Dkt. 1 (“Complaint”) (E.D. Tex. Dec. 1, 2025)
EX1005	U.S. Patent Publication No. 2011/0147908 (“ <i>Sun</i> ”), published June 23, 2011
EX1006	U.S. Patent Publication No. 2013/0182402 (“ <i>Chen</i> ”), published July 18, 2013
EX1007	U.S. Patent No. 5,334,804 (“ <i>Love</i> ”), granted Aug. 2, 1994
EX1008	U.S. Patent Publication No. 2013/0249083 (“ <i>Hu</i> ”), published Sept. 26, 2013
EX1009	Benson, et al., <i>Polymer Adhesives and Encapsulants for Microelectronic Applications</i> , Johns Hopkins APL Technical Digest, Volume 28, Number 1 (“ <i>Benson</i> ”) (2008)
EX1010	U.S. Patent No. 8,379,403 (“ <i>Waite</i> ”), granted Feb. 19, 2013
EX1011	IPC, <i>IPC-4761 Design Guide for Protection of Printed Board Via Structures</i> (“ <i>IPC-4761</i> ”) (July 2006)
EX1012	Declaration of Sylvia D. Hall-Ellis, Ph.D. in support of authenticity and public availability of documents for <i>inter partes</i> review of U.S. Patent No. 9,859,202
EX1013	U.S. Patent Publication No. 2008/0155820 (“ <i>Arai</i> ”), published July 3, 2008
EX1014	Osborn, <i>All-Copper Chip-to-Substrate Interconnects for High Performance Integrated Circuit Devices</i> , Georgia Institute of Technology (May 2009)
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EX1018	Cohn, et al., <i>Electronic Packaging and Interconnection Handbook, Packaging and Interconnection of Integrated Circuits</i> , Chapter 7, McGraw-Hill (2000)

EX1019	Vintage Computer, <i>IBM PC/AT</i> (first archived on Mar. 5, 2021) https://vintage-computer.com/machines.php?ibmpcat [https://web.archive.org/web/20210305084621/vintage-computer.com/machines.php?ibmpcat]
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EX1021	ICE, <i>Roadmaps of Packaging Technology, Interconnect Substrate Technologies</i> , Chapter 11 (1997)
EX1022	Kenny, et al., <i>From Thin Cores to Outer Layers: Filling through Holes and Blind Micro Vias with Copper by Reverse Pulse Plating</i> , 2009 International Conference on Electronic Packaging Technology & High Density Packaging (ICEPT-HDP) (2009).
EX1023	JEDEC, <i>JESD47F Stress-Test-Driven Qualification of Integrated Circuits</i> (Dec. 2007)
EX1024	IPC, <i>IPC-TM-650 Test Methods Manual</i> (May 2004)
EX1025	Koide, et al., <i>High-performance Flip-Chip BGA Technology Based on Thin-core and Coreless Package Substrate</i> , 2006 Electronic Components and Technology Conference (2006)
EX1026	Graf, <i>Modern Dictionary of Electronics</i> , Newnes, Seventh Edition (1999)
EX1027	Tummala, et al., <i>Microelectronics Packaging Handbook</i> , Van Nostrand Reinhold (1989)
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EX1029	Wang, et al., <i>Studies on A Novel Flip-Chip Interconnect Structure – Pillar Bump</i> , 2001 Electronic Components and Technology Conference (2001)
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EX1034	Declaration of Kyongman Kim
EX1035	Semiconductor Industry Association, <i>U.S. Semiconductor Ecosystem Map</i> (Dec. 1, 2025), https://www.semiconductors.org/ecosystem

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EX1038	Qualcomm, <i>Form 10-K</i> , https://s204.q4cdn.com/645488518/files/doc_financials/2025/q4/QCOM-09-28-25-FY2025-10-K-Final.pdf
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EX1046	Monica Allevan, <i>Samsung eyes 5G growth with regional U.S. operators</i> , https://www.fierce-network.com/wireless/samsung-eyes-5g-growth-regional-us-operators
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EX1049	Samsung, <i>Taylor</i> , https://semiconductor.samsung.com/sas/company/taylor/
EX1050	Samsung, <i>Samsung Austin Semiconductor’s two campuses pump \$19.8B into Central Texas economy in 2024</i> ,

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EX1054	Matthew Fazelpoor, <i>Samsung Electronics America to Open Flagship North Texas Campus</i> , https://news.samsung.com/us/samsung-electronics-america-open-flagship-north-texas-campus/
EX1055	Samsung, <i>Samsung moving US headquarters from New Jersey to Texas</i> , https://njbiz.com/samsung-us-headquarters-move-new-jersey-texas/
EX1056	Samsung, <i>Verizon Selects Samsung for 5G Commercial Launch</i> , https://news.samsung.com/us/verizon-5g-commercial-launch/
EX1057	@Tesla, https://x.com/Tesla/status/1936224423193067728
EX1058	Impact DataSource, <i>A Report of the Economic and Fiscal Impact During 2024 of Samsung Austin Semiconductor, LLC on the Central Texas Area (Austin and Taylor)</i> (April 8, 2025)
EX1059	CV of Julia Rowe
EX1060	2025 Samsung and its Subsidiaries Consolidated Financial Statements
EX1061	CSET, <i>The Semiconductor Supply Chain: Asserting National Competitiveness</i>
EX1062	Trump Proclamation, <i>Adjusting Imports of Semiconductors, Semiconductor manufacturing Equipment, and Their Derivative Products into the US</i>
EX1063	NIST, <i>Chips for America, Samsung Electronics (Texas)</i>

