PUBLIC VERSION

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CIRRUS LOGIC, INC. and
OMNIVISION TECHNOLOGIES, INC.,
Petitioners

v.

GREENTHREAD, LLC,
Patent Owner

Case: IPR2024-00019
U.S. Patent No. 11,316,014

PATENT OWNER'S RESPONSE

TABLE OF CONTENTS

I. INTRODUCTION 1
II. THE ’014 PATENT 4
III. ALLEGED PRIOR ART 4
IV. LEVEL OF ORDINARY SKILL 5
V. CLAIM CONSTRUCTION 5
VI. THE CITED REFERENCES DO NOT DISCLOSE OR SUGGEST ALL THE FEATURES OF THE CHALLENGED CLAIMS 6
A. “Graded” does not mean “aided” and “aided” is not inherent in “graded.” 6
1. A “graded dopant concentration” does not inherently “aid carrier movement.” 6
2. Greenthread never said all graded dopant concentrations aid carrier movement. 10
B. The Petition fails to establish that the prior art discloses or suggests the “aid carrier movement” limitation. (Elements [1.6], [1.7], [21.6], [21.7]) 13
1. The Petition fails, because it restricts its analysis to the direction of the gradient—and nothing else. 14
2. Petitioners’ Kawagoe-Based Arguments are Deficient. 14
3. Petitioners’ Wieczorek-Based Arguments are Deficient. 21
C. The Petition fails to establish that Kawagoe discloses or suggests the “first active region … with a second doping type opposite in conductivity to the first doping type” limitation. (Elements [1.3]/[21.3]). 23
D. The Petition fails to establish that Kawagoe alone or in view of Gupta discloses or suggests the “first active region and second active region are each separated by at least one isolation region” (Claims 6 and 27). 24
VII. OBJECTIVE INDICIA OF NON-OBVIOUSNESS ESTABLISH THAT THE CHALLENGED CLAIMS ARE PATENTABLE. 26
VIII. THE DECLARATION OF PETITIONERS’ EXPERT IS UNRELIABLE. 30
IX. THE PETITION IS UNTIMELY UNDER 35 U.S.C. § 315(B). 34
A. Background 34

1. Prior Litigation Involving the Challenged Patents 34
2. Petitioners' Relationship with PO's Licensees and the Co-Pending District Court Proceedings.....37
3. These Proceedings.....40

B. The Petition should be dismissed under 35 U.S.C. § 315(b). 42

1. Control of prior litigation is not required to establish privity. 42
2. Petitioners bears the burden to show that their petition is timely—i.e. they are not in privity with a time-barred party.....44
3. The Petitions should be dismissed, because Petitioners have not attempted to carry their burden. 45
4. The Petition should be dismissed, because evidence of record shows that the Petition is time-barred.....50
5. Due Process and the policy underlying the AIA support dismissing the Petition. 58

X. THE AIA IS UNCONSTITUTIONAL. 61

XI. CONCLUSION.....63

TABLE OF AUTHORITIES

Page(s)

Cases

Amazon.com, Inc. v. Barnesandnoble.com, Inc.,
239 F.3d 1343 (Fed. Cir. 2001) 7

Apple Inc. v. Vidal,
63 F.4th 1 (Fed. Cir. 2023) 63

Apps. in Internet Time, LLC v. RPX Corp.,
IPR2015-01750, Paper 128 (PTAB Oct. 2, 2020).....48, 49, 59, 60

Arigna Tech. Ltd. v. Volkswagen AG,
No. 2:21-cv-00054, 2022 WL 2761288 (E.D. Tex. Jan. 19, 2022).....55

Assa Abloy AB v. CPC Patent Tech. Pty., Ltd.,
IPR2022-01093, Paper 20 (PTAB Feb. 2, 2023).....47

Bungie Inc. v. Worlds Inc.,
IPR2015-01264, Paper 64 (PTAB Jan. 14, 2020) 43, 47, 54

Digital-Vending Servs. Int'l, LLC v. Univ. of Phoenix, Inc.,
672 F.3d 1270 (Fed. Cir. 2012) 2

Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.,
800 F.3d 1375 (Fed. Cir. 2015) 46, 48

Ericsson Inc. v. Regents of Univ. of Minn.,
IPR2017-01197, Paper 56 (PTAB Sept. 18, 2020).....*passim*

Fiumara v. Fireman's Fund Ins. Companies,
746 F.2d 87 (1st Cir. 1984).....52, 53

Fox Factory Inc. v. SRAM LLC,
IPR2017-00472, Paper 64 (PTAB April 18, 2018) 29

Goldberg v. Kelly,
397 U.S. 254 (1970).....60

In re Google LLC,
949 F.3d 1338 (Fed. Cir. 2020) 52, 53

Greene v. McElroy,
360 U.S. 474 (1959).....61

Greenthread LLC v. OmniVision Technologies Inc.,
23-cv-00212 (E.D. Tex.).....62

Greenthread, LLC v. Cirrus Logic, Inc.,
23-cv-00369 (W.D. Tex) 62

Hallco Mfg. Co. v. Foster,
256 F.3d 1290 (Fed. Cir. 2001) 50

Herrion v. Children's Hosp. Nat. Med. Ctr.,
448 F. App'x 71 (D.C. Cir. 2011).....51, 53

Herrion v. Children's Hosp. Nat. Med. Ctr.,
786 F. Supp. 2d 359 (D.D.C.), *aff'd*, 448 F. App'x 71 (D.C. Cir. 2011) 51

Jarkesy v. Sec. & Exch. Comm'n,
34 F.4th 446 (5th Cir. 2022) 62

John St. Leasehold, LLC v. Cap. Mgmt. Res., L.P.,
283 F.3d 73 (2d Cir. 2002) 51, 52, 53

[redacted] 27

LaserDynamics, Inc. v. Quanta Computer, Inc.,
694 F.3d 51 (Fed. Cir. 2012) 57

Microsoft Corp. v. i4i Ltd. P'ship,
564 U.S. 91 (2011).....62

Mistretta v. United States,
488 U.S. 361 (1989).....61

New Hampshire v. Maine,
532 U.S. 742 (2001).....58, 59

Phillips v. AWH Corp.,
415 F.3d 1303 (Fed. Cir. 2005) 5, 10, 11

Power Integrations, Inc. v. Semiconductor Comps. Indus., LLC,
926 F.3d 1306 (Fed. Cir. 2019) 59

In re Robertson,
169 F.3d 743 (Fed. Cir. 1999) 2

Samsung Electronics Co. Ltd., et al, v. *Neonode Smartphone LLC*,
IPR2021-00144, Paper 59 at 51 (PTAB Dec. 15, 2022) 27

Samsung Electronics Co. Ltd. v. Netlist, Inc.,
IPR2022-00615, Paper 40 (PTAB Feb. 3, 2023).....44

Samsung Electronics Co. Ltd. v. Netlist Inc.,
IPR2022-00615, Paper 64 (PTAB Jun. 30, 2023) 47

Semiconductor Components Indus., LLC v. Greenthread, LLC,
IPR2023-01242, Paper No. 31 (Feb. 5, 2024).....47

Semiconductor Components Indus., LLC v. Greenthread, LLC,
IPR2023-01243, Paper 30 (PTAB Feb. 5, 2024).....47

Semiconductor Components Indus., LLC v. Greenthread, LLC,
IPR2023-01244, Paper 31 (PTAB Feb. 5, 2024).....47

[redacted] 27

Taylor v. Sturgell,
553 U.S. 880 (2008).....*passim*

Toyota Motor Corp. v. Cellport Systems, Inc.,
IPR2015-00633, Paper 11 (PTAB Aug. 14, 2015).....5

Transclean Corp. v. Bridgewood Servs., Inc.,
290 F.3d 1364 (Fed. Cir. 2002) 2

Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.,
699 F.3d 1340 (Fed. Cir. 2012) 26, 27

United States v. Arthrex, Inc.,
141 S. Ct. 1970 (2021).....63

Ventex Co., Ltd. v. Columbia Sportswear N. Am., Inc.,
IPR2017-00651, Paper 148 (PTAB Jan. 24, 2019) 46, 57

Ventex Co., Ltd. v. Columbia Sportswear N. Am., Inc.,
IPR2017-00789, Paper 148, 2019 WL 858745 (PTAB Jan. 24, 2019) 43, 47, 48, 49

Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.,
200 F.3d 795 (Fed. Cir. 1999) 5

Volkswagen Grp. of Am. Inc. v. Argina Tech. Ltd.,
IPR2021-01263, Paper 16 (PTAB Jan. 21, 2022) 43, 48, 49

WesternGeco LLC v. ION Geophysical Corp.,
889 F.3d 1308 (Fed. Cir. 2018) 42, 46, 50, 55

Worlds Inc. v. Bungie, Inc.,
903 F.3d 1237 (Fed. Cir. 2018) 43, 44, 45, 47

Statutes

35 U.S.C. § 314(a) 62, 63

35 U.S.C. § 315(B).....*passim*

Other Authorities

37 C.F.R. § 100(b) (2019).....5

Wright & Miller § 4448 (3d ed.).....43

Wright & Miller § 4460 (3d ed.).....51

EXHIBIT LIST

Exhibit No.	Description	Submitted Previously?
Ex. 2001	*Greenthread, LLC v. Intel Corp.*, No. 6:22-cv-00105-ADA, Dkt. 1 (Complaint) (W.D. Tex. Jan. 27, 2022)	X
Ex. 2002	Definition of "privity" in Black's Law Dictionary (11th ed. 2019) available from Westlaw at westlaw.com	X
Ex. 2003	*Greenthread, LLC v. Intel Corp.*, 6:22-cv-00105-ADA, Dkt. 38 (First Amended Complaint for Patent Infringement) (W.D. Tex., filed Apr. 29, 2022)	X
Ex. 2004	*Greenthread, LLC v. Intel Corp.*, No. 6:22-cv-00105-ADA, Dkt. 113 (Redacted Memorandum Opinion and Order) (W.D. Tex. Dec. 27, 2022)	X
Ex. 2005	*Greenthread, LLC v. Intel Corp.*, 6:22-cv-00105-ADA, Dkt. 38-8 (Greenthread's Amended Preliminary Infringement Contentions) (W.D. Tex., filed Apr. 29, 2022)	X
Ex. 2006	*Greenthread, LLC v. Intel Corp.*, 6:22-cv-00105-ADA, Dkt. 38-12 (Exs. D-1, D-2, D-3, D-6 to Greenthread's Preliminary Infringement Contentions) (W.D. Tex., filed Apr. 29, 2022)	X
Ex. 2007	*Greenthread, LLC v. Intel Corp.*, 6:22-cv-00105-ADA, Dkt. 49 (Notice of Appearance of Additional Counsel) (W.D. Tex., filed June 9, 2022)	X
Ex. 2008	Petition (Paper 1) in *Sony Group Corp. v. Greenthread, LLC*, IPR2023-00376	X

Exhibit No.	Description	Submitted Previously?
Ex. 2009	*Greenthread, LLC v. Dell Inc.*, No. 6:22-cv-105-ADA, Dkt. 120 (Second Amended Complaint)	X
Ex. 2010	*Greenthread, LLC v. Intel Corp.*, 6:22-cv-00105-ADA, Dkt. 135 (Motion for Admission Pro Hac Vice of L. Popovski on Behalf of Sony) (W.D. Tex., filed January 30, 2023)	X
Ex. 2011	Email communication from Patent Owner's counsel to Petitioners' counsel dated October 20, 2023	X
Ex. 2012	Email Attachment – Cirrus Logic Technical Support Article Number 000207340	X
Ex. 2013	Email Attachment - Cirrus Logic Investor Presentation as of April 28, 2015	X
Ex. 2014	Email Attachment - GlobalFoundries 2022 Capital Markets Day, available at https://investors.gf.com/static-files/65f5f1b9-2aea-47a3-8455-10413c6560f4	X
Ex. 2015	Email Attachment - Intel RealSense Product Family D400 Series, dated 2019	X
Ex. 2016	Email communication from Petitioners' counsel to Patent Owner's counsel dated October 24, 2023	X
Ex. 2017	Email communication from Patent Owner's counsel to Board, copying Petitioners' counsel dated November 1, 2023	X
Ex. 2018	*Greenthread, LLC v. Cirrus Logic, Inc.*, No. 1:23-cv-00369 (Supplemental Preliminary Infringement Contentions) (W.D. Tex., served Oct. 13, 2023)	X
Ex. 2019	*Greenthread, LLC v. Cirrus Logic, Inc.*, No. 1:23-cv-00369, Dkt. 29 (Scheduling Order) (W.D. Tex. Aug. 18, 2023)	X