CLAIMS LISTING

Claim 1:

1[pre]	A structure, comprising:
1[a]	a bottom package substrate;
1[b]	a top package substrate stacked on top of the bottom package substrate;
1[c]	at least one spacer connector interposed between the bottom package substrate and the top package substrate to define a space between the bottom package substrate and the top package substrate, wherein
1[d]	the spacer connector comprises a core substrate;
1[e]	a plurality of metal pillars, each passing through the core substrate; and
1[f]	a plurality of top metal pads, each on a top end of a corresponding metal pillar among the plurality of metal pillars;
1[g]	wherein a bottom end of each metal pillar among the plurality of metal pillars protrudes downwardly from a bottom surface of the core substrate,
1[h]	the top package substrate has, on a bottom surface thereof, a plurality of bottom metal pillars each coupled to a corresponding metal pillar among the plurality of metal pillars of the spacer connector,
1[i]	the bottom package substrate has, on a top surface thereof, a plurality of top metal pillars each coupled to a corresponding metal pillar among the plurality of metal pillars of the spacer connector, and
1[j]	the top package substrate is electrically coupled to the bottom package substrate through the plurality of bottom metal pillars of the top package substrate, the plurality of metal pillars of the spacer connector, and the plurality of top metal pillars of the bottom package substrate; and
1[k]	a bottom chip arranged in the space between the bottom package substrate and the top package substrate, wherein
1[l]	the bottom chip is mounted to the top surface of the bottom package substrate, and
1[m]	the at least one spacer connector comprises two spacer connectors arranged on opposite sides of the bottom chip.

Claim 2:

2	The structure of claim 1, wherein a top surface of the bottom chip is spaced downwardly from the bottom surface of the top package substrate.
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Claim 3:

3[a]	The structure of claim 2, further comprising: a top chip mounted to the top surface of the top package substrate,
3[b]	wherein in a direction in which the top package substrate is stacked on top of the bottom package substrate, the top chip overlaps the bottom chip and each of the two spacer connectors.

Claim 4:

4	The structure of claim 1, wherein each bottom metal pillar among the plurality of bottom metal pillars of the top package substrate is aligned with a corresponding metal pillar among the plurality of metal pillars of the spacer connector, and with a corresponding top metal pillar among the plurality of top metal pillars of the bottom package substrate.
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Claim 5:

5[a]	The structure of claim 4, wherein the spacer connector is free of metal pads on the bottom ends of the plurality of metal pillars protruding downwardly from the bottom surface of the core substrate, and
5[b]	each metal pillar among the plurality of metal pillars and the corresponding top metal pad of the spacer connector form a T shape.

Claim 6:

6[a]	The structure of claim 4, wherein the bottom ends of the plurality of metal pillars protruding downwardly from the bottom surface of the core substrate of the spacer connector are connected, in an end-to-end manner, to corresponding top ends of the plurality of top metal pillars of the bottom package substrate, and
6[b]	bottom ends of the plurality of bottom metal pillars of the top package substrate are connected to the corresponding top ends of the plurality of metal pillars of the spacer connector via the corresponding top metal pads of the spacer connector.

Claim 7:

7[a]	The structure of claim 4, wherein the spacer connector further comprises a dielectric layer on the bottom surface of the core substrate, and
7[b]	the plurality of metal pillars pass through the core substrate and the dielectric layer.

Claim 8:

8	The structure of claim 7, wherein the dielectric layer is a dielectric adhesive in which the core substrate is pasted.
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Claim 9:

9[a]	The structure of claim 4, wherein the spacer connector further comprises a plurality of bottom metal pads, each on the bottom end of a corresponding metal pillar among the plurality of metal pillars,
9[b]	the bottom ends of the plurality of metal pillars are connected to corresponding top ends of the plurality of top metal pillars of the bottom package substrate via the corresponding bottom metal pads of the spacer connector, and
9[c]	bottom ends of the plurality of bottom metal pillars of the top package substrate are connected to the corresponding top ends of the plurality of metal pillars of the spacer connector via the corresponding top metal pads of the spacer connector.

I. INTRODUCTION

Petitioners Samsung Electronics Co., Ltd. (“SEC”) and Samsung Electronics America, Inc. (“SEA”), (collectively “Samsung”), respectfully request the Director reject TopWire’s request for discretionary denial. TopWire’s request distorts the record and ignores the substantial factors that favor institution.

First, Samsung’s \$47 billion investment in U.S. manufacturing—including semiconductor fabrication facilities in Austin and Taylor, Texas that support over 40,000 jobs—directly supports institution under Director Squires’s March 11, 2026 guidance. The accused Galaxy smartphones incorporate components manufactured at these facilities and the facilities of other U.S. suppliers. TopWire, by contrast, is a non-manufacturing entity that has contributed nothing to U.S. manufacturing.

Second, the Examiner committed material errors during prosecution that the Board is uniquely positioned to correct. The Examiner failed to properly consider the cited prior art—*Arai*—that explicitly discloses the feature the Examiner believed was missing in the prior art. The Examiner’s search was also deficient, omitting highly pertinent classification subgroups and failing to conduct any keyword searches or consider non-patent literature. When the Office commits such errors, institution serves the public interest by ensuring patent quality.

Third, settled expectations weigh in Samsung’s favor. The ’202 Patent is directed to semiconductor packaging technology at the die level, not the printed circuit board assemblies in Samsung’s Galaxy smartphones that TopWire now

accuses. Samsung had no reason to anticipate that claims covering nanotechnology and fine-pitch interconnects formed by electroplating would be asserted against its PCB technology. TopWire's recent acquisition and aggressive extension of this patent beyond its disclosure undermines PO's claim to settled expectations.

Fourth, the *Fintiv* factors strongly favor institution. The projected final written decision will issue months before trial, the parallel litigation is in its early stages, and Samsung's *Sotera-plus* stipulation eliminates any overlapping issues. The Petition also presents compelling merits.

II. PUBLIC INTEREST WEIGHS AGAINST DISCRETIONARY DENIAL

The public interest would be served by institution of this IPR. Samsung has invested over \$47 billion in the U.S.¹—including building facilities and creating an American workforce that both manufactures components of the accused Galaxy smartphones and services and repairs those phones in America—while TopWire has contributed nothing to domestic manufacturing and seeks only to extract royalties on a recently purchased patent. Institution would therefore allow Samsung to challenge an asserted invalid patent, while protecting the market demand that supports Samsung's continued investment in U.S. manufacturing, service, repair, and technical workforce development. EX1033, ¶¶11, 82–84.

¹ This exceeds Tesla's approximately \$44 billion investment in the U.S. since its inception. EX1057.

Director Squires’s March 11, 2026 memorandum states that the Director will consider whether the “products accused of infringement...are manufactured in the United States or are related to investments in American manufacturing operations.” EX1032 at 2. The accused Samsung Galaxy smartphones are related to Samsung’s substantial investments in U.S. manufacturing capabilities including the extensive U.S. service and repair infrastructure Samsung has developed to support and sustain the market for Galaxy smartphones. EX1033, ¶¶11–35. In addition, the accused phones incorporate numerous components designed and/or manufactured in the United States, further tying the products to U.S. manufacturing. EX1034, ¶¶3–9.

Samsung has invested \$47 billion in the United States since beginning operations here in 1978. EX1049; EX1048. This includes building and operating several semiconductor manufacturing facilities in Texas, which enable large-scale manufacturing of technologically sophisticated semiconductor components, and provide direct economic benefits to American workers and the U.S. economy. SEA’s subsidiary Samsung Austin Semiconductor LLC (“SAS”) began operating these facilities in Texas over 30 years ago. EX1049; EX1050; EX1058. Samsung has invested over \$18 billion to develop and maintain these fabrication facilities, supporting 38,498 jobs and \$2.6 billion in annual salaries to U.S. workers. EX1058 at 4–5; EX1051; EX1053.

The facilities include a 2.76 million square foot fabrication complex in Austin, Texas which employs 4,500 individuals and contributed \$10.96 billion to the U.S.

economy in 2024 alone. EX1058 at 4; EX1052. Additionally, in 2022 Samsung began constructing an additional fab complex in Taylor, Texas. EX1049. Samsung estimates that its Taylor fab will create 1,800 jobs for American workers. *Id.* Together, the Texas facilities provided over \$19.7 billion of economic impact to Texas in 2024. EX1058 at 4. TopWire’s assertion that “the U.S. government—not Samsung—will provide at least \$6.4 billion in funding for this fab” is highly misleading (Paper 7 at 17). The U.S. agreed to provide less than \$5 billion to ***supplement Samsung’s investment of “over \$37 billion”*** in “expected capital expenditure” to expand the Texas fab facilities. EX1063.

Various products manufactured at these facilities are incorporated into the accused products. EX1034, ¶4. Samsung manufactures at least [REDACTED] [REDACTED] for use in various models of the accused products at its semiconductor fabrication facilities in Texas. *Id.* ¶¶4–9.

Samsung has made substantial other U.S. investments in the configuration, service, repair, refurbishment, and technical-support infrastructure necessary to support Galaxy smartphones throughout their lifecycle in the United States. SEA currently employs approximately 4,000 people in the United States, including employees who support Samsung mobile products through software development, product planning, R&D, U.S.-specific retail and carrier training, carrier activation/configuration, service and repair, customer support, and supply-chain

operations. EX1033, ¶10. From 2022 through November 2025, SEA invested approximately [REDACTED] in salaries, overhead, operating costs, and plant and equipment in the U.S., specifically related to the accused products in this case. *Id.*, ¶35. This excludes shared expenses such as accounting, finance and human resources. More than [REDACTED] of that amount relates to SEA’s Service/Repair and Mobile Customer Services groups, which provide customer care, warranty support, physical repair, refurbishment, carrier configuration/software reflash, quality-control feedback, and repair operations for U.S.-market Samsung devices. *Id.*, ¶¶27–31. Those investments also include Samsung’s support for the development of a skilled U.S. repair workforce, including sponsorship of smartphone-repair competitions and Samsung Technical Training Centers that train mobile service professionals on mobile-device inspection, troubleshooting, and repair. *Id.*, ¶28; EX1043. This investment directly benefits the U.S. economy by encouraging the development of highly skilled consumer electronics service and repair workforce. EX1043. SEA also invests substantial resources in supporting the growth of the U.S. telecommunications market, and has supplied 5G gear to U.S. companies, including Verizon. EX1056; EX1046; EX1047.