Exhibit No.	Description	Submitted Previously?
Ex. 2020	Article entitled "Cirrus Logic Helps Ease PC Industry Transition to New MIPI SoundWire® Interface" available at https://investor.cirrus.com/news-and-events/investor-news/news-details/2023/Cirrus-Logic-Helps-Ease-PC-Industry-Transition-to-New-MIPI-SoundWire-Interface/default.aspx	X
Ex. 2021	*Greenthread, LLC v. Intel Corp.*, 6:22-cv-00105-ADA, Dkt. 120-8, Greenthread's Amended Preliminary Infringement Contentions (W.D. Tex., filed Jan. 23, 2023)	X
Ex. 2022	Confidential agreement	X
Ex. 2023	CS42L42, Low Power Audio Codec with SoundWire and Audio Processing, available at https://www.cirrus.com/pubs/proBulletin/cs42l43-cs36l56-bulletin.pdf	X
Ex. 2024	Cirrus Logic Immersive PC Audio Solution, available at https://www.cirrus.com/pubs/proBulletin/cs42l43-cs36l56-bulletin.pdf	X
Ex. 2025	Cirrus Logic – What Drives Our Success, available at https://investor.cirrus.com/company-overview/what-drives-our-success/default.aspx	X
Ex. 2026	Cirrus Logic, Inc. Terms and Conditions of Sale, available at https://www.cirrus.com/legal/productterms/	X
Ex. 2027	*Greenthread, LLC v. OmniVision Technologies Inc.*; 2:23-cv-212, Dkt. 1 (Complaint) (E.D. Tex May 10, 2023)	X
Ex. 2028	Confidential declaration	X

Exhibit No.	Description	Submitted Previously?
Ex. 2029	*Greenthread, LLC v. OmniVision Technologies Inc.*, 2:23-00212, Preliminary Infringement Contentions for OmniVision Technologies Inc.	X
Ex. 2030	[redacted]	X
Ex. 2031	Intel RealSense Product Family D400 Series, dated September 2023	X
Ex. 2032	Confidential declaration	X
Ex. 2033	GlobalFoundries Annual Report on Form 20-F for the fiscal year ended December 31, 2022, available at https://investors.gf.com/static-files/cc73efd0-09c1-442a-b4dd-0bcb74610e31	X
Ex. 2034	Confidential agreement	X
Ex. 2035	TechInsights Report on [redacted]	X
Ex. 2036	TechInsights Report Ad	X
Ex. 2037	Email communication from Petitioners' counsel to Patent Owner's counsel dated between January 9, 2024 through January 10, 2024	X
Ex. 2038	Email communication from Petitioners' counsel to Patent Owner's counsel dated between October 20, 2023 through October 31, 2023	X

Exhibit No.	Description	Submitted Previously?
Ex. 2039	*Greenthread, LLC v. Intel Corp.*, No. 6:22-cv-00105-ADA, Dkt. 7 (summons returned executed) (W.D. Tex. Feb. 7, 2022)	X
Ex. 2040	Petition (Paper 2) in *Sony Group Corp. v. Greenthread, LLC*, IPR2023-00324	X
Ex. 2041	Petition (Paper 3) in *Sony Group Corp. v. Greenthread, LLC*, IPR2023-00325	X
Ex. 2042	Petition (Paper 1) in *Sony Group Corp. v. Greenthread, LLC*, IPR2023-00375	X
Ex. 2043	*Greenthread, LLC v. OmniVision Technologies Inc.*; 2:23-cv-212 (OmniVision's Responses and Objections to Greenthread's Fourth Set of Common Interrogatories)	X
Ex. 2044	Email communication from Petitioners' counsel to Patent Owner's counsel dated between November 28, 2023 through December 6, 2023	X
Ex. 2045	[redacted]	X
Ex. 2046	Email communication to Petitioners' counsel attaching production dated October 5, 2023	X
Ex. 2047	Email communication to Petitioners' counsel attaching production dated June 30, 2023	X
Ex. 2048	*Greenthread, LLC v. Samsung Electronics Co., Ltd. et al*, EDTX-2-19-cv-00147, Dkt. 1 (Complaint) (E.D.Tex., April 30, 2019)	X

Exhibit No.	Description	Submitted Previously?
Ex. 2049	*Greenthread, LLC v. Samsung Electronics Co., Ltd. et al*, EDTX-2-19-cv-00147, Dkt. 6 (Order granting Motion for Extension of Time, and Waiver of Foreign Service Requirement) (E.D.Tex., May 31, 2019)	X
Ex. 2050	Correspondence from Patent Owner's counsel to Petitioners' counsel dated May 4, 2023	X
Ex. 2051	Webpage from DigiKey for Cirrus Logic CS35L41 (https://www.digikey.com/en/products/detail/cirrus-logic-inc/CS35L41-CWZR/16377919)	X
Ex. 2052	Webpage from DigiKey for Cirrus Logic CS40L25 (https://www.mouser.com/ProductDetail/Cirrus-Logic/CS40L25-CWZR?qs=xZ%2FP%252Ba9zWqYWfeisEtcaTA%3D%3D)	X
Ex. 2053	Webpage from Mouser for Cirrus Logic CS40L25 (https://www.mouser.com/ProductDetail/Cirrus-Logic/CS40L25-CWZR?qs=xZ%2FP%252Ba9zWqYWfeisEtcaTA%3D%3D)	X
Ex. 2054	Webpage from ArduCam for OmniVision OV9282 (https://www.arducam.com/product/ov9282-monochrome-globalshutter-camera-module-depthai-oak/)	X
Ex. 2055	Webpage from Uctronics for OmniVision OV9282 (https://www.uctronics.com/ov9282-monochrome-global-shutter-camera-module-depthai-oak.html)	X
Ex. 2056	Excerpts of the Deposition Transcript of Scott Warrick taken on June 7, 2024 along with marked Exhibits 3-5 in *Greenthread, LLC v. Cirrus Logic, Inc.*, 1:23-cv-00369-DC (W.D. Tex.)	

Exhibit No.	Description	Submitted Previously?
Ex. 2057	Declaration of Dr. Alexander Glew	
Ex. 2058	Transcript of Deposition of Dr. Sanjay Banerjee	
Ex. 2059	Excerpts from Chen, J. Y., CMOS Devices and Technology for VLSI, Prentice-Hall (1990)	
Ex. 2060	U.S. Patent No. 5,384,476 ("Nishizawa")	
Ex. 2061	CV of Dr. Alexander Glew	
Ex. 2062	U.S. Patent No. 8,421,195	
Ex. 2063	U.S. Patent No. 9,190,502	
Ex. 2064	U.S. Patent No. 10,510,842	
Ex. 2065	U.S. Patent No. 10,734,481	
Ex. 2066	U.S. Patent No. 11,121,222	
Ex. 2067	File History of U.S. Patent No. 8,421,195	
Ex. 2068	File History of U.S. Patent No. 9,190,502	
Ex. 2069	File History of U.S. Patent No. 11,121,222	

Exhibit No.	Description	Submitted Previously?
Ex. 2070	File History of U.S. Patent No. 10,734,481	
Ex. 2071	File History of U.S. Patent No. 10,510,842	
Ex. 2072	Declaration of Mohan Rao	
Ex. 2073	Statista Information	
Ex. 2074	*Greenthread, LLC v. Cirrus Logic Inc.*, No. 1:23-cv-369-DC-DTG, Dkt. 53 (Claim Construction Order and Memorandum in Support Thereof) (W.D. Tex. Mar. 13, 2024)	
Ex. 2075	*Greenthread, LLC v. Samsung Electronics Co., Ltd. Et Al.*, 2:19-cv-00147, Dkt. No. 67 (Claim Construction Memorandum Opinion and Order) (E.D. Tex. Apr. 20, 2020)	
Ex. 2076	*Intel Corp. v. Greenthread LLC*, IPR2023-00386, Ex. 1003 (Dr. Blalock Declaration), Dec. 19, 2022	
Ex. 2077	*Greenthread, LLC v. Cirrus Logic, Inc.*, No. 1:23-cv-00369-DC, Dkt. 86 (W.D. Tex. Jul. 11, 2024)	

I. INTRODUCTION[1]

The Petition fails, because none of Petitioners' references expressly teach "one graded dopant concentration to aid carrier movement from the first and second active regions towards an area of the substrate where there are no active regions," and "the graded dopant region to aid carrier movement from the surface towards the area of the substrate where there are no active regions."

Wieczorek does not say anything at all about using graded dopants to move carriers. It just has a concentration that Petitioners say is graded.

Kawagoe teaches the use of graded dopants to *impede* carrier movement up from the *bottom* of a device. Kawagoe does not teach *aiding* movement of any carriers. Regardless, Kawagoe does not teach *anything* about carriers in the active

[1] Greenthread, LLC ("Patent Owner," "PO," or "Greenthread") submits this Response to the Board's decision to institute IPR (Paper 33, "Decision") and to the Petition (Paper 1) filed by Cirrus Logic, Inc. ("Cirrus"), OmniVision Technologies, Inc. ("OmniVision"), and ams Sensors USA, Inc. (collectively, "Petitioners"; ams Sensors USA, Inc. is no longer a party). This Response is timely filed. Paper 35. The Board instituted review of U.S. Patent No. 11,316,014 ("the '014 patent" or "the Challenged Patent") (Ex. 1001) on six grounds challenging claims 1–9 and 12-28 ("the Challenged Claims"). Decision, 7-8, 43.

region at the *top* of the device. The fact that Kawagoe's transistors presumably have carriers in the active region is beside the point. Kawagoe says nothing about those carriers and Petitioners do not point to any teaching about those carriers.

In the absence of any teaching of the claim limitation in the prior art, Petitioners have two options: 1) they can read "aid carrier movement from the first surface" out of the claim or 2) they can argue that any "graded dopant concentration" in the active region will "aid carrier movement." Both options fail.

The first option is clearly wrong, because it is "contrary to the well-established rule that claims are interpreted with an eye toward giving effect to all terms in the claim." *Digital-Vending Servs. Int'l, LLC v. Univ. of Phoenix, Inc.*, 672 F.3d 1270, 1275 (Fed. Cir. 2012) (internal quotation marks omitted). Petitioners cannot ignore a claim limitation.

The second option—inherency—also fails. The "probability or possibility" that a dopant gradient aids carrier movement "is insufficient." *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999). The prior art "must *necessarily* include the unstated limitation." *Transclean Corp. v. Bridgewood Servs., Inc.*, 290 F.3d 1364, 1373 (Fed. Cir. 2002) (emphasis in original). Petitioners cannot possibly overcome this high bar.

First, one of the Petitioners, *admitted that a graded dopant concentration does not inherently aid carrier movement*. In the parallel district court proceedings

Cirrus's 30(b)(6) witness on "[t]he movement of carriers" in the accused devices[2] testified that it is impossible to determine whether a dopant gradient aids the movement of minority carriers based on knowledge of the dopant gradient alone, because "there's a long list of … physical attributes which affect the movement of carriers." *Id.* at 72:6-8. He said that "there's other things that might affect carrier movement besides the gradient." 96:1-13 (emphasis added). When Greenthread showed Mr. Warrick a dopant gradient in an accused product, he said it was not possible to say from the gradient alone whether the product met the "aid carrier movement" claim limitation because of these other "physical attributes." *Id.* at 72:6-8, 95:2-5, 96:1-13. Petitioners cannot take the "aid carrier movement" limitation out of the patent for validity and then put it back in for infringement.

Furthermore, objective indicia of non-obviousness confirm the patentability of Greenthread's claims. Two multibillion dollar semiconductor companies, [redacted], paid for <u>*licenses covering just the patent family at issue here without any threat of litigation*</u>. Moreover, Greenthread has never threatened litigation against those companies. These companies approached Greenthread first. If either company had wanted to, it could have challenged Greenthread's patents at virtually no expense. At the time of the licenses, [redacted] had IPRs pending against Greenthread's patents. [redacted] could have joined those petitions, filed

[2] Ex. 2056 (Warrick Deposition) at 7:1-7 (including topic 25).

copycat petitions, or drafted their own petitions (as they regularly do). There is no plausible explanation for these transactions, except that two of Petitioners' competitors looked at the evidence and came to the opposite conclusion than what Petitioners urge here. The Board should reach the same conclusion as [redacted] and confirm the patentability of the Challenged Claims.

II. THE '014 PATENT

At the time of invention of the Challenged Patent, most semiconductor devices relied on spatially uniform concentrations of dopants. Ex. 1001 (Challenged Patent), Abstract, 1:64-2:12. Dr. Rao (the named inventor) recognized, however, that graded concentrations of dopants can be used to improve certain aspects of the performance of transistors and other semiconductor devices. *Id.*, Abstract, 3:37-47, 4:1-3. The claimed invention is clearly disclosed in, e.g., Figs. 5B-5C of the Challenged Patent, and the corresponding parts of the specification. Ex. 2057, ¶¶34-37; *see also id.*, ¶¶1-33 (Dr. Glew's background and overview of relevant technology).

III. ALLEGED PRIOR ART

Dr. Glew provides an overview of pertinent portions of the Kawagoe (Ex. 1007) and Wieczorek (Ex. 1006) primary references relevant to the present dispute. Ex. 2057, ¶¶38-44.

IV. LEVEL OF ORDINARY SKILL

A person of ordinary skill in the art (POSITA) in the technology field of the Challenged Patent would be a person with at least a Bachelor's of Science degree in electrical or computer engineering, materials science, chemical engineering, applied physics, or a related field, with emphasis on semiconductor manufacturing, or an equivalent degree, and at least four years of experience in semiconductor design and manufacturing. Additional education in a relevant field or industry experience may compensate for a deficit in one of the other aspects of the requirements stated above. Ex. 2057, ¶¶17-18.