TopWire focuses its argument on alleged foreign activities, but its District Court complaint tells a different story. TopWire there concedes that Samsung has a “flagship campus” in Texas including the “Samsung Networks Innovation Center” with an onsite innovation lab. EX1004, ¶4. Even the exhibit TopWire relies on in

this proceeding notes that Samsung uses at least 29 U.S.-based suppliers. *See* EX2028. Samsung’s foreign manufacturing activity does not reduce the importance of Samsung’s substantial U.S. manufacturing activity and investments related to these products. TopWire mentions packaging purportedly performed by Samsung Electro-Mechanics Co., Ltd., but fails to explain it is an independent public company, in which SEC holds a minority, non-controlling interest. EX1060 at 47. Regardless, TopWire’s own evidence describes those foreign facilities as “only really assembling the devices.” EX2026 at 7. Assembly, testing, and packaging occupy the portion of the supply chain with “the lowest barriers to entry,” while semiconductor design and fabrication are the “highest value and most technologically complex parts of” the supply chain. EX1061 at 3–4. Low-barrier assembly capacity is comparatively easier to add, shift, or replicate; it therefore says little about whether the United States has developed the advanced manufacturing capability needed to reduce supply-chain vulnerability in a crisis. President Trump’s January 14, 2026 Proclamation therefore focused specially on “the foundational role that semiconductors play in the modern economy and national defense” and adjusting tariffs specifically to “incentiviz[e] the development of domestic *manufacturing of certain semiconductors*....” EX1062, ¶¶5, 10. Samsung’s U.S. investments are directly expanding domestic manufacturing capability of this key part of the supply chain with the highest barrier to entry.

In addition to Samsung's U.S. manufacturing activities and related investments, the accused Samsung Galaxy smartphones include numerous components that are designed and/or made in the United States by others. EX1032, at 2–3 (“parties should address...the extent to which components of a product are made in the United States....”). For example, as discussed above, Samsung manufactures at least [REDACTED]

[REDACTED] for use in various models of the accused products at its semiconductor fabrication facilities in Texas. EX1034, ¶¶6–9. Moreover, at least the following key components are manufactured in the U.S. and sold to Samsung for incorporation into various models of the accused phones—providing further benefit to the U.S. economy: [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]. EX1034, ¶¶6–9. Other key components including the application processors and memory are designed in the U.S. incorporated into various models of the accused phones—providing further benefit to the U.S. economy. EX1035; EX1036; EX1037; EX1038 at 36.

The record thus confirms that Samsung's accused Galaxy smartphones are not merely imported into the United States; they are tied to extensive domestic manufacturing, engineering, validation, service, repair, and workforce-development

investments. Denying institution would not advance the manufacturing-focused concerns identified in the March 11 memorandum. It would do the opposite: impairing the ability of a major U.S. investor and employer to obtain PTAB review of a patent asserted against products, the sales of which support American semiconductor fabrication, telecommunications development, repair operations, and technical jobs. Because TopWire has shown no competing domestic product or U.S. manufacturing activity that would be protected by denial, the public interest weighs strongly against discretionary denial and in favor of institution.

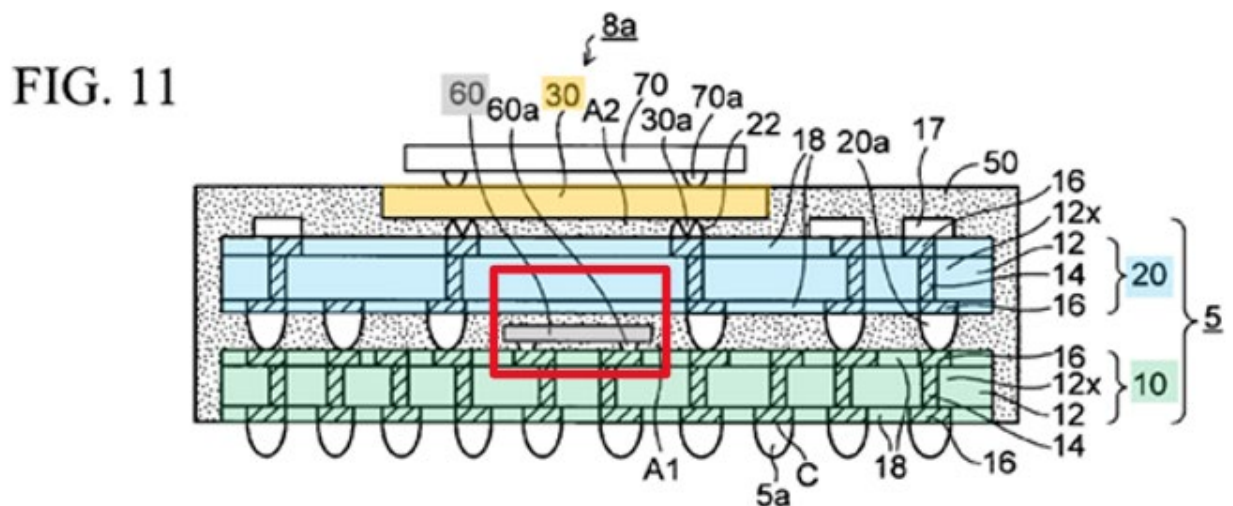
III. THE BOARD IS BEST SITUATED TO REVIEW THE EXAMINER’S MATERIAL ERRORS

When “Petitioner appears to show a material error by the Office, it is an appropriate use of Office resources to review the potential error,” even when “the challenged patent has been in force for [eight] years.” *TSMC Ltd. and Apple Inc. v. Marlin Semiconductor Ltd.*, IPR2025-00847, Paper 11 at 4 (Director Sept. 3, 2025); *Eunsung Global Corp. v. Hydrafacial LLC*, IPR2025-00445, Paper 14 at 2–3 (Director Jul. 10, 2025) (Although challenging an 8-year-old patent would “ordinarily favor denying institution,” “discretionary denial ... is not appropriate due to a material error in examination,” where “the patent examiner overlooked certain teachings in [relevant art] that appear to disclose the allowable features.”); *Tesla, Inc. v. Bulletproof Property Management, LLC*, IPR2026-00204, Paper 14, 3–4 (Director Jun. 15, 2026) (informative) (The Examiner’s material error that

“overlooked certain teachings in [relevant art]” overcame PO’s “settled expectations.”). Here, Samsung demonstrates just such material errors that warrant the Board’s review.

First, the Examiner erred in failing to understand that the cited prior art disclosed the feature that rendered the claims purportedly allowable. The Examiner correctly found U.S. Patent No. 8,994,188 to *Arai* disclosed each limitation of the sole independent claim (claim 11). EX1002 at 97, 100–03. However, without any analysis, the Examiner found dependent claim 12 allowable for reciting “a bottom chip arranged in the space between the bottom package substrate and the top package substrate...” *Id.* at 104–05. The Applicant amended claim 11 to add this limitation, which then issued as claim 1. *Id.* at 113, 117–18; *see also* limitations 1[k]–[m].

As illustrated below, FIG. 11 of *Arai* plainly also discloses the purportedly missing “bottom chip” i.e., semiconductor chip 60, annotated in the red box. EX1013 at FIG. 11 [0073] (discussing “semiconductor chip 60 (LSI chip)”).



The Examiner further erred in concluding that *Arai* neither anticipates nor renders obvious “the at least one spacer connector comprises two spacer connectors arranged on opposite sides of the bottom chip” limitation. EX1002 at 104–05; EX1003 at ¶¶40–44. As Mr. Elenius explains, *Arai*’s wiring board 20 — “the at least one spacer connector”—comprises two spacer connector portions (though connected) located on opposite sides of chip 60. EX1003 at ¶40. It would have been obvious to separate the two portions to increase headroom for the bottom chip, because no functional component exists in the connecting portion. *Id.* at ¶¶40–42. Indeed, among references identified in Petition (which share a similar Package-on-Package structure, but were not considered by the Examiner), *Sun* expressly discloses at least one “second substrates 300” (spacer connector) that can be implemented as a connected piece or multiple separate segments arranged on opposite sides of the bottom. EX1005 at [0048], FIGs. 9-11 (showing various arrangements of the spacer connector). *Chen* similarly discloses “two TAV modules 28” disposed on opposite sides of package component 24. EX1006 at [0012]. The Examiner’s failure to consider the obvious modification of *Arai* constitutes another material error. *See Microsoft Corp. v. ParTec Cluster Competence Ctr. GmbH*, IPR2025-00318, Paper 9, 3 (Director June 12, 2025) (finding material error when the Examiner overlooked “the combined teachings” of relevant art); *Anthony Inc. v. ControlTec, LLC*, IPR2025-00559, Paper 12, 2 (Director July 16, 2025); *Xencor, Inc. v. Merus N.V.*, IPR2025-00604, Paper 12, 2–3 (Director July 17, 2025) (the Examiner’s failure to

consider “a reference cited in an IDS during prosecution” constituting material error and overcoming “strong settled expectations”); *Freightcar America, Inc. v. National Steel Car Ltd.*, IPR2025-01046, Paper 20, 3 (Director July 17, 2025) (similar).