V. CLAIM CONSTRUCTION

The claims in an IPR are construed using the same standard that applies in district court proceedings, as set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc); 37 C.F.R. § 100(b) (2019). "The Board only construes the claims when necessary to resolve the underlying controversy. *Toyota Motor Corp. v. Cellport Systems, Inc.*, IPR2015-00633, Paper 11 at 16 (PTAB Aug. 14, 2015) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)). PO does not believe express claim construction is necessary for any claim terms of the Challenged Claims. Each term of the Challenged Claims should be given its plain and ordinary meaning. Ex. 2057, ¶¶20-25, 45. However, as discussed below, Petitioners' argument rests on an improper collapsing of the terms "graded

dopant concentration" and "aid carrier movement." Further, Petitioners assert that the "aid carrier movement" limitation can be met in situations where there is no carrier movement—an absurd result. *Infra* Section VI.A.1. In light of Petitioners' positions, the Board should clarify that these are separate terms and that the plain and ordinary meaning of "aid carrier movement" requires that a carrier move in the specified direction.

VI. THE CITED REFERENCES DO NOT DISCLOSE OR SUGGEST ALL THE FEATURES OF THE CHALLENGED CLAIMS

The Petition is deficient because it fails to establish that the references identified in the Petition teach or suggest at least the "aid carrier movement" limitations (Elements [1.6], [1.7], [21.6], [21.7]) which are found in the challenged independent claims.

A. "Graded" does not mean "aided" and "aided" is not inherent in "graded."

Petitioners' references do not teach the "aid carrier movement" claim limitation. Therefore, to locate "aid carrier movement" in the prior art, Petitioners assert that *any* "graded dopant concentration" will "aid carrier movement." Petitioners are wrong.

1. A "graded dopant concentration" does not inherently "aid carrier movement."

Petitioner Cirrus Logic has admitted that a graded concentration of dopants does not inherently aid carrier movement. Cirrus's 30(b)(6) witness on the

"movement of carriers" in its devices, Scott Warrick, agreed that "there's a ***long list of … physical attributes which affect the movement of carriers***" and "there's other things that might affect carrier movement besides the gradient." Ex. 2056 at 72:6-8 (emphasis added), 96:1-13. Greenthread showed Cirrus's corporate representative a doping profile from one of the Cirrus accused products and asked him if the downward sloping gradient met the "aid carrier movement" claim limitation. He said "***I cannot tell you that***." *Id.* (emphasis added). Greenthread then asked "***is that because there's other things that might affect carrier movement besides the gradient***?" to which Mr. Warrick replied "***Yes.***" Id. at 95:2-5; 96:1-13 (emphasis added). Petitioners cannot interpret Greenthread's claims one way when comparing them to the accused products and another when comparing them to the prior art. *Amazon.com, Inc. v. Barnesandnoble.com, Inc.*, 239 F.3d 1343, 1351 (Fed. Cir. 2001).

Second, Greenthread's expert, Dr. Glew, agrees that the net force acting on a carrier is what determines whether it moves and the direction of motion. Other forces, such as the intrinsic resistance of silicon, may prevent movement or push in the opposite direction from the force exerted by the gradient. Petitioners' assumption that the gradients in their prior art references would aid carrier movement fails, because they assume that any gradient would suffice to overcome the other forces that are present, such as the inherent resistance of silicon. Since

Petitioners do not measure or account for these forces, and do not compare them to the magnitude of the force exerted by the gradients in the alleged prior art, they fail to establish that the disclosed gradients would "aid carrier movement." Ex. 2057, ¶¶46-50.

Indeed, Petitioners' position that *any* gradient aids carrier movement, leads to absurd results that are plainly inconsistent with the claim language. For example, if the forces acting on a carrier—i.e. the force exerted by a gradient and any other forces—cancel each other out, the carriers do not move at all. Yet, Petitioners' "graded" entails "aided" assumption (or claim construction) implies that a gradient can "aid" the movement of carriers that do not move at all. "Aid[ing] carrier movement" requires "movement." Petitioners fail to address this claim limitation. *Id.*, ¶50.

Third, the specification, like Greenthread's statements during prosecution, describes the slope of the dopant concentration as a relevant parameter for determining whether a concentration gradient will aid carrier movement. "The gradient can be linear, quasi linear, exponential or complimentary error function. The relative slope of the donor concentration throughout the base creates a suitable aiding drift electric field, to help the" carriers move. Ex. 1001, 3:1-5.

Fourth, during prosecution, the examiner said that in "a complex electronic device, movement of minority carriers is affected by multiple forces and fields" and

that a "drift field may attempt to apply a force on all minority carriers in a specific direction" but that "without knowing other parameters of the device" one cannot say whether the field would aid carrier movement. Ex. 1016, 270. This is exactly what Cirrus Logic's 30(b)(6) and Greenthread's expert testified. Ex. 2057, ¶50.

Fifth, not one but two District Courts have previously agreed with Greenthread that not *all* doping gradients *must* aid carrier movement. The Western District of Texas unequivocally stated, "a graded concentration…that is [not 'sufficiently graded'] will not aid in the movement of minority carriers[.]" Ex. 2074, 39-40. And the Eastern District of Texas understood that direction alone does not determine whether a gradient aids carrier movement—the ***magnitude*** of the gradient must also be considered. Ex. 2075, 15 (explaining that "the slope [of the gradient] has both a direction and a magnitude and [d]efendant [incorrectly] suggests that the direction of the drift electric field depends solely on ***the direction*** of the slope of the graded concentration") (emphasis in original).

Sixth, Petitioners' own reference, Kawagoe, confirms that graded dopant concentrations do not necessarily *aid* carrier movement, because Kawagoe teaches using a graded slope to *impede* carrier movement. Kawagoe is concerned with naturally occurring α-rays striking a semiconductor device and generating free electrons in the substrate. These free electrons can disrupt the operation of the device during a "single event upset" ("SEU"). Kawagoe teaches a "concentration gradient"

to "*prevent*[] [these SEU-generated carriers] from entering the p-well." Ex. 1007, 16:7-11. Kawagoe proves that graded dopant concentrations don't *always* aid carrier movement, as Petitioners claim, because sometimes the "concentration gradient" can "prevent" carrier movement. Ex. 2057, ¶¶49-51.

2. Greenthread never said all graded dopant concentrations aid carrier movement.

Petitioners argue that Greenthread admitted that any dopant gradient "aids carrier movement," but Greenthread's claims themselves show why that cannot be so. If <u>*any*</u> "graded dopant concentration" would "aid carrier movement" then there was no reason to include the separate claim term. Greenthread included "aided" and "graded" as two separate claim terms, because they have separate meaning. As the Federal Circuit said in *Phillips v. AWH Corp.,* "[w]hen a claim refers to 'steel baffles,'" that "strongly implies that the term 'baffles' does not inherently mean objects made of steel." 415 F.3d 1303, 1314 (Fed. Cir. 2005). Here, "a graded dopant concentration <u>*to aid carrier movement*</u>" "strongly implies" that a "graded dopant concentration" "does not inherently" "aid carrier movement." *Id.*

Petitioners point to the prosecution history to support conflating "graded" with "aided," but—setting aside the fact that Petitioners misrepresent that history—the prosecution history is the wrong place to start. "The prosecution history represents an ongoing negotiation between the PTO and the applicant, rather than the final product of that negotiation, it often lacks the clarity of the specification and

thus is less useful" in understanding the scope of the patent. *Phillips*, 415 F.3d at 1317. The prosecution history cannot overcome the clear claim language distinguishing the "graded" and "aided" terms.

First, Petitioners argue that Greenthread argued in prosecution that the "graded dopant concentration itself creates a 'built-in' electrical field that forces the movement of carriers into a particular direction." Petition, 30. The point of the sentence Greenthread actually wrote is that a "graded dopant concentration" "must move" carriers *to meet the claim limitation*, not that any and every graded dopant concentration "must move" carriers. Greenthread was emphasizing that "aid carrier movement" is a separate claim element from "graded dopant concentration"—the exact opposite of what Petitioners assert. In context, Greenthread said:

> Defendants assert that the specification does not provide guidance on how to assess or measure carrier movement. This is not true. The claims and the specification make clear that the electric field must move the carriers in a particular direction (from the surface layer to the substrate). Whether the carrier movement has a particular speed or acceleration is beyond the scope of the claim, as long as it meets the other limitations of the claim.

Ex. 1020, 29.

Next, Petitioners attribute to Greenthread the statement that "'when the dopant concentration is graded in a particular direction, [certain] charge carriers will move

in the [same] gradient direction ....'" Pet., 28, 60. This comes from the *background* section of a Greenthread claim construction brief where Greenthread was describing a phenomenon called "carrier drift." Ex. 1020, 2. By definition, carrier drift involves the movement of carriers. Ex. 2057, ¶33. The fact that a phenomenon definitionally involves carrier movement and graded dopant concentrations does not mean that the phenomenon always occurs. *Id.*

Finally, Petitioners claim that Greenthread said during prosecution of a related patent that "a downward-sloping graded dopant concentration was known in the prior art to create an 'inherent "built-in" unidirectional electric field' that sweeps carriers down into the substrate." Pet., 28. Most of this quote is from Petitioners, not Greenthread. Furthermore, Petitioners do not quote Greenthread's full statement. In fact, Greenthread added that the movement of carriers "[*d*]*epend*[*s*] *on the particular slope* of the graded concentration of dopant[s]." Ex. 1016, 289. Moreover, Greenthread was responding to an Office Action regarding a claim that required a "single static unidirectional electric drift field to aid the movement of carriers." *Id.*, 286. Those additional claim limitations were, as Greenthread said, an "*additional parameter* for ensuring that all minority carriers are moved in one direction." *Id.*, 290. The fact that an "additional parameter" *besides* the graded dopants is necessary to "ensur[e] that all minority carriers are moved" shows that Greenthread was not asserting that "graded" entails "aided."

B. The Petition fails to establish that the prior art discloses or suggests the "aid carrier movement" limitation. (Elements [1.6], [1.7], [21.6], [21.7]).

For all of the asserted grounds, the Petition fails to show that any of the primary references disclose any of the claim elements requiring "aid carrier movement."[3]

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[3] (A) Element [1.6]: "at least a portion of at least one of the first and second active regions having at least one graded dopant concentration to aid carrier movement from the first and second active regions towards an area of the substrate where there are no active regions"; (B) Element [1.7]: " at least one well region adjacent to the first or second active region containing at least one graded dopant region, the graded dopant region to aid carrier movement from the surface towards the area of the substrate where there are no active regions, wherein at least some of the transistors form digital logic of the semiconductor device"; (C) Element [21.6]: "at least a portion of at least one of the first and second active regions having at least one graded dopant concentration to aid carrier movement from the surface to an area of the substrate where there are no active regions"; and (D) Element [21.7]: "at least one well region adjacent to the first or second active region containing at least one graded dopant region, the graded dopant region to aid carrier movement from the surface to the area of the substrate where there are no active regions, and wherein the graded

1. The Petition fails, because it restricts its analysis to the direction of the gradient—and nothing else.

The Petition fails because it rests on a false premise. As discussed above, a mere downward sloping gradient does *not* inherently "aid carrier movement." *See supra* Section VI.A. Cirrus admitted that the existence of a gradient alone is not enough to determine whether the gradient would "aid carrier movement." *See* Ex. 2056 (Warrick Deposition) at 95:2-96:13. Since the Petition fails to analyze the magnitude of the dopant gradient or the magnitude of other forces, it cannot show that the prior art dopant gradients aided carrier movement. Ex. 2057, ¶50-57.

2. Petitioners' Kawagoe-Based Arguments are Deficient.

The Petition fails to demonstrate that Kawagoe teaches the "aid carrier movement" claim limitation. Ex. 2057, ¶¶47-55.

<u>The Petition fails to consider the relevant factors in analyzing Kawagoe:</u>

The Petition points to Figures 17 and 23 of Kawagoe for the claimed "graded dopant concentration" of limitations [1.6], [1.7], [21.6], and [21.7]. Pet. at 23-34. But for the claimed "aid carrier movement" feature of limitations [1.6], [1.7], [21.6], and [21.7], the Petition contains no discussion of the magnitude of the slope of the gradient or net forces. To the contrary, the Petition focuses on the direction of

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dopant concentration is linear, quasilinear, error function, complementary error function, or any combination thereof."

Kawagoe's slope. *Id.* As explained above, Petitioners' premise is flawed. *See supra* Section VI.A.1. Indeed, as Cirrus testified, "other things … might affect carrier movement besides the gradient" and the existence of a gradient alone is insufficient to establish the "aid carrier movement" claim limitation. Ex. 2056 (Warrick Deposition) at 96:10-13.

Kawagoe's concentration gradient *impedes* carrier movement: *See supra* Section VI.A.2. The Petition strategically uses square brackets to conceal the fact that Kawagoe's graded dopant concentration is quite different from what Petitioner claims. The Petition reproduces the following passage from Kawagoe in which Greenthread has highlighted Petitioners' square brackets:

> [T]he impurity concentration of the p-well 6p is given such a gradient that it is ***gradually lowered in the depthwise direction from the surface*** of the epitaxial layer 2E, so that the influence to be caused by the carriers (or electrons) due to the α-ray is lowered. Specifically, the ***electrons produced by the α-ray are attracted to the substrate body 2S by that concentration gradient []*** so that the soft errors can be reduced in case the MIS memory of the DRAM or the like is formed in the p-well 6p.