The Examiner’s deficient prior-art search further compounded this error. MPEP § 904.02(a) instructs that “**every** group/subgroup ... of the Cooperative Patent Classification” and “class/subclass of the U.S. Patent Classification ... **pertinent to each** type of invention claimed should be included” in a search. But the Examiner confined his search to only a small, arbitrary set of subgroup/subclass all in a single day. EX1002 at 138–39. For example, although CPC H05 group constitutes at least **thirteen** subgroups (H05K 1–13), the Examiner searched only 1 and 3, **excluding eleven subgroups** from the search, including highly relevant subgroup 7 (“constructional details common to different types of electric apparatus”). In fact, the subgroup H05K 7 included *Chen* (EX1006) and *Waite* (EX1010). See EX1006 at Cover (“H05K 7/04”); EX1010 at Cover (“H05K 7/00”); Pet. 57–85, 93–117. Nor did the Examiner supplement the classification search with any keyword or text search. EX1002 at 138–39. Moreover, the Examiner cited **zero** non-patent literature, even though MPEP (2015 ver.) § 904.02 expressly advised examiners to “take special care to ensure that [their] searches include consideration of NPL,” when examining patents in “very active” arts, such as semiconductor packaging. See EX1003 at ¶¶45–51. As the Petition identifies, pertinent NPL discloses many elements that were well-known in the art. See, e.g., Pet. 94–95 (*IPC-4761* (EX1011))

disclosing “industry standard” metal pillars), 92–93 (*Benson* (EX1009) disclosing “polymer adhesives” “widely used” in “microelectronic packaging”).

The Examiner’s failure to properly consider relevant art and his deficient search each constitute “a material error by the Office,” and “it is an appropriate use of Office resources to review the potential error.” IPR2025-00847, 4.

IV. SETTLED EXPECTATIONS WEIGH AGAINST DISCRETIONARY DENIAL

There are settled expectations that Samsung’s accused products (Galaxy smartphones) do not implicate any claims of the ’202 Patent. While the disclosure of the ’202 Patent is extremely thin, including just over a page of description, it is clear to a person of ordinary skill in the art (POSITA) that the ’202 Patent is directed to semiconductor packaging technology and specifically, to small-dimension Package-on-Package (“PoP”) structures at the die level involving “nanotechnology” and fine-pitch interconnects formed by electroplating, rather than macroscopic connections between PCBs. EX1001 at 1:16–25; EX1003 at ¶¶29–30, 45–48 (further noting the ’202 Patent’s “Description of Related Art” describes dimensional loss “critical” “when it comes to nanotechnology”). Because the ’202 Patent “is specially directed to semiconductor packaging” that is “in a different technical field than PCB assemblies”—the accused structures in Samsung’s Galaxy smartphone products, Samsung could not reasonably expect to be accused of infringing the ’202 Patent. *See* EX1003 at ¶29; EX2004 at 3–6; *see Home Depot v. H2 Intellect LLC*, IPR2025-

00480, Paper 11, 2–3 (instituting an IPR against 12-year-old patent where “Patent Owner only previously targeted smartphones, tablets, and watches, whereas Petitioner, Home Depot, is the proprietor of a chain of hardware stores and did not have reason to anticipate assertion of the patent”).

TopWire, on the other hand, does not have settled expectations. It stretches the claims to cover a completely different technological domain from what the ’202 Patent actually discloses. The ’202 Patent was originally invented and owned by a foreign individual (Dyi-Chung Hu), who according to his public resume has not worked on anything relating to the stacked PCB technology, which TopWire now accuses of infringement. EX1039. Before the patent was acquired by TopWire in 2025, it had never been asserted against any products, let alone those utilizing stacked PCB assemblies. Nor had TopWire provided any notice to Samsung about the alleged infringement of the ’202 Patent prior to filing the district court complaint². Moreover, no record indicates the patent was “commercialized, ... marked, licensed, or otherwise applied” in the PCB/smartphone technology space. *Intel Corp. v. Proxense, LLC*, IPR2025-00327, Paper 12, 2 (Director June 26, 2025) (finding patents not “commercialized, asserted, marked, licensed, or otherwise applied in a petitioner’s particular technology space” weigh against discretionary denial).

² TopWire retracted its assertion of prior notice to Samsung after filing its discretionary denial brief. See Notice of Errata, Paper 8.

Accordingly, Samsung's settled expectations of non-assertion by the '202 Patent weigh strongly against discretionary denial.

V. SAMSUNG ACTED DILIGENTLY IN FILING ITS IPR PETITION

Samsung acted diligently, filing its petition less than four months after TopWire filed its Complaint. Similar timelines have been considered diligent. *See, e.g., Savant Techs. LLC v. Feit Electric Company, Inc.*, IPR2025-00260, Paper 16 (PTAB June 12, 2025).

TopWire urges the Director to impute knowledge based on prosecution activity and to treat Samsung as having knowledge of every patent that has ever been cited by an examiner or disclosed in an IDS across its entire patent portfolio. That approach is neither practical nor consistent with the goals of the patent system. It would effectively require innovative companies with large portfolios to monitor, evaluate, and potentially challenge hundreds of thousands of references cited during prosecution, or risk forgoing any future IPR challenge.

Such a rule would impose a substantial innovation penalty. Rather than encouraging innovators to seek patent protection and disclose technical advances, it would discourage patent filings to avoid this imputed knowledge. The more a company innovates and discloses those inventions via patent filings, the greater the risk that knowledge of unrelated references would be imputed to it.