Pet., 26-27 (quoting Ex. 1007, 16:2-11, emphasis and square brackets after "gradient" added by Petitioners). What is missing from Petitioners' quotation is Kawagoe's teaching that the graded concentration actually *inhibits* carrier movement. The full sentence from Kawagoe that Petitioners elide actually states:

> Specifically, the electrons produced by the α-ray are attracted to the substrate body 2S by that concentration gradient and *prevented from entering the p-well 6p* so that the soft errors can be reduced in case the MIS memory of the DRAM or the like is formed in the p-well 6p.

Ex. 1007, 16:7-11 (emphasis added). Since Kawagoe teaches inhibiting carrier movement, it does not teach aiding carrier movement. Ex. 2057, ¶51.

Kawagoe's carriers are not in the active region: Not only does Kawagoe not disclose aiding carrier movement, the carriers that its graded dopant concentration affects are in the wrong place. Each challenged independent claim requires "*active regions* having at least one graded dopant concentration to aid carrier movement," but Kawagoe's graded dopant concentration and the electrons it seeks to affect are not in the "active regions" of the device.

Petitioners state in a footnote that, according to Kawagoe, SEUs generate "electrons created by an α-ray in the substrate body below the wells"—far below the active regions. *See* Pet. at 27 n.7. Kawagoe's electrons are initially ***below*** p-well 6p, and prevented from moving ***upward*** into p-well 6p. Ex. 2057, ¶52. Kawagoe's 6p extends to the very top of the device. Therefore, carriers travelling vertically

could only enter 6p from below.[4] Kawagoe does not address carriers in the "active region" and does not "aid carrier movement *from the first surface*" because Kawagoe's carriers are nowhere near what Petitioners identify as the "first surface."

The Petition relies on a post-priority date reference to make up for Kawagoe's deficiency: Apparently recognizing that Kawagoe doesn't teach anything about carriers in the "active region" or moving "from the first surface to the second surface of the substrate," Petitioners rely on testimony from their expert witness, Dr. Banerjee, and another reference to fill the gap. The Petition says that "Dr. Banerjee explains that during a so-called single event upset (SEU), an α-ray generates millions of carriers, *some of which are produced in or near the active regions at the top surface of the substrate*." Pet., 27.

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[4] Even if carriers could be located above 6p those carriers would not satisfy the claim limitation. Those carriers would be in what Petitioners identify as the surface or active regions. Since they are "prevented from entering" 6p, they would remain above 6p and Kawagoe's gradient would not aid their movement downward. As explained below, Dr. Glew confirms (citing Nishizawa) that Kawagoe is discussing carriers outside the surface layer. Nishizawa explicitly states that that probability of carriers from an alpha ray at the top of a device is "extremely low" and any such carriers can be "disregarded." Ex. 2060, 19:21-20:22.

But Dr. Banerjee doesn't (and can't) fill the gap. First, in support of that assertion, Dr. Banerjee *only* cites Wang (Ex. 1009)—a document whose public availability Petitioners have not established, and which purports to be from ***2008, i.e., four years after the critical date*** for the Challenged Patent. Ex. 1003, ¶91 (citing Ex. 1009); Pet., Table of Exhibits (listing "2008" for Ex. 1009); Ex. 1009, 429 (listing copyright date of 2008). Dr. Banerjee did not cite any other reference or basis for his assertion that during an SEU "some [carriers] are produced in or near the active region at the top surface of the substrate" (Ex. 1003, ¶91). Therefore, the Petition contains no evidence that a POSITA would have known about SEU carriers in the active region at the time of the Challenged Patent.

Second, setting aside the date issue, Wang does not give a POSITA a reason to use Kawagoe in the active region. Ex. 2057, ¶53. Wang's image—just like Kawagoe—shows that the SEU carriers are primarily generated deep in the device. *Id.* Wang shows some carriers in the active region, *but never says that they are known to be a problem*. *Id.* Dr. Banerjee does not say that either. He merely asserts that some carriers are in the active region, without saying how many or that a POSITA would have been concerned about them.

In short, the Petition cites no evidence that a POSITA would have known of or thought about α-rays at the top of a semiconductor device on the critical date,

much less adopted Kawagoe's solution (misconstrued by Petitioners) to solve the problem.

Alpha-ray carriers are not generated at the "surface" or "active regions" of semiconductor devices: As explained by Dr. Glew, Petitioners' understanding of Kawagoe's disclosure regarding electrons generated by alpha-rays is incorrect. Ex. 2057, ¶54. As explained by Dr. Glew—who has experience working with alpha-rays/alpha particles (*id.*, ¶10)—a POSITA would have understood when Kawagoe mentions "electrons produced by the α-ray" (Ex. 1007, 16:7-11), Kawagoe is *not* describing electrons near the surface. Ex. 2057, ¶54. Dr. Glew cites Nishizawa—a reference from before the Challenged Patent's priority date—to demonstrate what a POSITA would have known:

> Accordingly, it will be understood that the alpha-particle immediately after irradiation to the surface of a semiconductor body has an energy of several MeV, for example about 5 MeV, and that, accordingly, ***the probability of creation of electron-hole pairs is extremely low near the surface***. The alpha-particle will begin to create electron-hole pairs after it has entered into the semiconductor substrate to a certain distance.

Ex. 2060, 19:21-34; *see also id.*, 20:19-22 ("[T]he amount of electrons created which adversely affect the memory action is no greater than only 10% of the stored electric charge, and thus it can be disregarded."); Ex. 2057, ¶54. Kawagoe is describing electrons "***created … in the substrate body below the wells***," as Dr. Banerjee

conceded. *Id.* (citing Ex. 1003, ¶90 n.6). Thus, a POSITA would have understood that Kawagoe's electrons that are prevented from entering the p-well are *not* created near the surface. *Id.*

In short, the Petition cites no evidence that a POSITA would have known of or thought about α-rays generating carriers at the top of a semiconductor device on the critical date, much less adopted Kawagoe's solution (misconstrued by Petitioners) to solve the problem.

The Petition does not include any obviousness arguments, or cite Dr. Banerjee for any obviousness rationale/evidence, regarding the "aid carrier movement from…" of elements [1.6] or [1.7] (and the corresponding "aid carrier movement" limitation of the other challenged independent claim) for Ground I. Pet., 23-34; Ex. 1003, ¶¶87-90. Ground III of the Petition relies on Gupta (Ex. 1014) as a secondary reference, but not regarding the "aid carrier movement" limitation of the independent claims. Pet., 77-83.

Therefore, Petitioner cannot rely on obviousness to save its faulty arguments regarding "aid carrier movement" in the Kawagoe-based grounds. And due to the Petition's deficient arguments regarding that limitation in the challenged independent claims, the Petition is deficient regarding the challenged dependent claims, too.

3. Petitioners' Wieczorek-Based Arguments are Deficient.

The Petition's Wieczorek grounds fail for similar reasons as the Kawagoe grounds: Wieczorek does not say that the dopant gradient it discloses has any effect on carriers at all. Ex. 2057, ¶¶56-57.

The Petition points to Figure 2B of Wieczorek for the claimed "graded dopant concentration" of limitations [1.6], [1.7], [21.6], and [21.7]. Pet., 57-59. But for the claimed "aid carrier movement" feature of limitation [1.6], the Petition relies entirely on Greenthread's supposed admissions:

> Further, Wieczorek's downward-sloping graded dopant concentrations aid carrier movement … from the first and second active regions towards/to an area of the substrate where there are no active regions *to the same extent* to which Applicant relied on the prior art and admitted to the Patent Office that such carrier movement would occur under the same scenario."

Pet., 59. (emphasis added). As he did for the Kawagoe-based ground regarding claim 1, Dr. Banerjee repeated the Petition's language nearly verbatim without analyzing anything actually disclosed in Wieczorek for the "aid carrier movement…" feature. Pet., 57-61; Ex. 1003, ¶¶147-150; Ex. 2057, ¶56. As explained above, however, the existence of a downward-sloping graded-dopant concentration alone is not sufficient to establish the "aid carrier movement" claim limitation. *Supra* Section VI.A.2.

Dr. Banerjee's declaration does not indicate that he calculated the slope of the graded concentration curve in Wieczorek. *See generally* Ex. 1003. Indeed, it would have been impossible for him to make such a calculation, because the dopant gradient Petitioners point to in Figure 2B (and Wieczorek generally) does not have any values from which one could calculate a slope. Ex. 2057, ¶57. The magnitude of the slope is essential to determine the magnitude of the force the dopant gradient places on the carrier and thus the net force. *Supra* Section VI.A.1; Ex. 2057, ¶57.

The Petition does not include any obviousness arguments, or cite Dr. Banerjee for any obviousness rationale/evidence, regarding the "aid carrier movement" of elements [1.6] or [1.7] (and the corresponding "aid carrier movement" limitation of the other challenged independent claim) for Ground II. Pet., 57-63; Ex. 1003, ¶¶147-56. Although the Petition introduces Wolf as a secondary reference in Ground II (Pet., 49-51), it does not rely on Wolf for the "aid carrier movement" limitation. Pet., 57-63; Ex. 1003, ¶¶147-56. Ground IV of the Petition relies on Gupta (Ex. 1014) as a secondary reference, but not regarding the "aid carrier movement" limitation of the independent claims. Pet., 77-83.

Therefore, Petitioners cannot rely on obviousness to save their faulty arguments regarding "aid carrier movement" in the Wieczorek-based grounds. And due to the Petition's deficient arguments regarding that limitation in the independent claims, the Petition is deficient regarding the challenged dependent claims, too.

C. The Petition fails to establish that Kawagoe discloses or suggests the "first active region … with a second doping type opposite in conductivity to the first doping type" limitation. (Elements [1.3]/[21.3]).

For the Kawagoe-based grounds (Grounds I and III), the Petition has not established that Kawagoe discloses or suggests a "first active region … with a second doping type opposite in conductivity to the first doping type" as required by each challenged independent claim (elements [1.3]/[21.3]). Ex. 2057, ¶¶58-60. For elements [1.2]/[21.2] (where antecedent basis for "the first doping type" is found), the Petition mapped "a first doping type" to p-type doping. Pet., 11. For elements [1.3]/[21.2], the Petition states that Kawagoe's regions 4Na and 4Nb "have a second doping type (n-type) opposite in conductivity to the first doping type (p-type) of the substrate." Pet., 18-19. Kawagoe discloses that regions 4Na and 4Nb are doped n-type (Ex. 1007, 8:66-9:3), but the Petition also states that the *channel* of transistor 4N is part of the first active region. Pet., 18 ("Source-drain regions 4Na/4Nb (purple) form part of the claimed first active region, which also includes the channel region…."). And for elements [1.6]/[21.6], which recite "at least a portion of at least one of the first and second active regions having at least one graded dopant concentration…," the Petition pointed to the concentration profile under the *channel*. Pet., 23-26. But the channel of transistor 4N is doped <u>*p-type*</u>, because it is the top portion of a p-well (as shown in Figure 23 of Kawagoe). Pet., 24 (citing Ex. 1007, FIG. 23, which shows channel of transistor 4N at the top of p-well 6p); *see also id.*,

18 ("the channel region (light purple) between source-drain regions 4Na/4Nb"); Ex. 2057, ¶59 (explaining that the channel in a CMOS transistor has the same doping type as the well in which the source and drain are formed). Simply, the channel of NMOS 4N made from the p-well, the p-well, and the p type substrate are all doped p-type. Ex. 2057, ¶59.

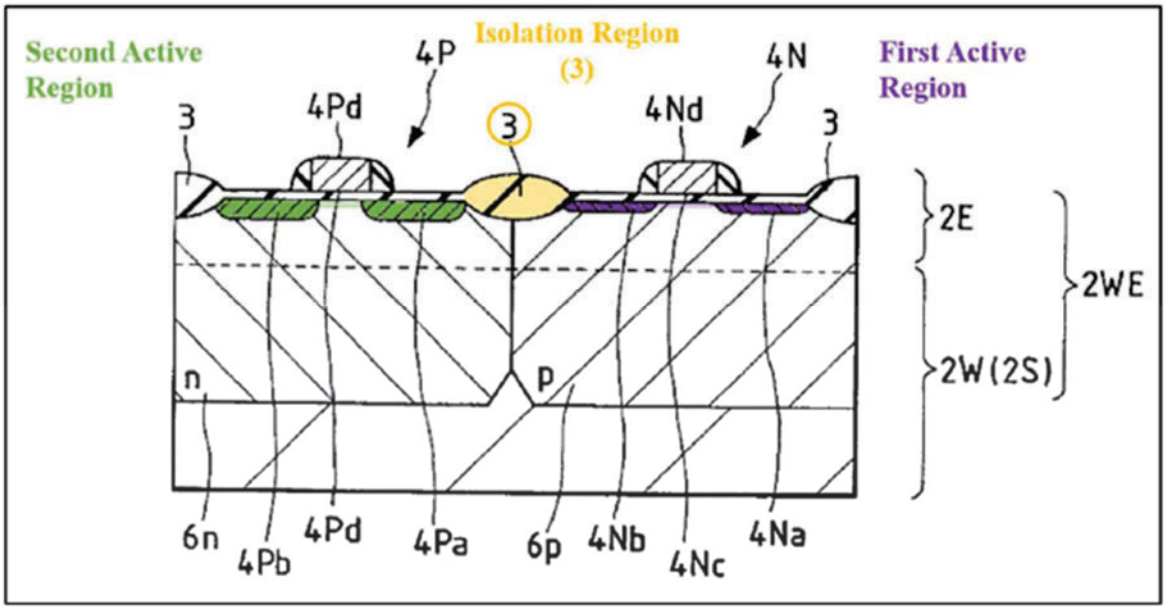
Therefore, under the Petition's mapping in which the source, drain, and channel are all part of Kawagoe's first active region, the Petition has not established that the active region has n-type doping (which is what the Petition would need to establish for elements [1.3]/[21.3], in light of the Petition's analysis for elements [1.2]/[21.2]). Ex. 2057, ¶60.

The above deficiency in the Petition's analysis of the challenged independent claims carries through to the challenged dependent claims. Although Gupta (in Ground III) is introduced as a secondary reference for various claims, the Petition does not rely upon Gupta for the above feature of the challenged independent claims. Pet., 77-83.

D. The Petition fails to establish that Kawagoe alone or in view of Gupta discloses or suggests the "first active region and second active region are each separated by at least one isolation region" (Claims 6 and 27).

The Petition has not established for Ground I and III that Kawagoe alone or in view of Gupta discloses or suggests the feature "the first active region and second active region are each separated by at least one isolation region" as recited in

dependent claims 6 and 27. Ex. 2057, ¶¶61-63. The Petition provides the following annotated Figure 23 of Kawagoe and maps Kawagoe's source/drain 4Na/4Nb and channel of nMOS 4N to the claimed "first active region," and maps Kawagoe's source/drain 4Pa/4Pb and channel of pMOS 4P to the claimed "second active region." Pet., 37-38 ("As shown below, the first (purple/light purple) and second active regions (green/light green) are separated by 'field insulating film 3' (claimed 'isolation region') (yellow).").



Pet., 38 (citing Ex. 1007, FIG. 23). The Petition maps Kawagoe's field insulating film 3 to the claimed "isolation region." *Id.*, 37-38.

But the Petition fails to appreciate that regions 4Na and 4Nb, which "are regions for forming the source-drain regions of the nMOS 4N" (Ex. 1007, 8:66-67), "are made as deep as about 0.5 μm and ***formed in the range of the thickness of the***

epitaxial layer 2E." Ex. 1007, 9:3-6 (emphasis added). Kawagoe provides similar disclosure regarding regions 4Pa and 4Pb. *Id.*, 9:47-53. Thus, a POSITA would have understood that the first and second active regions extend to about the depth of the epitaxial layer 2E and abut each other laterally, and therefore they are not separated by Kawagoe's field insulating film 3, as required by claims 6 and 27. Ex. 2057, ¶63. The field insulating film 3 is formed "[o]ver the principal surface of the epitaxial layer 2E" (Ex. 1007, 8:40-42) and a POSITA would have understood that it does not extend deep enough to separate the two active regions. Ex. 2057, ¶63.

For Ground III, the Petition does not rely on obviousness in view of Gupta for the above claimed feature, and thus the Petition is confined to its defective Kawagoe-based analysis.

VII. OBJECTIVE INDICIA OF NON-OBVIOUSNESS ESTABLISH THAT THE CHALLENGED CLAIMS ARE PATENTABLE.

"Objective evidence of nonobviousness … may often be the most probative and cogent evidence in the record. It may often establish that an invention appearing to have been obvious in light of the prior art was not." *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1349 (Fed. Cir. 2012). During its prior litigation against [redacted] RPX Corp. ("RPX") approached Greenthread about negotiating a license on behalf of [redacted] and other companies. Greenthread and RPX then negotiated a license for [redacted] The license covered only the patent

family at issue here—no other patents. Moreover, Greenthread had never threatened litigation against either [redacted] in any way. *Id.* Rather, both companies first approached Greenthread through RPX.

"[L]icenses with companies under no apparent threat of litigation" are especially probative of non-obviousness. *Transocean*, 699 F.3d at 1353. For example, the Board has previously found claims not unpatentable based on licenses that were not "prompted by a threat of litigation." *Samsung Electronics Co. Ltd*., et al, v. *Neonode Smartphone LLC*, IPR2021-00144, Paper 59 at 51 (PTAB Dec. 15, 2022). Here, both [redacted] are sophisticated semiconductor companies with substantial annual revenue—in excess of $7 billion ([redacted] and $20 billion ([redacted]). Ex. 2073. Both companies also frequently file IPR petitions. *See, e.g.,* [redacted]. In short, both companies know how to evaluate semiconductor technology and challenge patents they believe are invalid. Moreover, the expense for [redacted] to challenge Greenthread's patents would have been trivial. In addition to filing their own IPRs, they could have sought to join

[redacted] then-pending IPRs or filed copy-cat petitions. Yet, without any threat of litigation, both paid for licenses covering just the single patent family at issue here.[5]

Furthermore, the specification of the Challenged Patent, which is common to the Greenthread family, identifies "a novel technique" of creating "a drift field to sweep these unwanted minority carriers from the active circuitry at the surface into the substrate." Ex. 1001, 3:64-4:1. The specification also ties that part of the invention to "important performance enhancements" in semiconductor devices such as "decrease[d] programming time in nonvolatile memory devices" and "[p]ixel and color resolution … enhance[ments] in imaging ICs." *Id.*, 3:42-43, 3:59-61, 4:9-14.

This aspect of Greenthread's invention is part and parcel of Greenthread's licenses, because every patent in the family contains claim language relating to using graded dopants to move carriers "from the active circuitry at the surface" further down into the device. *See, e.g.*, U.S. Pat. Nos. 11,316,014 (Ex. 1001); 11,121,222

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[5] Greenthread later acquired two patents as part of its most recently signed license. Greenthread's earlier licenses provide for a springing license to future-acquired patents to ensure permanent peace between the parties and because it is part of RPX's standard terms. However, at the time of the earlier licenses no party had an expectation that Greenthread would acquire patents outside the Greenthread family. Ex. 2072.

(Ex. 2066); 10,510,842 (Ex. 2064); 10,734,481 (Ex. 2065) ("graded dopant concentration to aid carrier movement from the [first surface or active region]…"); U.S. Pat. Nos. 8,421,195 (Ex. 2062); 9,190,502 (Ex. 2063) ("a graded concentration of dopants… to aid the movement of minority carriers from said surface…).

Moreover, moving carriers "from the active circuitry at the surface" is missing from the prior art. As explained above, Kawagoe does not address carriers near the surface of the device, much less disclose a technique for moving them. *Supra* Section VI. Likewise, Wieczorek, at best, shows a downward sloping gradient, with no information about whether, why, or how such a gradient might be useful. *Supra* Section VI. Petitioners rely entirely on post-hoc expert testimony, a post-priority date reference (Wang), and misreading of the prosecution history to locate that claim limitation in the prior art. Greenthread's licenses discredit Petitioners' argument as hindsight. [redacted] had access to the same prosecution history and employ numerous semiconductor experts, but decided to license Greenthread's invention, without any threats or coercion.

Finally, licenses that are part of litigation settlements can also be probative of non-obviousness. *Fox Factory Inc. v. SRAM LLC*, IPR2017-00472, Paper 64 at 44 (PTAB April 18, 2018). Here, in addition to [redacted], other major semiconductor companies—Intel, [redacted] Micron, and Western Digital, and AMS-OSRAM—have all taken licenses to Greenthread's patents (with no

expectation of receiving licenses to other patents) to settle litigation. Ex. 2072. In total, eight major semiconductor companies have paid more than $50 million—more than $6 million per company on average—for licenses all of which covered *only one patent family*. These agreements confirm that Greenthread's patents have been widely recognized in the industry and valid and valuable.

VIII. THE DECLARATION OF PETITIONERS' EXPERT IS UNRELIABLE.

The declaration of Petitioners' expert Dr. Banerjee (Ex. 1003) is unreliable and should be disregarded for numerous reasons. His declaration does not add anything of value beyond what is already found in the Petition. Additionally, Dr. Banerjee admitted that portions of his declaration include material that was merely provided to him by Petitioners' attorneys—portions that he did not himself verify, such that he does not even know if they are accurate. Shockingly, he even testified that "***I don't know how [judges] could tell***" which portions of his declaration he verified and which ones he didn't verify and instead relied on the attorneys for. Ex. 2058, 125:9-126:1.

Dr. Banerjee's declaration relies on the same grounds as the expert declaration of Dr. Travis Blalock supporting an IPR petition that Intel previously filed against the Challenged Patent. *See* Ex. 2076 (Blalock declaration). And more significantly, the analysis in Dr. Banerjee's declaration matches Dr. Blalock's declaration nearly verbatim. *Compare* Ex. 1003 *with* Ex. 2076. For example, regarding claim elements

[1.6]-[1.7], which recite the "aid carrier movement" feature discussed above in Section VI, Dr. Banerjee's declaration is nearly identical to Dr. Blalock's declaration. *Compare* Ex. 1003, ¶¶87-102 *with* Ex. 2076, ¶¶90-106. Dr. Banerjee stated during his deposition that he was given Dr. Blalock's declaration and that he "didn't see any point in reinventing the wheel." Ex. 2058, 53:13-54:10; *see also id.*, 54:11-17 (when asked if it would surprise him that his analysis matches the analysis of Intel's expert Dr. Blalock almost verbatim, Dr. Banerjee responded "[i]t does not surprise me"), 57:13-58:5 (Q: "[I]f we were to do a line-by-line comparison here, would it surprise you to find substantially identical lines and sentences in paragraphs in Dr. Blalock's declarations and your declarations?" / A: "No, it did not surprise me. …").

It is simply not plausible that Dr. Banerjee reached the exact same conclusions as Dr. Blalock on ***every*** aspect of the latter's analysis regarding the Kawagoe-based and Wieczorek-based grounds. Instead, it is apparent that Petitioners just asked Dr. Banerjee to sign on to Dr. Blalock's existing analysis, and Dr. Banerjee complied. Dr. Banerjee copied Dr. Blalock right down to specific details that would not be expected to be found in both declarations if he had put in any thought whatsoever. For example, both declarations (Dr. Banerjee's and Dr. Blalock's) contain the following:

> I am familiar with the Wolf textbook. An internet search for this textbook title limited to the ".edu" domain yields over 800 results. Thus, it is clearly used as a teaching resource in engineering courses in many, many universities and is widely cited in scientific works.

Ex. 1003, ¶60; Ex. 2076, ¶63.

When confronted at his deposition about the above passage regarding the 800 search results, Dr. Banerjee admitted: "***I did not do that search myself. My lawyers did.***" Ex. 2058, 114:7-12. He also admitted that he did not verify if that portion of his declaration is accurate, (*id.*, 114:14-22) and he does not even know if it is accurate (*id.*, 117:2-8, 122:20-123:5). He further admitted that it would not surprise him to find out there are other portions of his declaration that he did not verify and instead relied on Petitioners' attorneys for. *Id.*, 118:2-15. Dr. Banerjee boldly testified that he stands by all of the opinions in his declaration. *Id.*, 54:19-55:1, 119:6-11. But when asked how he could stand by parts of his declaration that he didn't verify and instead relied on Petitioners' attorneys for, Dr. Banerjee shifted position, saying that he "definitely verified what I regard as substantive matters" and that the portion about 800 search results is a "peripheral issue." *Id.*, 119:16-20; *see also id.*, 125:9-126:1 (admitting "***I don't know how they could tell***" when asked how judges could possibly know which portions of his declaration he verified).

However, it is clear from the above passage that Dr. Blalock (in the Intel IPR) mentioned the 800 search results to support his statement regarding familiarity with the Wolf reference and also his statement regarding Wolf being used as a teaching resource in engineering courses in many universities and widely cited in scientific works—not a "peripheral" issue. Dr. Banerjee even testified, when asked why his declaration includes the sentence about 800 search results, that "[i]t demonstrates that Wolf is a well-respected reference used by many professors"—clearly a substantive issue regarding one of the references in the grounds. *Id.*, 113:19-114:5.

Apparently recognizing his predicament, Dr. Banerjee then testified that the "main basis" for his opinion is something else (his usage of the Wolf reference in graduate courses), which is not found in his declaration but which he said is "kind of implicit in the statement I'm familiar with the Wolf textbook." *Id.*, 120:8-121:20 (conceding that he "do[es] not mention that explicitly"). The Board (and PO cannot reasonably be expected to figure out what is allegedly implicit in Dr. Banerjee's declaration, and should not rely on a declaration whose accuracy is unknown even to the declarant.

IX. THE PETITION IS UNTIMELY UNDER 35 U.S.C. § 315(B).

A. Background

1. Prior Litigation Involving the Challenged Patents

a. [redacted] Litigation

On April 30, 2019, Greenthread filed a complaint against [redacted] in the Eastern District of Texas alleging infringement of the Challenged Patent and other patents not at issue in the Petition. On July 8, 2020, Greenthread and [redacted] settled the litigation and Greenthread granted a license to [redacted] as described below.

b. Intel-[redacted]-[redacted] Litigation

On February 1, 2022, Greenthread served Intel and [redacted] with a complaint filed in the Western District of Texas alleging infringement all of the Challenged Patents, except the ’014 patent. Ex. 2001 (Complaint), 1-4; Ex. 2039 (Returned Summons). After the ’014 patent issued, Greenthread filed a First Amended Complaint against [redacted] and Intel which it served via ECF on April 29, 2022. Ex. 2003. The cases against Intel and [redacted] were severed and the case against Intel was transferred to the District of Oregon. Ex. 2004, 22. The [redacted] litigation remained in Texas and continued in parallel with the Intel litigation.