Samsung illustrates the problem. Over the past decade, Samsung has consistently ranked among the top two recipients of U.S. patents and was the leading

recipient from 2022–2025. EX1040. Applying a broad imputed-knowledge rule to a company of Samsung’s scale would create burdens far beyond those faced by smaller entities.

The Director’s prior decisions do not support such a result. TopWire relies on *iRhythm, Inc. v. Welch Allyn, Inc.*, where the Director found iRhythm was aware of an asserted patent based on its citation in iRhythm’s IDS filed during prosecution of an unrelated patent. IPR2025-00377, Paper 10, at 3 (PTAB June 6, 2025). That conclusion in the context of a company that had prosecuted only 68 U.S. patent applications as of the IPR petition filing date cannot reasonably be extended to Samsung. EX1041. As of this writing, Petitioners SEA and SEC together have prosecuted at least 181,445 U.S. patent applications—approximately 2,668 times more than iRhythm. EX1042. An imputed knowledge that may be reasonable for a small portfolio becomes untenable when applied to a portfolio of Samsung’s size.

VI. THE *FINTIV* FACTORS WEIGH AGAINST DISCRETIONARY DENIAL

Fintiv factors strongly weigh against discretionary denial because, among other reasons, the projected FWD is earlier than the trial date, the parties’ investment in parallel litigation is minimal, Samsung’s broad stipulation removes potential overlapping issues, and the Petition presents compelling merits.

A. Factor 1: Parallel Case is Likely to be Stayed Upon Institution

Factor 1 weighs against discretionary denial. Although neither party has moved for a stay, the parallel district court’s precedents strongly suggest “one may be granted,” *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11, 6 (PTAB Mar. 20, 2020), upon institution of this IPR. *See, e.g., AGIS Software Dev. LLC v. Google LLC*, No. 2:19-CV-00359-JRG, 2021 WL 465424, at *2 (E.D. Tex. Feb. 9, 2021) (“[W]here the PTAB has instituted IPR proceedings ..., this Court has likewise routinely stayed cases.”); *Emed Techs. Corp. v. Repro-Med Sys. Inc.*, No. 2:15-cv-1167-JRG, 2016 WL 2758112, *2–3 (E.D. Tex. May 12, 2016) (same); *Stingray Music USA, Inc. v. Music Choice*, No. 2:16-cv-586-JRG, 2017 WL 9885167, *2 (E.D. Tex. Dec. 12, 2017) (same).

B. Factor 2: Projected FWD is Earlier Than Trial Date

Factor 2 strongly weighs against discretionary denial because the projected FWD (October 2, 2027) is nearly four months before the scheduled trial date (January 10, 2028). EX2015 at 1 (Docket Control Order). Thus, the Board can resolve the invalidity challenge before trial, minimizing the risk of duplicative or conflicting decisions, which heavily weighs against discretionary denial. *Hanwha Solutions Corp. v. Maxeon Solar Pte. Ltd.*, IPR2024-01198, Paper 13, 31 (PTAB Feb. 26, 2025) (FWD deadline over two months before trial weighs against discretionary denial); *American Airlines, Inc. et al. v. Intellectual Ventures I LLC*, IPR2025-00785, Paper 11, 2–3 (PTAB Feb. 26, 2025) (similar).

C. Factor 3: Investment in Parallel Case is Minimal

Factor 3 strongly weighs against discretionary denial because the parties' investment in parallel proceeding is minimal. Currently, the parties have only just exchanged discovery requests and initial contentions. *See* EX2021–22; EX2004; EX2023. As of the expected institution, no claim construction, no expert reports, no *Markman*, and minimal document discovery will occur. *See* EX2015 at 1–4. This is the opposite of the facts in *Advanced Micro Devices, Inc., et al v. XtreamEdge, Inc. et al*, IPR2025-00223, Paper 9, 2 (Director June 12, 2025), upon which TopWire relies. There, the parties had “conducted *over seven months* of fact discovery, and a *Markman hearing* is scheduled to occur *before* the due date for an *institution decision*.” *Id.* (emphasis added). Here, Samsung diligently filed an IPR even before “serving its initial invalidity contentions,” and there is “relatively limited investment in the parallel proceeding to date.” *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12, 16–17 (PTAB Dec. 1, 2020) (precedential).

D. Factor 4: Samsung’s Stipulation Removes Any Risk of Overlapping Issues

Factor 4 strongly weighs against discretionary denial because Samsung’s *Sotera*-plus stipulation (EX1031) eliminates any potential overlap between this IPR and the district court, ensuring the IPR functions as a “true alternative” to litigation. Once institution occurs, Samsung will be barred from pursuing in district court the grounds raised or that reasonably could have been raised in this IPR, thereby

eliminating overlap. *See Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12, 18–19 (PTAB Dec. 1, 2020) (precedential); *Snap, Inc. v. SRK Technology LLC*, IPR2020-00820, Paper 15, 15–16 (PTAB Oct. 21, 2020) (precedential). TopWire’s conspicuous omission of any reference to Samsung’s *Sotera*-plus stipulation underscores the weakness of its argument.