[redacted] was a real-party-in-interest to the [redacted] litigation. Greenthread’s allegations in the First Amended Complaint against [redacted] (i.e. the April 29 complaint)

were based on, among other things, Sony components in [redacted] products. Ex. 2003, ¶¶18, 60, 76-81; Ex. 2005, 8 ("[redacted] Accused Products"), 18-20 (section entitled "[redacted] Accused Products"); Ex. 2006, 1-34. After Greenthread served the April 29 complaint accusing [redacted] products, additional counsel stepped in to represent [redacted] with respect to [redacted] products. Ex. 2007. [redacted] then filed its own IPRs against the Challenged Patents that had been asserted against [redacted] products. Ex. 2008 (IPR2023-00376, Petition), Ex. 2040 (IPR2023-00324, Petition), Ex. 2041 (IPR2023-00325, Petition), Ex. 2042 (IPR2023-00375, Petition). The [redacted] petitions named [redacted] as a real-party-in-interest. *E.g.*, Ex. 2008, 7; Ex. 2040, 7; Ex. 2041, 7; Ex. 2042, 8. Afterwards, Greenthread added [redacted] as a party to the [redacted] litigation. Ex. 2009. After [redacted] was added to the case, [redacted] counsel for [redacted] products appeared in the case for [redacted] Ex. 2010. [redacted] other counsel did not represent [redacted] Greenthread and Intel, [redacted] and [redacted] settled their disputes and Greenthread granted Sony and Intel licenses as described below.

c. Greenthread Licenses to [redacted] Intel, and [redacted]

As part of the settlements, Greenthread granted [redacted] Intel, and [redacted] releases for past infringement and a license to Greenthread's patents, by way of sublicense through RPX Corporation ("RPX") ("Licenses"). Ex. 2022, 2. Greenthread licensed [redacted] (and two other companies) in one agreement signed July 8, 2020. Ex. 2034. Greenthread signed the second agreement, licensing and

Intel and [redacted] on April 7, 2023. Ex. 2022. The two agreements are similar in all relevant respects. In a parallel IPR, RPX submitted an affidavit stating: "By operation of their membership agreements with RPX, Intel and [redacted] acquired the full scope of sublicensable rights Greenthread granted to RPX at the time the RPX-Greenthread Agreement was executed." Ex. 2028.

The Licenses grant Licensees (i.e. [redacted] Intel, and [redacted] via RPX) the right "to make, have made, use, have used, sell, … offer for sale, have offered for sale, have sold, … import, have imported, own, order, … purchase, … obtain, keep, acquire, receive, … and otherwise exploit or dispose of any Licensed Product and Service." Ex. 2022, 3 (definition of "Patent License"); Ex. 2034, 3 (definition of "Patent License"); see also Ex. 2028.

The Licenses define "Licensed Product and Service" to include "any product … made, have made, used, purchased, provided, hosted, sold, leased, licensed, distributed, transmitted, exported, imported or offered for sale, lease, or import or otherwise exploited or disposed of by or on behalf of" Licensees. Ex. 2022, 2; Ex. 2034, 2.

The Licenses cover all of Greenthread's patents, including the Challenged Patent. *See* Ex. 2022, 3-4 ("'Patents' shall mean ….") and 17 (listing patents); see also Ex. 2034, 3 ("'Patents' shall mean ….") and 15 (listing patents).

Accordingly, "any product" Licensees "have made" by Petitioners or "purchase" from Petitioners is a "Licensed Product or Service" which Licensees have the right to "use, … sell, … obtain, … acquire, … receive, … and otherwise exploit." Ex. 2022, 2-3; *see also* Ex. 2034, 2-3.

2. Petitioners' Relationship with PO's Licensees and the Co-Pending District Court Proceedings

PO is currently involved in district court litigation against CL and OV. Each of the district court actions was filed before any of these petitions was filed.

a. Cirrus Logic

i. Litigation against Cirrus Logic

On March 31, Greenthread filed a complaint in the U.S. District Court for the Western District of Texas alleging that CL infringes each of the Challenged Patents. Greenthread's preliminary infringement contentions identified, among other products, CL's CS35L41, CS40L25 and CS42L42. Ex. 2018, 4.

ii. Accused CL product sales overlap with prior litigation.

[redacted] and [redacted] are major CL customers. A CL investor presentation lists [redacted] and [redacted] as among its "Tier One Customers." Ex. 2013, 5.

In 2022, [redacted] published a list of its suppliers, confirming that Cirrus Logic "agreed to be disclosed" as a supplier. Ex. 2045, 1.

Cirrus Logic chips, including those currently accused, are incorporated into numerous [redacted] products, including products accused in the [redacted] litigation. For

example, CS35L41 and CS40L25 are both currently accused, Ex. 2018 at 4, and both are components of the [redacted], which was accused in the [redacted] litigation. *Compare* Ex. 2021, 17-18 *with* Ex. 2035 at 2, 10, 63, 64 *with* Ex. 2018 at 4. Additionally, Greenthread has moved to amend its infringement contentions to include all Cirrus Logic products made with a particular Global Foundries process. Ex. 2077, 1. Accordingly, additional products will be added.

iii. Cirrus Logic works closely with and indemnifies Licensees.

CL says that its "engineers work closely with" product teams at electronics manufacturers to make "custom" products. Ex. 2025. CL's standard sales agreements include indemnification of its customer. Ex. 2026, 1, 4-5. CL admits that it indemnifies Licensees, but claims that the indemnification arrangement is not "straightforward." Paper 11, 8.

iv. Cirrus Logic admits to being a sub-licensee under the Licenses.

After CL received the [redacted] license, CL has insisted that some of its products are licensed, because they are manufactured by one of the other companies licensed in that agreement. CL says it "intend[s] to continue treating the product as a licensed product." Ex. 2037, 1.

b. OmniVision

i. Litigation against OmniVision

On May 10, 2023, Greenthread filed a complaint in the U.S. District Court for the Eastern District of Texas alleging that OmniVision infringes the Challenged Patents. Ex. 2027. On July 6, 2023, Greenthread served its infringement contentions identifying, among other OmniVision products, the OV9282 and OV7261 image sensors. Ex. 2029, 6, 8.

ii. Accused OV Product sales overlap with prior litigation.

OmniVision sells the accused OV9282 to Intel who incorporates it into its RealSense D400 series stereo vision depth camera system. Ex. 2015, 34.

Table 3-13. Wide Left and Right Imager Properties

Parameter	Camera Sensor Properties
Image Sensor	OmniVision OV9282
Active Pixels	1280 X 800
Sensor Aspect Ratio	8:5

Intel Realsense Datasheet (Ex. 2015 at 34)

iii. OV claims the benefit of the Licenses.

In response to one of Greenthread's interrogatories, OV said it intends to assert a license or exhaustion defense based on sales to [redacted] and/or Intel. Ex. 2043, 6-7. When Greenthread asked OV which products were licensed, OV responded: "Greenthread is in the best position to address its own license agreements and

whether OmniVision is a beneficiary in some manner. Please let us know which OmniVision products Greenthread believes are already licensed." Ex. 2044, 1.

c. Global Foundries creates custom products for Licensees and Indemnifies them.

Global Foundries investor materials state that it manufactures products under contract for all three Licensees. Ex. 2014, 19.

Additionally, Global Foundries' investor disclosures state that its primary business is manufacturing to specifications provided by its customers. GF describes itself as a "pure-play foundry" which is "focuse[d] on producing ICs for other companies, rather than those of its own design." Ex. 2033 at 12, 35.

GF "defend[s]" its customers against "intellectual property infringement claims and indemnify[ies] them for damages." Ex. 2033, 24.

3. These Proceedings

On October 11, 2023, Petitioners filed the first petition in these proceedings, IPR2024-00016; IPR2024-00001 followed on October 12 and IPR2024-00017 followed on October 18. On October 20, 2023 Greenthread notified Petitioners that the Petitions are time barred by virtue of Petitioners' contracts with Licensees. Ex. 2011, 1. Greenthread's email included much of the evidence of Petitioners relationships with Licensees discussed above and pointed Petitioners to the Licenses,

which they had already received in discovery.[6] Greenthread requested that Petitioners withdraw their petitions or at a minimum provide discovery into whether the petitions are time barred.

On October 24, 2023, Petitioners responded that they "have demonstrated that the petitions are not time barred" and that they "object to" Greenthread's request for discovery. Ex. 2016, 1.

On October 27, Petitioners filed four more petitions, IPR2024-00018, IPR2024-00019, IPR2024-00020, and IPR2024-00021. In spite of the parties' correspondence, these petitions included the identical assertion that "Petitioner [sic] is not barred or estopped from requesting IPR of the Challenged Claims" unsupported by any argument or evidence whatsoever. IPR2024-00018, Paper 1 (Petition), 4; IPR2024-00019, Paper 1 (Petition), 4; IPR2024-00020, Paper 1 (Petition), 4; IPR2024-00021, Paper 1 (Petition), 4. The same day, Greenthread

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[6] Petitioners were aware of the Licenses before filing any of the Petitions. On May 2, 2023 Greenthread's counsel offered to produce the Licenses to CL. Ex. 2050, 1. CL responded that it had no significant liability and was not interested. Greenthread nevertheless served CL with copies of the Licenses on October 5, 2023. Ex. 2046. Greenthread served OV with copies of the Licenses on June 30, 2023. Ex. 2047.

informed Petitioners that its objections to the first three IPRs applied equally to the additional four. Ex. 2038, 3-4.

B. The Petition should be dismissed under 35 U.S.C. § 315(b).

1. Control of prior litigation is not required to establish privity.

Section 315(b) provides that "[a]n inter partes review may not be instituted if the petition requesting the proceeding is filed more than 1 year after the date on which the petitioner, real party in interest, or privy of the petitioner is served with a complaint alleging infringement of the patent." 35 U.S.C. § 315(b).

Whether two parties are privies with respect to one another is evaluated under the "common law" framework set forth in *Taylor v. Sturgell*, 553 U.S. 880 (2008). *WesternGeco LLC v. ION Geophysical Corp.*, 889 F.3d 1308, 1317 (Fed. Cir. 2018); *see also* Office Trial Practice Guide at 13 (citing *Taylor*). Control of the prior litigation is *sufficient* to establish privity between the parties. *See, e.g.*, *WesternGeco LLC v. ION Geophysical Corp.*, 889 F.3d 1308, 1319 (Fed. Cir. 2018). But control or even awareness of the prior litigation are <u>*not necessary*</u> to establish privity. Rather, *Taylor* identifies a "pre-existing 'substantive legal relationship'" as <u>*one*</u> reason to find privity and litigation via "proxy" or "control over the [prior] litigation" as <u>*different*</u> reasons to find privity. 553 U.S. at 894-95 (cleaned up). Preclusion based on a pre-existing substantive legal relationship is justified by the "needs of property law," *not* because a precluded party was adequately represented in prior

litigation, controlled prior litigation, or served as a proxy. *Id.* "Preclusion is extended or denied in an effort to protect conflicting property interests *rather than an effort to implement concepts of participation or representation.*" *Wright & Miller* (3d ed.) § 4448 Persons Affected by Preclusion (emphasis added).

The Board also has distinguished between privity based on a proxy relationship and privity based on pre-existing substantive legal relationship. For example, in the *Worlds* remand decision, the Board rejected the argument that the petitioner was not in privity when it "was not placed on notice of the infringement" previously and could not "control the [prior] District Court litigation." *Bungie Inc. v. Worlds Inc.*, IPR2015-01264, Paper 64 at 38, 44 (PTAB Jan. 14, 2020).

Therefore, *Taylor* and the Board have identified "a variety of pre-existing 'substantive legal relationship[s]' between" two parties that can create privity, even in the absence of control over the prior litigation. *Taylor*, 553 U.S. at 894 (alterations in original). For example, customer-supplier relationships can and frequently do create privity. *See, e.g.*, *Ventex Co., Ltd. v. Columbia Sportswear N. Am., Inc.*, IPR2017-00789, Paper 148 at 14, (PTAB Jan. 24, 2019) (precedential); *Volkswagen Grp. of Am. Inc. v. Argina Tech. Ltd.*, IPR2021-01263, Paper 16 (PTAB Jan. 21, 2022); *Ericsson Inc. v. Regents of Univ. of Minn.*, IPR2017-01197, Paper 56 at 8, 10 (PTAB Sept. 18, 2020). "[A]n indemnity relationship is [also] the type of relationship that can establish privity," particularly when the indemnity obligations

"directly relate to the" accused products. *Ericsson Inc. v. Regents of Univ. of Minnesota*, IPR2017-01197, Paper 56 at 8, 10 (PTAB Sept. 18, 2020). A finding of privity is also appropriate when two parties are "preceding and succeeding owners of property" and when one party acts as the "agent" for the other. *Taylor*, 553 U.S. 894-95.

2. Petitioners bears the burden to show that their petition is timely—i.e. they are not in privity with a time-barred party.

"[T]he IPR petitioner bears the burden of persuasion to demonstrate that its petitions are not time-barred" under § 315(b). *Samsung Electronics Co. Ltd. v. Netlist, Inc.*, IPR2022-00615, Paper 40 at 2 (PTAB Feb. 3, 2023) (quoting *Worlds Inc. v. Bungie, Inc.*, 903 F.3d 1237, 1242 (Fed. Cir. 2018)). There is no "rebuttable presumption that formally shifts a burden of production to the patent owner" or a presumption that a petition is timely because a petitioner asserts that it is. *Worlds*, 903 F.3d at 1242. Throughout the proceeding, the "burden remains with the petitioner to establish" that its petition is timely. *Id.* at 1242.

[redacted] Intel, and [redacted] were served with a complaint alleging infringement of the Challenged Patent more than one year prior to the filing of the Petition. Ex. 2001, 2, 4; Ex. 2018; Ex. 2009. [redacted] was an RPI to the First Amended Complaint against [redacted] (served by ECF on April 29, 2022). Ex. 2032; Ex. 2017, 7. Thus, the Petition is untimely if Petitioners are in privity with [redacted] Intel, or [redacted] Greenthread has disputed the timeliness of the Petition with evidence showing that

Petitioners are in privity with Licensees. Petitioners have offered no evidence whatsoever. Accordingly, the Petition should be dismissed.

3. The Petitions should be dismissed, because Petitioners have not attempted to carry their burden.

a. PO has satisfied its "practical" burden under *Worlds*.

There can be no serious dispute that PO here has met its initial "practical" burden under Worlds. *Worlds*, 903 F.3d at 1243-44. First, it is well-established that customer-supplier relationships can create privity and there is no dispute that Petitioners and the Licensees have such a relationship. *See supra* Section IX.A.2; Ex. 2035 at 2, 10, 63, 64; Ex. 2030, 1; Ex. 2015, 34. Some of the products Petitioners supply, such as those GF manufactures, are custom made for Licensees. Ex. 2014, 19. CL "collaborates" with Intel and makes "custom" products for its customers. Ex. 2020, 1. A number of these products were at issue in the litigation with Licensees, including the Cirrus Logic CS35L41 and CS40L25 (*compare* Ex. 2021, 17-18 *with* Ex. 2035 at 2, 10, 63, 64 *with* Ex. 2018 at 4), and the OmniVision OV9282 (*compare* Ex. 2015, 34 *with* Ex. 2029, 8). Petitioners do not dispute, and even acknowledge, that sales of accused products to Licensees are licensed. Ex. 2037, 1; Ex. 2044, 1. Ex. 2038, 6. Finally, Petitioners owe indemnity obligations to Licensees for these products. Ex. 2026, 1, 4-5; Ex. 2033, 24.

b. Petitioners have done nothing to satisfy their burden under Section 315(b).

"Failure to prove [a] matter … means that the party with the burden of persuasion loses on that point—thus, if the fact trier of the issue is left uncertain, the party with the burden loses." *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378–79 (Fed. Cir. 2015). Here, Petitioners "lose[]," because (1) they have the burden to show that the Petitions are timely and (2) Petitioners deliberately chose to ignore the issue, even after PO expressly identified it to them. *Id.* In short, Petitioners have not even attempted to meet their burden.

The instant Petition, like all seven of the Petitions, simply asserts, without support or explanation, that "Petitioner [sic] is not barred or estopped from requesting IPR of the Challenged Claims on the grounds identified in this Petition." Pet., 5. That is inadequate. Meeting their burden requires Petitioners to put into the record evidence about its relationships.

The privity inquiry is a "highly fact-dependent question," "handled by the Office on a case-by-case basis.'" *Ventex Co., Ltd. v. Columbia Sportswear N. Am., Inc.*, IPR2017-00651, Paper 148 at 6 (PTAB Jan. 24, 2019) (precedential). Therefore, in virtually every case where the Board has found that a petitioner met its burden, the Board examined the actual agreements and correspondence between the alleged privies. *See, e.g.*, *WesternGeco LLC v. ION Geophysical Corp.*, 889 F.3d 1308, 1321 (Fed. Cir. 2018) ("the Board reviewed the purchase agreements");

Samsung Electronics Co. Ltd. v. Netlist Inc., IPR2022-00615, Paper 64 at 14-15 (PTAB Jun. 30, 2023) (examining "indemnification correspondence" and contracts); *Assa Abloy AB v. CPC Patent Tech. Pty., Ltd.*, IPR2022-01093, Paper 20 at 18 (PTAB Feb. 2, 2023) (citing an "88-page agreement"). When the documents are *not* in the record the Board has consistently said that the absence of evidence "cuts against" the *petitioner*, not the patent owner. *Ventex Co., Ltd. v. Columbia Sportswear N. Am., Inc.*, IPR2017-00789, Paper 148 at 14 (PTAB Jan. 24, 2019) (precedential).[7] Moreover, to the extent that control of the prior litigation is relevant, "the lack of evidence" regarding control should count against Petitioner, not Greenthread. *Bungie Inc. v. Worlds Inc.*, IPR2015-01264, Paper 64 at 35 (PTAB Jan. 14, 2020). Mere "attorney argument that itself fail[s] to cite evidence" cannot meet Petitioners' burden. *Worlds*, 903 F.3d at 1246. With no evidence to support the

[7] The only exception of which Greenthread is aware are decisions involving Greenthread. *E.g.*, *Semiconductor Components Indus., LLC v. Greenthread, LLC*, IPR2023-01242, Paper 31 (PTAB Feb. 5, 2024). *See also* IPR2023-01243, Paper 30 (PTAB Feb. 5, 2024); IPR2023-01244, Paper 31 (PTAB Feb. 5, 2024). Greenthread respectfully urges the panel decide this case in accordance with the Board's other post-*Worlds* precedents.

timeliness of the Petitions, Petitioners "lose[]." *Dynamic Drinkware*, 800 F.3d at 1379.

Indeed, not only do Petitioners lose in the absence of any evidence, the "lack of evidence" that would presumably be in Petitioners' possession, such as their contracts with Licensees, affirmatively "cuts against the party bearing the burden of proof on these issues." *Ventex Co., Ltd. v. Columbia Sportswear N. Am., Inc.*, IPR2017-00789, Paper 148 at 14, 2019 WL 858745, at *6 (PTAB Jan. 24, 2019) (precedential).

c. Petitioners cannot show timeliness by asserting that they have "standard" relationships.

Petitioners claim that they are not in privity with Licensees' because they "have standard, arms-length relationships with their customers." Paper 11, 7. That is incorrect. There is no "standard" relationship that evades privity. Privity "is a 'highly fact-dependent question.'" *Apps. in Internet Time, LLC v. RPX Corp.*, IPR2015-01750, Paper 128 at 7 (PTAB Oct. 2, 2020) ("*AIT*") (precedential).

Customer-supplier relationships can and frequently do create privity. *See, e.g., Ventex Co., Ltd. v. Columbia Sportswear N. Am., Inc.*, IPR2017-00789, Paper 148 at 14, (PTAB Jan. 24, 2019) (precedential); *Volkswagen Grp. of Am. Inc. v. Argina Tech. Ltd.*, IPR2021-01263 Paper 16 (PTAB Jan. 21, 2022); *Ericsson Inc. v. Regents of Univ. of Minn.*, IPR2017-01197, Paper 56 at 8, 10 (PTAB Sept. 18, 2020).

Here, Petitioners admit they have customer-supplier relationships with time-barred parties, but have introduced no evidence regarding the nature of those relationships. A petitioner's failure to produce pertinent documents regarding its customer-supplier relationships precludes institution. *Volkswagen*, IPR2021-01263, Paper 16 at 10 n.4. *Ventex,* IPR2017-00789, Paper 148 at 14. Petitioners cannot prevail on a "fact-dependent question" when they offer no evidence to support a finding of facts. *AIT*, IPR2015-01750, Paper 128 at 7.

Further, Petitioners do not dispute "an indemnity relationship is the type of relationship that can establish privity" or that they have such indemnity obligations. *Ericsson*, IPR2017-01197, Paper 56 at 8, 10 (PTAB Sept. 18, 2020). CL just claims that its indemnity obligations are not "straightforward." Paper 11, 8. GF admits indemnifying its customers and does not dispute that its obligations are "straightforward." Ex. 2033, 24. OV does not deny owing indemnity to Licensees and offers no explanation of why its indemnity obligations to Licensees would not be dispositive here. Since Petitioners bear the burden of persuasion, their failure to produce the contracts is dispositive.[8]

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[8] The fact that Greenthread did not raise a *res judicata* defense in district court in response to invalidity counterclaims is irrelevant. When a patent owner and the same alleged infringer are involved in successive litigation regarding the same

4. The Petition should be dismissed, because evidence of record shows that the Petition is time-barred.

The Board need not evaluate whether PO's evidence suffices to show that the Petition are time-barred, because Petitioners bear the burden of proof on that issue and have not even attempted to meet their burden. If the Board chooses to look at the evidence of record, however, it is clear that the Petitions are time-barred.

Whether two parties are privies with respect to one another is evaluated under the "common law" framework set forth in *Taylor v. Sturgell*, 553 U.S. 880 (2008). *WesternGeco LLC v. ION Geophysical Corp.*, 889 F.3d 1308, 1317 (Fed. Cir. 2018); *see also* Office Trial Practice Guide at 13 (citing *Taylor*). *Taylor* identifies "a variety of pre-existing 'substantive legal relationship[s]' between" two parties that can

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patent, the alleged infringer may re-assert an invalidity defense if the accused products in the second litigation are materially different than those in the first litigation. *Hallco Mfg. Co. v. Foster*, 256 F.3d 1290, 1297 (Fed. Cir. 2001). Here, Greenthread is alleging infringement based on some products that were at issue in the prior litigation, but also other products that are materially different. Therefore, even if Greenthread were litigating against Intel or [redacted] themselves, those parties would be able to re-assert their invalidity defenses, because the products in the litigations are different.

create privity. *Taylor*, 553 U.S. at 894 (alterations in original). Among them are when two parties are "preceding and succeeding owners of property" and when one party acts as the "agent" for the other. *Id.* at 894-95. Here, Petitioners are in privity with Licensees. Since Licensees are time-barred, Petitioners are likewise time-barred.

a. Petitioners act as Licensees' "agent" for Licensees' "have made" rights.

Petitioners are in privity with Licensees, because, by virtue of their contracts with Licensees, they exercise Licensees' rights under the Licenses and are thus Licensees' agents.

"[A]gents and principals are in privity for res judicata purposes 'if the prior action concerned a matter within the agency.'" *Herrion v. Children's Hosp. Nat. Med. Ctr.*, 448 F. App'x 71, 73 (D.C. Cir. 2011). The D.C. Circuit is "hardly alone in this approach to privity between principals and their agents." *Herrion v. Children's Hosp. Nat. Med. Ctr.*, 786 F. Supp. 2d 359, 371 n.9 (D.D.C.), *aff'd*, 448 F. App'x 71 (D.C. Cir. 2011). Courts around the country have held similarly and the leading treatise on Federal procedure agrees. *Id.* (citing cases from the Supreme Court and eight Circuits); Wright & Miller § 4460 (3d ed.).

For example, in *John St. Leasehold, LLC v. Cap. Mgmt. Res., L.P.*, 283 F.3d 73, 75 (2d Cir. 2002), the FDIC contracted with asset managers to exercise its rights as receiver for a failed bank. The Second Circuit held that the asset managers were

the FDIC's agents, acting within "the scope of their agency," and thus "in privity with the" FDIC. *Id.* at 75.

Likewise in *Fiumara v. Fireman's Fund Ins. Companies*, 746 F.2d 87, 87 (1st Cir. 1984), a motel operator sued his fire insurer for denying his claim. The motel operator lost and then sued the contractors the insurer used to investigate his claim. *Id.* The First Circuit affirmed summary judgment for the contractors, holding that the contractors were "acting as agents of the" insurer and therefore "clearly qualify as persons in privity." *Id.* at 92.

Finally, *In re Google LLC*, 949 F.3d 1338, 1346 (Fed. Cir. 2020) the Federal Circuit said that contracts between Google and an internet service provider to "[a]ssembl[e] equipment based on information and instructions provided by" Google were "suggestive of an agency relationship."[9]

Here, Petitioners are in the same position as the (1) contract asset managers in *John St. Leasehold* acting on behalf of the FDIC and (2) the contract investigators acting on behalf of the insurance company in *Fiumara*, because Petitioners are likewise exercising the contractual rights of another party as its agent. The specific contractual rights are different—controlling the operation of a failed bank,

[9] The contractors were not "conducting Google's business within the meaning of the [venue] statute," but that is irrelevant for purposes of agency. *Id.* at 1346.

investigating a fire, and making licensed products—but privity does not turn on the nature or scope of the agency. Here, Licensees could exercise their license rights by making the accused products themselves, but choose to "have [the accused products] made" by Petitioners instead, just as the FDIC or insurer could have exercised their rights directly, but chose to employ an agent. For privity, what matters is not the scope or nature of the agency, but whether "the prior action concerned a matter within the agency." *Herrion*, 448 F. App'x at 73. Here, the manufacture of licensed or accused goods is obviously relevant to these proceedings.