E. Factor 5: TopWire Asserted the ’202 Patent Against a Third Party in Another District Court

“This factor [5] adds little if anything to the discretionary denial analysis.” *Aylo Freesites Ltd. f/k/a MG Freesites Ltd. v. WellcomeMat, LLC*, IPR2024-00710, Paper 13, 17–18 (PTAB Sep. 5, 2024). Moreover, TopWire had asserted the same ’202 Patent against a third party (Apple) in another district court (WDTX). *See TopWire LLC v. Apple Inc.*, 7:25-cv-00551-ADA (WDTX); IPR2026-00303. “Because the litigation between the parties would proceed to several district court trials in different jurisdictions, resolving the dispute between the parties at the Office would be more efficient.” *Berkshire Hathaway Energy Co. et al. v. Birchtech Corp.*, IPR2025-00274, Paper 23, 2 (Director July 2, 2025); *Harbor Freight Tools USA Inc. et al. v. Champion Power Equipment, Inc.*, IPR2025-00805, Paper 20, 2.

F. Factor 6: Compelling Merits of Petition Favor Referral

The Petition presents extensive annotated figures, element-by-element prior art mappings, and relies on prior art references never considered by the Examiner.

See generally Petition. TopWire’s merits arguments are superficial and fail to undermine the strength of the Petition.

Sun Grounds: TopWire argues that *Sun*’s Figure 14(a) does not clearly disclose a “top metal pad.” But the Petition is not based on a drawing alone. *Sun* expressly teaches that “bonding pads may [be] used to connect the metal pillars to the respective other substrates.” EX1005 at [0066]; EX1003 at ¶¶122–30. Even if *Sun* did not expressly disclose top metal pads, it renders them obvious. *Id.*

Chen Grounds: TopWire asserts that *Chen* discloses “an entirely different packaging structure” and that a “device die” is “not even a chip.” PO’s Brief, 14. This misleading assertion is based on TopWire’s incorrect interpretation of the ’202 Patent as “disclos[ing] a chip-level ***board-on-board structure***.” *Id.*, 15 (emphasis added). As explained above in § IV, the ’202 Patent is directed to “semiconductor packaging involving ... PoP,” EX1003 at ¶29; EX1001 at 1:16–25, which is completely different technology from a “board-on-board structure,” involving PCB assemblies. *Chen* expressly discloses the claimed invention of the ’202 Patent as correctly understood: a PoP structure with TAV modules 28 (spacer connectors) interposed between top and bottom package components, with a bottom chip (package component 24) placed between the packages. EX1006 at [0009], [0012], [0018]–[0024]. *Chen* also teaches that package component 24 “may include a Central Computing Unit (CPU) die” (*i.e.* a “chip”). *Id.* at [0009]. *Chen* further discloses two TAV modules 28 disposed on opposite sides of package component

24, precisely the claimed “two spacer connectors.” *Id.* at FIGs. 2, 9; EX1003 at ¶¶209–50.

Waite Ground: TopWire also conspicuously ignores Ground 9 of the Petition (combining *Waite* with *IPC-4761*). Pet., 6–7, 93–117.

VII. TOPWIRE’S COMPLAINT ABOUT SAMSUNG’S RELIANCE ON AN EXPERT DECLARATION IS UNWARRANTED

TopWire complains about Mr. Elenius’s declaration (EX1003). PO Br. at 18–20. But TopWire does not identify any specific instance where Mr. Elenius’s testimony is “conclusory” or untethered from the prior art. This failing is dispositive. *See iRhythm Technologies, Inc. v. Welch Allyn, Inc.*, IPR2025-00377, Paper 10 at 2–3 (Director June 6, 2025) (finding Patent Owner’s expert-testimony objection weighed ***against*** discretionary denial because “Patent Owner does not identify any portions of the expert testimony that suggest Petitioner is using its expert to fill gaps in the prior art...[Petitioner’s] expert provides citations to evidence in support of his statements in the required manner.” *Id.*

VIII. CONCLUSION

In meritorious cases, such as this one, IPR proceedings should be instituted, such that innovators with substantial U.S. manufacturing investments tied to the accused products may efficiently challenge weak patent claims asserted by non-manufacturing entities.

Respectfully submitted,

Dated: July 2, 2026

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CERTIFICATE OF COMPLIANCE

I hereby certify that this PETITIONERS' OPPOSITION TO PATENT OWNER'S REQUEST FOR DISCRETIONARY DENIAL, excluding the parts of the brief exempted by 37 C.F.R. § 42.24, complies with the page limits provided by § III.C.iii of the Interim Director Discretionary Process, <<https://www.uspto.gov/patents/ptab/interim-director-discretionary-process>>, which states: "Effective for patent owners' discretionary denial requests due on or after September 1, 2025, a petitioner's opposition to the patent owner's discretionary denial brief is limited to 20 pages, regardless of when a patent owner files its brief."

Dated: July 2, 2026

/ Eliot D. Williams /

Eliot D. Williams

CERTIFICATE OF SERVICE

In accordance with 37 C.F.R. §§42.6(e) and 42.105, the undersigned certifies that on July 2, 2026, a complete and entire copy of the PETITIONERS' OPPOSITION TO PATENT OWNER'S REQUEST FOR DISCRETIONARY DENIAL was served on counsel of record as follows:

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