Furthermore, as in *Google*, Petitioners "[a]ssembl[e] equipment"—or manufacture accused products—at Petitioners' instruction. For example, when GF "produc[es] ICs for other companies, rather than those of its own design," or when CL makes "custom" products, their actions are legally indistinguishable from the contractors in Google assembling equipment at Google's direction. Ex. 2033 at 12, 35. Therefore, Petitioners are Licensees' agent and is in privity with Licensees. *Herrion*, 448 F. App'x at 73.

Finally, to be in privity with Licensees, Petitioners do not need to be Licensees' agent for these proceedings or the prior proceedings. What matters is whether Petitioners are agents with respect to the facts giving rise to the parties' dispute. In all the examples cited above—*Herrion*, *St. John's Leasehold*, *Fiumara*, and *Google*—the party held to be in privity was an agent with respects to the fact

underlying the dispute, not the prior litigation. Nothing in those cases indicates that the party in privity was an agent with respect to the prior litigation.

Moreover, the Board has rejected the argument that § 315(b) "should not apply if a petitioner was not placed on notice of the [prior] infringement allegation" or if the petitioner lacked "the opportunity to participate in and control the District Court litigation." *Bungie*, IPR2015-01264, Paper 64 at 44. To the extent that control is relevant, it is Petitioners' burden to show that they did not control the prior litigation.

b. Petitioners and Licensees are "preceding and succeeding owners of property" and parties to sales of accused goods.

It is undisputed that Petitioners on the one hand and Licensees on the other are "preceding and succeeding owners of" the licensed and/or infringing products, because Petitioners products are indisputably components of Licensees' products.[10] *Taylor*, 553 U.S. at 894.

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[10] Petitioners apparently sell at least some of these accused models to parties other than licensees, such as Digikey and Mouser Electronics. Exs. 2051-2055. These sales and sales of other accused products are the subject of the current district court litigation.

Petitioners also do not dispute that several of these Licensee products were accused in the prior litigation, including [redacted]. GF has not identified what products it makes for Licensees, but GF products, such as accused Intel or [redacted] chips, may actually be Licensees' products, not just components.[11]

Under the AIA, privity "extend[s] to parties to transactions and other activities relating to the property in question," i.e., infringing goods. *WesternGeco LLC v. ION Geophysical Corp.*, 889 F.3d 1308, 1318 (Fed. Cir. 2018). Here, the "transactions … in question" are the sales Petitioners make to Licensees and "the property in question" is the goods conveyed in those sales. *Id.* Each sale of accused products to Licensees is a "transaction" regarding a piece of "property" which puts Petitioners and Licensees in privity. *WesternGeco*, 889 F.3d at 1318.

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[11] Even if none of the products currently accused by model number were sold to Licensees, Greenthread has moved to amend its infringement contentions against Cirrus Logic and add GlobalFoundries as a party to the case. "'It is expected that during [] discovery, infringement contentions may be clarified or refined' based upon information produced during discovery." *Arigna Tech. Ltd. v. Volkswagen AG*, No. 2:21-cv-00054, 2022 WL 2761288, at *2 (E.D. Tex. Jan. 19, 2022)).

In their opposition to Greenthread's discovery motion, CL and OV tried to distance themselves from Licensees, by claiming to sell to Licensees through "distributors." Paper 11, 8, 9. This argument fails.

First, GF does not claim to sell through distributors. It makes products for Licensees, according to Licensees' specifications. Ex. 2033 at 12, 35.

Second, CL and OV do not dispute that their products are components in Licensee products, including products accused in the prior litigation. If CL and OV believe that there is some relevance to their use of distributors, they must provide evidence showing how their products are sold and their contracts with Licensees and/or "distributors."

Third, even if CL's and OV's claims were supported by evidence, selling through distributors does not change the fact that CL and OV have direct relationships with Licensees and make the products for Licensees. CL says that its "engineers work closely with" product teams at electronics manufacturers to make "custom" products. Ex. 2025; Ex. 2020, 1. Additionally, CL acknowledges that it owes indemnity to Licensees. CL just asserts that its obligation is not "straightforward." Paper 11, 8.

Finally, how CL's and OV's products end up in Licensee's products is irrelevant. CL and OV are still preceding owners of property that was previously accused and is accused again, even if the property flows through another party.

i. Petitioners and RPI are beneficiaries of Licensees' "agreement[] directly related" to the accused products.

"[A]greements directly related to the product accused of infringing the patent at issue in this proceeding" satisfy Taylor's "pre-existing substantive legal relationship" test. *Ventex Co. v. Columbia Sportswear North America, Inc.*, IPR2017-00651, Paper 148 (PTAB Jan. 24, 2019) (precedential)). Here, Petitioners operate under and are beneficiaries of Licensees' agreements with PO. That agreement is "directly related to" the accused products. *Id.*

Under the Licenses, "any product" Licensees "have made" by Petitioners or "purchase" from Petitioners is a "Licensed Product or Service" which Licensees have the right to "use, … sell, … obtain, … acquire, … receive, … and otherwise exploit." Ex. 2022, 2-3; Ex. 2034, 2-3. Furthermore, the license grants a limited sublicense to Licensees' "have-made vendors" (for the limited purposes of making products for Licensees). Ex. 2022, 5; Ex. 2034, 5. Petitioners are such vendors and therefore are (limited) sublicensees of Licensees under the Licenses. Even if that were not the case, "have-made vendors" are entitled to a limited implied license. *See LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51, 73 (Fed. Cir. 2012).

c. Petitioners' indemnity obligations to Licensees support a finding of privity.

"[A]n indemnity relationship is the type of relationship that can establish privity," particularly when the indemnity obligations "directly relate to the" accused

products. *Ericsson*, IPR2017-01197, Paper 56 at 8, 10. Here, CL does not dispute that it indemnifies Licensees, but instead claims that its indemnity obligation is not "straightforward." Paper 12, 8. CL does not say what is not "straightforward" about its indemnity obligations and does not deny that they apply to accused products. If CL believes that its indemnity obligations do not create privity, it must explain why and produce the relevant documents

GF also admits that it indemnifies its customers. GF does not characterize its obligations in any way which would negate a finding of privity. Ex. 2033, 24. To the contrary, it says that in the past these indemnity obligations have been significant costs to the company. *Id.*

5. Due Process and the policy underlying the AIA support dismissing the Petition.

a. Petitioners are trying to take inconsistent positions before the Board and in district court.

"[T]o protect the integrity of the judicial process," "courts have uniformly … prohibit[ed] parties deliberately changing [litigation] positions according to the exigencies of the moment." *New Hampshire v. Maine*, 532 U.S. 742, 750 (2001). That is what Petitioners are attempting here. Right now, Petitioners want to claim that it is a stranger to Licensees' agreement, and therefore not in privity with them. But, Petitioners refuse to produce any evidence to support that conclusion or to say whether it will later claim the benefit of the agreement to reduce the likely damages

against it in district court. Petitioners are "playing fast and loose" with the Board and the district court. *Id.* [12]

b. Petitioners' other interests are irrelevant.

"Congress 'chose language that bars petitions where proxies or privies would *benefit* from an instituted IPR, even where the petitioning party might separately have its own interest in initiating an IPR.'" *Power Integrations, Inc. v. Semiconductor Comps. Indus., LLC*, 926 F.3d 1306, 1316 (Fed. Cir. 2019) (emphasis in original); *RPX Corp. v. Applications in Internet Time LLC*, IPR2015-01750, Paper 128 at 10 (PTAB Oct. 2, 2020) (precedential) (same). Therefore, the fact that Petitioners benefits from a license that does not cover *all* of Petitioners' sales is irrelevant. Petitioners *still benefit* from the license (and exercise Licensees' "have

[12] PO is not suggesting Petitioners could make their Petition timely by disclaiming a license defense in district court. Whether or not Petitioners actually asserts its license defense, they still have been acting under the license and reaping benefits from it, such as not owing any indemnity to Licensees. *Supra* § IX.A.2. Petitioners also have been selling goods subject to exhaustion, thereby limiting PO's rights, whether or not Petitioners disclaim any license. *Supra* § IX.B.1. Petitioners cannot turn privity on and off at will. Petitioners' apparent strategy is unfair and the Board should not condone it.

made" rights). Therefore, Petitioners is in privity with Licensees. Petitioners will have the opportunity to challenge the validity of the Challenged Patent in district court. The only question before the Board is whether Petitioners can avail themselves of *additional* challenges here. The answer Congress provided in § 315(b) is "no."

c. A finding in Petitioners' favor here would violate due process.

A finding in favor of Petitioners on § 315(b) would violate Greenthread's constitutional right to due process. First, "[i]n almost every setting where important decisions turn on questions of fact, due process requires an opportunity to confront and cross-examine adverse witnesses." *Goldberg v. Kelly*, 397 U.S. 254, 269 (1970). Here, Petitioners made various "factual assertions" in its preliminary reply to support institution, which the Board apparently relied on, such as Petitioners' assertion that they have merely "a standard supplier-customer relationship" with Licensees. *E.g.*, Paper 18 at 11; Paper 11 at 7 (asserting without evidence that "Petitioners have standard, arms-length relationships with their customers"); *id.* 5 (offering to provide a declaration that was never provided). But there is no evidence to support this conclusion in the record, just the statement from Petitioners' attorney. Greenthread has had no opportunity to cross examine any witness about those assertions or see relevant documents, because Petitioners did not identify a declarant, other than Petitioners' counsel.

Second, "where governmental action seriously injures an individual, and the reasonableness of the action depends on fact findings, the evidence used to prove the Government's case must be disclosed to the individual so that he has an opportunity to show that it is untrue." *Greene v. McElroy*, 360 U.S. 474, 496 (1959). Here, Greenthread has received no notice of any evidence to support a finding for Petitioners under § 315(b). For example, it is undisputed that Petitioners have a customer-supplier relationship with time-barred parties and that such relationships can create privity. The Board has apparently determined that Petitioners have merely "a standard supplier-customer relationship" with Licensees. *E.g.*, Paper 18 at 11. However, neither Greenthread has not seen the documents governing Petitioners' relationships, or any other evidence to support a finding for Petitioners under § 315(b). Therefore, Greenthread has not had the "opportunity to show that [Petitioners' assertions about the facts are] untrue." *Id.*

X. THE AIA IS UNCONSTITUTIONAL.

The Board should dismiss this IPR, because the AIA violates the Supreme Court's non-delegation doctrine and the Constitution. "Congress generally cannot delegate its legislative power to [the Executive] Branch" without identifying an "intelligible principle" to guide the Executive's exercise of that power. *Mistretta v. United States*, 488 U.S. 361, 372 (1989). In determining whether a statutory scheme violates the non-delegation doctrine, Courts consider "(1) whether Congress has

delegated power to the agency that would be legislative power but-for an intelligible principle to guide its use and, if it has, (2) whether it has provided an intelligible principle such that the agency exercises only executive power." *Jarkesy v. Sec. & Exch. Comm'n*, 34 F.4th 446, 461 (5th Cir. 2022).

The power to determine whether a dispute proceeds before an "Article III court" or in an "agency adjudication" is a "legislative power" "that Congress uniquely possesses." *Id.* at 462. Here, Greenthread and Petitioners are currently litigating their disputes, including the issue of patent validity, in Article III Courts. *Greenthread, LLC v. Cirrus Logic, Inc.*, 23-cv-00369 (W.D. Tex); *Greenthread LLC v. OmniVision Technologies Inc.*, 23-cv-00212 (E.D. Tex.). In the AIA, however, Congress delegated to the Director the power to determine whether the PTAB should decide the very same dispute. In other words, the Director decides whether Greenthread "should receive *certain legal processes* (those accompanying Article III proceedings)" such as the protections of a jury trial and the clear and convincing evidence standard for patent validity. *Id.* (emphasis in original); *see also Microsoft Corp. v. i4i Ltd. P'ship*, 564 U.S. 91, 95 (2011) (affirming clear and convincing evidence standard).

In § 314(a), Congress told the Director when she can institute proceedings—i.e., only if "there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims"—but once that criterion is satisfied, the decision

to institute is committed "to the Director's unreviewable discretion" without any further guiding principle. 35 U.S.C. § 314(a); *United States v. Arthrex, Inc.*, 141 S. Ct. 1970, 1977 (2021); *Apple Inc. v. Vidal*, 63 F.4th 1, 6 (Fed. Cir. 2023). After making the threshold finding under § 314(a), the Director can institute or not institute for any reason, no reason, or a completely arbitrary reason, like the flip of a coin. She could institute every petition meeting the § 314(a) or no petitions at all, if she prefers, and need not give any reasons. Since Congress provided no intelligible principle for the Director to apply in deciding whether to institute IPR proceedings, the governing statute is unconstitutional and the Petition must be dismissed.

XI. CONCLUSION

For the foregoing reasons, Petitioners have failed to prove by a preponderance of the evidence that any Challenged Claims are unpatentable. PO requests the Board confirm the patentability of the Challenged Claims.

Dated: August 16, 2024

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CERTIFICATE OF WORD COUNT

The undersigned hereby certifies that the portions of the above-captioned **PATENT OWNER'S RESPONSE** specified in 37 C.F.R. § 42.24 have 13,976 words, in compliance with the 14,000 word limit set forth in 37 C.F.R. § 42.24(b)(1). This word count was prepared using Microsoft Word 2016.

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